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An Investigation into Theoretical State Aggression
and the Difficulties Surrounding its Psychometric
Quantification

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A thesis submitted to the University of Huddersfield in
partial fulfilment of the requirements for the degree of
Masters by Research in Psychology

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Abstract

To date, the General Aggression Model has been the most extensive method of measuring aggression, with media violence being used as a strong influence on aggressive behaviour within a western society. However, due to the consistent increase in realism portrayed within the media, a more contemporary method of measurement is required to ensure reliability in relation to current society trends. Due to the extensive range of psychometric scales available to measure trait aggression effectively, the current research aimed to develop a psychometric scale to measure the shifts in state aggression to ultimately coincide with the current trait aggression scales to create an overall extensive psychological measure of aggression. 354 self report questionnaires were developed based on four predominant factors identified from previous literature as influential on state aggression. They were separated into 177 consisting of questionnaire A and 177 consisting of questionnaire B. Using an opportunity based sample, 177 mixed gender (47.5% male and 52.5% female) participants were recruited. Ages ranged from 18 – 72 years (mean = 1.53, SD = 0.5, range= 54, with the average age group being 30 – 39). Factor analysis was employed in the form of principal component analysis (PCA), allowing factors to be extracted to enable the development of a reliable self report scale. However, the proportions of residuals highlighted a lack of reliability ($227 > 0.05$) suggesting that a state aggression scale could not be developed efficiently. Consequently, validity of the scale was not tested throughout the development process. The importance of hostility as an influential factor (24.378%) on the measurement of state aggression was highlighted within PCA as a strong element to focus on within future research on state aggression.

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Introduction

The current research focused on the development of a psychological measure of state aggression. From exploring previous research such as Farrar and Kremer (2009); Bushman and Anderson (2002), Spielberg, (1983) and Huesmann (1988), it became apparent that a psychological measure of state aggression was necessary to facilitate any future research, and understanding of state aggression, which to date does not exist. To demonstrate the lack of such a psychological measure, it is important to focus on aggression in general, and the methods that have been applied to measure aggression in the past at the outset.

Aggression as a term is extremely broad and therefore can be used to describe a variety of different situations and refer to a variety of different acts (Reber & Reber, 2001). Consequently, it is a very complex term to define (Anderson & Bushman 2002). Attempts have been made, such as Geen, (2001) who suggests 'aggression is the delivery of an aversive stimulus from one person to another' (Geen, 2001, p. 3).

Although this definition can be seen as useful due to its simplistic nature, it can also be argued that it is one-dimensional, and other aspects of aggression need to be acknowledged within such a definition. Reber (2001) identified that the motivations behind aggressive behaviour also play an influential role. Motivations behind the aggression include the individual's desire and feelings behind fear; wanting to put fear in others alongside the perpetrators personality type, for example, attempting to push one's own idea forward through the notion of aggression (Reber & Reber, 2001). Other factors having an influential role in the definition of aggression include; whether the aggressive act was intentional or unintentional; whether it was an actual act or an

aggressive thought, with the intent to carry out the action (Green, Richardson & Lago, 1988); whether the aggression was carried out with the intention to harm another or whether the individual expected the aggression to have the intended effects (Geen, 2001).

When focusing on aggression, there are a variety of sociocultural variables that need to be focused on, such as the Sex of participants, the community they are from, alongside gender influences and cultural influences on behaviour (Geen & Donnerstein, 1998). Different cultures hold different beliefs on the legitimacy of aggressive behaviour alongside the use of aggression as a tool of power and status (Geen & Donnerstein, 1998). These factors must be accounted for in the measurement of aggression; what may be counted as an aggressive act in one culture may merely be classified as a statement of power in another (Geen & Donnerstein 1998). For this reason, the current research is based on a western centric view of aggression; all research used is based on western culture.

Furthermore, many disciplines within psychology have contributed to the theory of aggression, such as Ethologists (Slater, 1980), social learning theorists (Bandura, 1877), cognitive behavioural psychologists (Bushman & Geen, 1990) and environmental psychologists (Geen, 2001). Supporting the notion that aggression is not a simplistic area to research and define. It has been noted by Ethologists that aggression can be evolutionary determined (Reber & Reber, 2001). For example, Ethologists believe that aggression occurs due to the widespread appearance of destructive behaviour caused by natural selection (Slater, 1980). It is suggested that natural selection occurs because an individual “Should follow their own self-interest, or to be more precise, that of their genes” (Dawkins, 1976, cited in Slater, 1980, p. 608).

Consequently, this statement implies that aggressive behaviour occurred due to each individual fighting to survive and to obtain what was important to them. Furthermore, Ethologists, such as Slater (1980), have suggested that aggression also occurred due to a physiological deficit, such as lack of food. In relation to animals, aggressive tendencies appeared when they had to fight for food to survive (Slater, 1980). This however, was less common in humans, due to the society in which they live; this analogy can be related to human aggression in terms of psychological deficits. It could be suggested that humans don't fight for things they necessarily need, but more so for things they want.

Unlike the Ethologists view of aggression, in Freudian terms (Buss, 1961), it is believed that aggression becomes apparent in humans due to the conscious manifestation of Thanatos (Reber & Reber, 2001). It has been suggested that death is the fulfilment of life (Dollard, Doob, Mowrer and Seers, 1939). Although humans are not aware of this, it is deeply hidden within their subconscious to eventually achieve death; this is done through the notion of aggression (Dollard et al., 1939). It is thought that "the stronger the death instinct in a person, the more necessary it is for him to direct the aggression outward against objects and people" (Buss, 1961, p.185). Furthermore, Thanatos is always combined with Eros to establish the ID; also known as the pleasure principle (Dollard et al., 1939), suggesting that destruction will always occur with construction. Subsequently, when an individual achieves something in life, it is suggested by Freud that destruction will also be apparent to try and bring the individual down; this would be shown as aggression (Dollard et al., 1939). Overall, aggression occurs in all parts of life in the same way that pleasure appears; it is dependent on the individual as to how much of their aggression is demonstrated in their actions.

Alternatively, environmental psychology suggests that genetic makeup, internal instincts and biological endowment create the potential for aggressive behaviour to become apparent, however the behaviour is actually demonstrated due to external, environmental influences (Bandura, 1983). The environment therefore determines the frequency in which an individual will demonstrate aggressive tendencies through providing triggers and situations that would cause the behaviour (Bandura, 1983).

Moreover, “Environmental conditions prime aggressive thoughts, feelings and dispositions to act” (Geen, 2001, p. 8). Ultimately, environmental psychologists suggest that everyone has the potential to display aggressive tendencies, however it is the role of the environmental situation to prime an individual’s aggressive thoughts, feelings and actions (Geen, 2001).

Alternately, it has been suggested by social learning theorists that aggression is learned through the observation of behaviour (Bandura, 1977). Social learning theory focused on aggression in a more general sense, suggesting that aggressive behaviour can develop and become apparent in any individual through the observation of behaviour carried out by family members, strangers and even behaviours portrayed in the media (Bandura, 1977). Consequently, new forms of aggression evolve rapidly through individuals synthesising different aspects of one’s own aggressive tendencies into their observed aggressive behaviours. Ultimately, people acquire aggressive responses in the same way they acquire all other behaviours in other situations (Bandura, 1983). Overall, social learning theory suggests that aggressive behaviour is essentially learned in the same way as all other behaviour (Bandura, 1977).

Subsequently, focusing on literature within developmental psychology supports the notion of aggression being learnt in the same way as all other behaviours (Bandura,

1977). Bandura, Ross and Ross (1961) demonstrate this notion through observing children between the ages of 37 and 69 months in a play situation (Bandura et al., 1961). They found that children with no prior aggressive exposure played in a calm manner assembling tinker toys, compared to the aggressive condition whereby children had previously been exposed to aggressive behaviour. After initially assembling tinker toys, these children then began to demonstrate aggressive play towards a bobo doll after approximately one minute (Bandura et al., 1961). This demonstrates how aggressive behaviour can be learnt even before an individual's trait aggression levels are developed efficiently (Bandura et al., 1961).

Furthermore, developmental psychology can demonstrate the impact of early life and the influence experiences can have on an individual's state aggression levels (Röll, Koglin, & Petermann, 2012). This is in terms of emotional regulation, and how a child learns to deal with internal emotion regulation in early life (Röll et al., 2012).

Aggression is a common factor that occurs within nursery settings, due to children learning how to internalise their emotional thoughts and feelings at this stage (Röll et al., 2012). Unsuccessful internalisation of emotional regulation at this stage can have great impacts of aggressive tendencies in later life (Röll et al., 2012), therefore demonstrating the important role developmental psychology plays in the influence of aggressive behaviours.

In an attempt to research the ambiguous notion of aggression, the General Aggression model (GAM) was created (Bandura, 1977; Berkowitz, 1989). The GAM integrated mini theories of aggression such as; the cognitive neoassociation theory, social learning theory, script theory, excitation transfer theory and social interaction theory, to develop an overall cohesive theory of aggression (Bushman & Geen, 1990). This to date, has

been an effective measure of aggression, however, more up to date measurements need to be created adapting the theories the GAM created to enable measurements of aggression to be obtained in relation to current society and cross culturally.

It is thought that the General Aggression Model is actually an exemplified version of the social cognitive model in psychology. This suggests that through viewing violent media; cognitive priming, excitation and arousal allow aggressive behaviours to be learnt (Huesmann & Taylor, 2006). Furthermore, it is thought that aggression is a process of cognition where scripts and schemas develop through observation of behaviour to influence future behaviour (Ferguson & Dyck, 2012). This is an unconscious process where the individual experiencing the aggression is passive in the process (Huesmann & Taylor, 2006). Ultimately, the social cognitive model which the GAM is based on is an elaborate version of social learning theory which suggests that aggressive behaviours occur as a result of cognitive priming, excitation and arousal, leading to imitation of behaviours (Huesmann & Taylor, 2006).

The GAM was initially created to develop a comprehensive measure of aggression, integrating mini theories together to create an overall measure of aggression (Bushman & Anderson, 2002; Carnagey et al., 2004; DeWall, Anderson, & Bushman, 2011).

However, it has been suggested that despite trying to create a comprehensive theory, the GAM actually remains as a complex social cognitive script theory (Bushman & Anderson, 2002). This is due to violent media, within western society, leading to aggressive scripts developing, which in turn define future situations (Huessmann, 1986). The script is selected in a situation and the person then assumes the role of the script and acts accordingly (Huessmann, 1986). These scripts can become part of the semantic memory (Huessmann, 1986). Semantic memory is a critically important

subcomponent of the brain that allows interpretation of meanings of words and sentences, the ability to recall information from previous events, alongside recognition of objects and the ability to learn new information (Saumier & Chertkow, 2002). Subsequently, once the scripts become part of the semantic memory they can be recalled at any time (Huessmann, 1986).

Furthermore, despite allowing biological and personological factors of aggression to be taken into account, the GAM has been criticised by Ferguson and Dyck (2012) for not elaborating on factors such as personological factors and focusing primarily on the cognitive factors such as script theory (Ferguson & Dyck, 2012). Equally, the GAM incorporates factors such as personality as a construct of script theory suggesting a dismissal of its importance in the measurement of aggression (Dewall et al., 2011). Furthermore, it has been stated that a great lack of emphasis has been put forth on personality as an influence of aggressive behaviour, with much research focusing on the influence of social determinants (Bushman & Geen, 1990). This supports Dewall et al. (2011) when criticising the GAM for incorporating personality into script theory, suggesting it may actually be extremely influential (Bushman & Geen, 1990).

The GAM holds that through exposure to society and learning, social knowledge scripts are created overtime (Bushman & Anderson, 2002). This in turn represents individual learning trials through direct observation or through the media (Bushman & Anderson, 2002) which would suggest that social learning theory is extremely influential within the GAM as an explanation of aggression (Bandura, 1977). Over time, through repetition of similar events, the social knowledge scripts are reinforced and strengthened which ultimately influences the individual's personality, possibly in terms of an aggressive personality, depending on the level of violent and neutral exposure

(Anderson & Bushman, 2002). In relation to developmental psychology influencing an individual's aggression from a young age, the notion of observing violent media leading to the development of social knowledge scripts could occur in children as well as adults. This would therefore emphasise the impact violent media can have on long term aggression (Huessmann, 1986). As mentioned within the social learning theory explanation of aggression, the more violent media children view, the more time the aggressive scripts have to develop and therefore impact adult behaviour (Bandura, 1970).

In relation to short term exposure of violent media, social knowledge scripts are primed through exposure which can result in the individual expecting to experience aggressive situations (Anderson & Bushman, 2002). This can result in the individual perceiving ambiguous stimuli to be hostile based (Anderson & Bushman 2002). This is referred to as the hostile attribution bias (Anderson & Bushman, 2002) and can be used as an explanation as to why normally non aggressive personalities can display aggressive behaviour in an ambiguous situation due to short term exposure of violent media.

Anderson and Bushman (2001) have put forth clear support for the link between playing violent video games and an increase in aggressive behaviours (Anderson & Bushman, 2001). Furthermore, they propose that this is done through the priming of already established aggressive schemas within the brain (Goodson, Pearson & Gavin, 2010) alongside the development of an aggressive state through the media experience and an increase in physiological arousal while playing a game (Goodson et al., 2010). Aggressive schemas are thought to develop to enable an individual to react in an appropriate way within a similar situation (Anderson & Bushman 2001). Subsequently, it was proposed that through playing violent video games, the schemas that developed

would facilitate how the individual reacts in a similar but real life situation (Goodson et al., 2010) therefore relating the fantasy world of gaming to real life. Overall, in terms of the GAM in a western culture, repeated exposure to violent video games increases the occurrence of aggressive behaviour (Anderson & Bushman, 2001).

A further criticism of the General Aggression Model is its lack of exposure to real life violence (Ferguson & Dyck, 2012). The majority of research the GAM has been used within has primarily focused on media violence rather than relating it to real world violence. This could create an issue in its validity as it is meant to be a comprehensive model of aggression (Bushman & Anderson, 2002; Carnagey et al., 2004; DeWall et al., 2011), yet is primarily focused on aggression created through fictional situations within the media (Ferguson & Dyck, 2012). This therefore means that results cannot be generalised across cultures due to the media not being available to certain cultures outside of a western society. Further supporting this, Ferguson (2007) focused on meta-analysis of 17 published studies within the field of media violence and aggression. Results indicated that there was publication bias apparent for both experimental and non-experimental studies (Ferguson, 2007). Subsequently, it has been suggested within the GAM that modern technology such as exposure to video game violence increases an individual's aggressive tendencies through physiological arousal, aggressive effects, aggressive cognition and aggressive behaviour (Anderson & Carnagey, 2009). This is due to the increase in realism of action portrayed in video games, due to the improvement in technology, allowing the game to be more representative of modern day society and to allow an improvement of visual interpretation therefore increasing realism (Barlett et al., 2007). Due to an increase of technology occurring in a more modern society, this factor has not been included in some of the previous research,

which could result in the GAM to become un-reliable and out of date. However, there is some scepticism surrounding this notion (Anderson et al., 2010) with the suggestion that due to publication bias, there is little to no evidence demonstrating media violence having an effect on aggression (Ferguson & Kilburn, 2009) which could be held as a very strong criticism towards the GAM. This is due to the GAM basing much of its research on the impact of violent media (Bushman & Geen, 1990). Consequently, more up to date research is fundamental within aggression to account for the increasing advances in technology.

Moreover, Ferguson and Dyck (2012) believe that the GAMs credibility will follow the route of the psychoanalytical approach to psychology due to the lack of empirical evidence in testing the theory, alongside numerous areas of the theory to already be considered as false (Ferguson & Dyck, 2012). Subsequently, it is important that a measure of aggression is created that will allow reliability and validity alongside the ability to be empirically tested and non falsifiable. This should be done in the form of a psychometric state aggression scale, which can be put with the already established trait aggression scale and therefore focus on all areas of aggression as a whole to gain an overall reliable measure.

Despite the complexities and ambiguity surrounding aggression, it has previously been identified that there are two components of aggression causing conflict; this is the difference between trait aggression and state aggression (Butcher & Spielburg, 1983). Furthermore, it has been suggested, particularly within the GAM, that media violence such as television and video games, increases the likelihood of aggression occurring in both short term; known as state aggression, and long term; known as trait aggression, situations (Anderson, 2003). To date, one fourth of research into aggression has focused

primarily on trait aggression rather than state measures of aggression (Anderson & Bushman, 2001; Sherry, 2001; Farrar & Kramer, 2009). Currently, the use of trait measures within aggression research rather than state is used to reduce the measured effects of media violence on aggression (Farrar, Kramer & Nowak, 2006). Focusing on trait – state aggression is focusing on aggression as a whole; trait aggression is whether the aggression is a disposition of an individual's personality (Butcher & Spielberg, 1983) or whether the aggression has occurred due to the individual's emotional state at the time (Butcher & Spielberg, 1983). Additionally, it is the difference between long term aggressive reactions, known as trait and short term aggressive reactions, known as state (Anderson et al., 2010) therefore the development of a state aggression scale may allow the affects of aggression to be measured more validly (Farrar et al., 2006).

Focusing further on an increase in modern technology influencing aggression, the GAM explains the relationship between state and trait aggression further as an interaction with one another to create overall aggression (Barlett, Harris & Bruey. 2008). Subsequently, the GAM predicted that personal factors such as an individual's personality, otherwise referred to as a trait, and situational factors, such as real life violence, or as mentioned previously, the realism portrayed in video games, interact with one another to influence an individual's internal state (Barlett et al., 2008). This therefore creates short term aggression (Barlett et al., 2008). This in turn can repeat, eventually influencing the individual's trait aggression in the long term (Anderson et al., 2010). This notion is referred to as the violent-content hypothesis (Anderson et al., 2010) whereby aggressive scripts must be primed through exposure to violent stimuli, followed by the increase in aggressive arousal to allow aggressive behaviour to become apparent (Anderson et al., 2010). It is thought that immediate short term effects of aggression can be demonstrated when existing scripts or schemas are primed (Anderson et al., 2010). This

can occur through very brief exposure to violent stimuli, or if the person already has an aggressive script which is used as a base for the aggressive behaviour to develop from (Bushman & Huesmann, 2006). Furthermore, aggressive scripts can develop initially from increased exposure to aggressive stimuli for example, in the form of a violent video game (Anderson et al., 2010). For example, the more violent media viewed by an individual, the more 'normal' the behaviour will appear through exposure. This will develop into a knowledge script which will become the natural way to react in a real life similar situation, which in turn can cause long term effects through repeated exposure (Anderson et al., 2010). Consequently, the aggressive related knowledge structure becomes part of the individual's personality and therefore part of their trait aggression (Anderson et al., 2010).

Although a great deal of research has focused on the importance of trait aggression, the violent content hypothesis demonstrates that states also play an influential role in an individual's aggression and therefore need to be investigated in more depth (Bushman & Geen, 1990). This is due to state aggression being such a crucial factor influencing a person's trait aggression in the long run. If state aggression is focused on, then hopefully an overall view and measurement of aggression will be available.

Trait aggression has been researched to a great extent; with very little focus being given to state aggression (Anderson & Bushman, 2001). This is most likely due to trait aggression being easily measured using psychological methods (Geen & Donnerstein, 1998; Barlett et al., 2008). However, thoughts are linked to emotional reactions and behavioural tendencies (Anderson & Murphey, 2003) suggesting that, despite the difficulties of measuring aggression, it should be measured as a whole rather than just

trait aggression alone. This again is further evidence supporting the notion that both state and trait aggression need to be measured psychologically, before an effective measure of aggression can be made, unlike current research (Reber & Reber, 2001; Barlett, Harris & Baldassaro, 2007) which is mainly an effective psychological measure of trait aggression, not state.

Furthermore, the GAM (Anderson et al., 2010) has been implemented to ultimately demonstrate how the interaction of a person and a situation can either increase or inhibit an individual's learning (Butcher & Spielburg, 1983). It has however, been suggested that all learning is mediated by internal states; therefore each individual encounter leads to another learning trial (Butcher & Spielburg, 1983). This would suggest that when an individual experiences state aggression, they will emotionally experience anger or aggression. However, overtime, through experiencing similar state aggression, schemas will develop and the state reaction to a situation becomes part of an individual's personality; leading to trait aggression (Anderson et al., 2010). Ultimately, children learn scripts to aid their future social behaviour (Huessmann, 1986). These scripts can be retrieved at any time so the individual can recall how to react in certain situations (Huessmann, 1986). In relation to a western centric society, it is believed that children observe media violence through various forms of social media which in turn creates aggressive scripts (Huessmann, 1986). These cognitive scripts are then retrieved at a later date and the children then enact behaviour deemed appropriate by the media in the social society, in the form of aggressive behaviour (Huessmann, 1986).

To date, little research has focused on cognitive priming to create aggressive scripts, despite the importance it appears to have on the development of aggression (Rule, Taylor & Dobbs, 1987). Overall, it appears to be essential to focus on each aspect of

aggression individually, therefore a measure of state aggression and trait aggression is essential to ultimately coincide to create an overall effective psychological measure of the complexities of aggression.

Perception is an influential aspect in the development of social scripts (Huesmann, 1986). Depending on how an individual perceives a previous event to be will have an effect on how they react to future situations (Tzafestas, 1995). The internal motivation of perception is extremely important (Tzafestas, 1995). It deciphers how an individual will react to an external event depending on how they perceive the event (Tzafestas, 1995). If the individual perceives an event to be a regular, safe situation, they will respond in a cooperative manner (Tzafestas, 1995), which will therefore impact their cognitive priming to allow for positive scripts to be developed (Huesmann, 1986). Alternatively, if the individual perceives an event to be hostile, dangerous or unpleasant, they are more likely to react in a hostile manner to the situation (Tzafestas, 1995), which will therefore lead to the development of more aggressive scripts for future situations (Huesmann, 1986).

As previously mentioned, measuring trait aggression has proven much easier than measuring state aggression (Green & Donnerstein, 1988). This is however, in terms of a psychological measure, rather than a physical measure. This is due to the emphasis trait aggression has on personality (Green & Donnerstein, 1988). Personality already has an established method of measurement within the school of Psychology, such as the big 5 Personality test (Costa & McCrae, 1992). Tests such as this, allowed for the psychological measurement of trait aggression to be easily adapted, due to its similarity (Green & Donnerstein, 1988).

Similarly to the measure of personality types, self report scales are frequently used to gain an effective psychological measure of trait aggression. For instance, the Buss – Durkee hostility inventory (BDHI) (1957) which is a self report measure of aggression, was initially created based on behavioural conceptualisation of aggression (Lange et al., 1994). It assesses the individual's beliefs about their own hostility levels through a number of self descriptive statements which summarise an individual's own hostile feelings, beliefs and behaviours (Anderson, Deuser & DeNeve, 1995). The Buss – Durkee hostility inventory consists of 66 questions separated into seven sub sections (Felsten, 1996). These sub sections were allocated to the scale based on the definition of aggression provided by Buss (1961) (Lange et al., 1994). Factor analysis was later conducted on the seven subscales, identifying two main factors; neurotic hostility and expressive hostility (Buss & Durkee, 1957). The issue of replicability of the BDHI is a concern due to analysis by a number of researchers finding various different influential factors and generating a variety of different findings (Becker, 2007). Subsequently the Buss Perry Aggression Questionnaire (BPAQ) was introduced to overcome these issues (Becker, 2007). Similarly to the BDHI, it also had a Likert scale format to respond rather than a true/false layout resulting in participants responding in a binary fashion (Becker, 2007).

Buss and Perry later adapted the BDHI further in 1992 (Lange et al., 1994). After extensive factor analysis they created a new BDHI consisting of 29 questions divided into four subscales; physical aggression, verbal aggression, anger and hostility (Lange et al., 1994). In the development of the BPAQ, the issue of social desirability was attempted to be overcome through careful wording of questions and providing justification for an aggressive response within questions, for example; if someone hit me I would hit back (Becker, 2007). To test for social desirability responses, Edwards

(1953) created a scale whereby social desirability measures are taken from the method of successive intervals (cited in Becker, 2007). This test was run on the BPAQ and although it was found to be effective to some extent in the elimination of social desirability, scores within the upper .20's of a correlation indicate social desirability, therefore the issue was not resolved completely (Becker, 2007).

Furthermore, The BPAQ results fail to interpret the results of the factor analysis in terms of the four factors identified in a higher order analysis (Becker, 2007). It is not explained how the four factors interact with one another and how without one factor, the others may not be demonstrated efficiently therefore, this leaves the question of validity of the order and influence of the four factors selected (Becker, 2007). Despite the limitations discovered, the adaptation of the BDHI to the BPAQ demonstrates the adaptivity of self-report scales over time again reinforcing their importance within psychological research. A reliable and valid scale can be adapted as society evolves, allowing it to continue to be representative of the general population over time (Becker, 2007). The adaptation of the scale allowed for the important stance of physical aggression within this test by correlating the hostility score with the physical aggression score to create an overall measurement of aggression, therefore enhancing the reliability of this scale (Green & Donnerstein, 1988). However, it should be noted that simply rewording a scale cannot be representative enough to measure the complexities of state aggression compared to trait (Farrar et al., 2006). In relation to the measurement of state aggression the BPAQ has been used on some occasions, which would indicate a limitation of the scale (Becker, 2007).

Despite not being perfect, to date, the Buss – Durkee Hostility inventory has been a useful self-report measure of hostility (Felsten, 1996). It is able to hold validity due to it

consisting of several subscales which have been broken down into manageable factors to focus on through the method of factor analysis (Felsten, 1996). However, in relation to health psychology in which the scale was initially used to focus on relationships between hostility and heart disease, the BDHI could be a stronger measure (Felsten, 1996). This is due to it being categorised as a measure of personality, categorising hostility as a component of type A personality and therefore a trait not a state (Felsten, 1996). In relation to personality measures in the form of self-report scales, the 5 factor model (Costa & McCrae, 1992) is thought to be a more valid reliable measure due to its emphasis on domains, providing an overall focus on personality (Felsten, 1996). Hostility is included within one of these domains (Costa & McCrae, 1992) within the 5 factor model.

Another common method of measuring trait aggression is the Buss and Perry Aggression Questionnaire (Barlett et al., 2008). The Buss and Perry aggression questionnaire consists of 29 items in a Likert format. It is further split into four subsections consisting of verbal aggression, physical aggression, hostility and anger (Barlett et al., 2008). Despite providing a plausible psychometric self report measure of trait aggression, the Buss and Perry aggression questionnaire has been heavily criticised within the field of psychology as a measurement of aggression for a number of reasons (Gerevich, Bácskai & Kzober, 2007).

The first issue that has arisen in terms of criticism is the validity of the scale (Gerevich et al., 2007). This is due to the scale being tested on restricted samples of the adult population, meaning it is difficult to generalise the results (Gerevich et al., 2007; Felsten & Hill, 1999; Bryant & Smith, 2001). This creates further issues when focusing on what the scale was created to do (Gerevich et al., 2007). Due to the emphasis the

scale has on measuring aggression, it could be classed as an important area of research, especially within areas where the prevalence rate of aggression is thought to be high (Van Praag, Plutchik & Apter (1990). Subsequently due to a restricted sample of participants used to test the validity of the scale, it is likely that it will not be representative of the target participants (Van Praag et al., 1990). Collani and Werner (2005) attempted to overcome this issue through using the scale on a more generalised sample (Collani & Werner, 2005). This however proved difficult to do, concluding that they had sample bias towards younger participants from colleges (Collani & Werner, 2005). This highlights the importance of gaining a reliable sample to allow for a valid self-report scale to be produced.

A further criticism highlighted by several authors regarding the Buss and Perry Aggression Questionnaire (Bernstein & Gesn, 1997; Vigil-Colet, Lorenzo-Seva, Codorniu-Raga & Morales, 2005; Gerevich et al., 2007) is the unusual distribution of the five item categorical ratings within the Likert scale (Gerevich et al., 2007). This restricted the range that was available for different factors to form, suggesting that actually, a higher number of factors were recognised within factorial analysis than were actually involved within the scale (Bernstein & Gesn, 1997). This would suggest that prior to publication of the scale, complex factor analysis should have been undertaken to ensure the correct number of factors towards aggression were within the scale already, rather than analysis of the results from the scale indicating more factors.

A further self report scale created to measure aggression is the Expagg. The Expagg was designed by Campbell, Muncer and Coyle (1992) based on previous observations of male and female interpretations of aggression, to measure different social

representations of aggression (Campbell et al., 1992). This was due to literature suggesting men view aggression in an instrumental manner, as a way of controlling others whereas women view aggression from an expressive perspective whereby aggression is seen to be due to a loss of control (Campbell et al., 1992). The scale itself consists of 20 questions, each ending with either an instrumental or expressive response which would indicate the aggressive type dependant on the participant's responses (Campbell et al., 1992).

This initial Expagg scale was criticised by Archer and Haigh (1997) for not measuring aggressive social representation, but aggressive beliefs, therefore suggesting an individual can have a mixture of instrumental and expressive beliefs depending on the situation put forth (Archer & Haigh, 1997). They therefore created a revised version of the Expagg consisting of 40 items; 20 instrumental and 20 expressive, allowing a representation of a combined belief towards aggression to be recorded. This was later further adapted into a Likert scale form to allow for reliable quantitative data to be produced (Archer & Haigh, 1997).

Principle component analysis was conducted on the Revised Expagg and it was concluded that the scale had a two dimensional interpretation which allowed researchers to use either the instrumental subscale or expressive subscale independently; depending on what they were measuring (Forest, Shevlin, Eatough, Gregson, & Davis, 2002). Subsequently, it was later suggested through factor analysis that the Revised Expagg could be adapted further to two, 8 question, unidimensional subscales (Forest et al., 2002). This was completed through selecting the highest factor loadings and using them for each respective subscale (Forest et al., 2002). Subsequently the use of principle component analysis and the breakdown of subscales through

focusing on factor loadings imply it to be an effective, reliable method for the development of scales (Forest et al., 2002). However, this could be viewed as a very limited method focusing on the psychometric properties of scale when it is fully developed; therefore confirmatory factor analysis is needed to emphasize the validity of the Revised Expagg (Forest et al., 2002). When confirmatory factor analysis of the Revised Expagg was conducted by Forest et al., (2002) it raised concerns regarding the reliability and validity of the scale (Forest et al., 2002) therefore suggesting that this form of psychometric scale for measuring aggression is not as objective as initially thought and further work needs to be conducted.

Physical measurements are used within trait aggression to provide support for the psychological measurement (Barlett et al., 2009). This is due to heart rate being correlated to increased aggression (Felston, 1996; Anderson et al., 1995). If heart rate is fast and psychological measures indicate aggressive tendencies, the support for aggression is higher (Anderson et al., 1995). A common test known to report physical measurements along with psychological measurements of trait aggression is the Taylor Competitive Reaction time task which uses the measurement of heart rate and reaction time to create a physical measure of aggression (Anderson et al., 2010). This test, by demonstrating the evidence of physical aggression within the tests, provides evidence that the psychological measurements being provided are effective, reliable measures of aggression (Anderson et al., 2010). Taylor (1967) developed the Taylor Competitive Reaction Time Task (TCRTT) to measure aggressive responding within a lab setting (Cherek, Moeller, Schnapp & Dougherty, 1997). Within the TCRTT, a participant was in competition against a fictitious opponent in a reaction time task (Cherek et al., 1997). The loser of the reaction time task received an electric shock as punishment. To ensure it appeared real to the participant, they selected the intensity of shocks to be received

prior to each trial and the participant loses around half of the trials (Cherek et al., 1997). If they do not receive a shock after the trial, it means the participant has 'won' against their opponent (The fictitious character) and is therefore informed of the level of intensity of shock that was given to the opponent (Cherek et al., 1997). In later modified versions of the TCRTT, electric shocks were replaced with sound blasts to address ethical issues (Anderson & Dill, 2000). To manipulate aggression, the participant was told that their opponent was constantly increasing the shock intensity they will receive (Cherek et al., 1997). Subsequently, the aggressive responses were measured through the level of intensity the participants requested their opponent to receive. To measure the physiological effects of aggression, physical measurements were recorded throughout such as heart rate and blood pressure (Cherek et al., 1997).

Due to the TCRTT being a laboratory experiment, it was regularly criticised regarding the level of external validity it had (Baron & Richardson, 1994). For example can such controlled conditions relate to any activity within real life or was the laboratory setting too unreal therefore was the TCRTT actually measuring real aggression when it cannot be related to the real world (Cherek et al., 1997). Furthermore, in relation to the Taylor competitive reaction time test (Anderson & Dill, 2000), it was reported by Ferguson (2007) that there was no evidence within the research using this scale to indicate external validity. This was due to it not being applied to a representative population. Furthermore, in relation to ethical issues it should be noted that each participant within the TCRTT experienced deception as they believe they are providing electric shocks to an opponent when actually the opponent is fictional (Ferguson et al., 2008).

Within these measures of trait aggression, state aggression has been distinguished throughout, but not focused on solely due to the complexities surrounding effective

measurement (Barlett, Anderson & Swing, 2009). Furthermore, it was suggested by Barlett et al. (2009) that the primary cause of aggression was difficult to distinguish due to three internal states being inter-correlated (Barlett et al., 2009). This suggested that not only the measurement of state aggression was problematic within research, but also identifying the notion itself; again relating back to the issue surrounding defining aggression as a whole (Reber & Reber, 2001).

It has however, been suggested by Barlett, Harris and Bruey (2008), when focusing on ‘the effects of blood in violent video games on trait aggression,’ that the three internal states that are apparent consist of psychological arousal, feelings and thoughts (Barlett et al., 2008). Consequently, Barlett et al., (2008) partly concluded within their research, that the three internal states mentioned previously, lead to aggressive behaviour through interacting with one another to create a decision process (Barlett et al., 2008). This conclusion became apparent due to Barlett et al., (2008), using a hostility scale as an attempt to gain a state psychological measure within their trait aggression research (Barlett et al., 2008).

The state hostility scale was initially created by Anderson et al. (1995) to use within their research on the effects of temperature on hostility levels (Anderson et al., 1995). Within the initial study the state hostility scale was described to participants as a current mood scale and was used to measure state hostility levels in relation to temperature after video game play (Anderson et al., 1995). It was a self report, 5 point Likert scale measurement where participants were instructed to state how much they agreed or disagreed with mood statements (Anderson et al., 1995). The scale consisted of 35 statements containing both hostile and anger related adjectives, all of which began with the statement ‘I feel...’ (Anderson et al., 1995) for example; ‘I feel discontented’ and ‘I

feel polite' (Anderson et al., 1995). Questions such as the latter example were reversed scored and all scores were accumulated to create an overall state hostility score (Anderson et al., 1995). Physiological measures such as heart rate were taken alongside the state hostility scale to allow validation of results in relation to the physical effects of aggression (Anderson et al., 1995). Results of the state hostility scale demonstrated that as the temperature increased, so did the individual's hostility score (Anderson et al., 1995) alongside their hostile cognitions.

The use of a hostility scale to measure state aggression has become more common in recent years (Barlett et al., 2008), due to the close link hostility has with state aggression; hostility is actually a state, therefore is a large contributing factor to the overall measure of state aggression (Barlett et al., 2008). This however, suggested that it was not an effective measure of state aggression individually; rather it was measuring an aspect of state aggression known as hostility. Subsequently, many other researchers have used hostility scales in an attempt to measure state aggression.

Through evaluating studies that have used a state hostility scale as a measure of state aggression, various limitations become apparent. Arraiga, Esteves, Carnerio and Monterio (2006) used the state hostility scale to measure the effects of violent computer games. They concluded a limitation of the current state hostility scale was the lack of validity in relating results to actual behaviour (Arraiga et al., 2006). This was due to participants writing down how they think they will react in a situation and not recording physiological factors to support the results (Arraiga et al., 2006). A further limitation is potential of participants guessing the expectation of the research and therefore answering accordingly due to it being a self report scale (Arraiga et al., 2006). Furthermore, social desirability could become an issue (Arraiga et al., 2006) due to the

scale being a self report format, participants may respond in a way that makes them look socially desirable. While using the state hostility scale to measure how long the short terms effects of video game violence last, Barlett et al. (2009) stated that a limitation of their research was not being able to precisely determine the length of time the participants took part in each area of the study, due to three different factors being manipulated (Barlett et al., 2009). This created difficulties in defining increases on heart rate, aggressive feelings and aggressive thoughts from the baseline measures (Barlett et al., 2009). Future research would therefore need to allocate clear conditions to allow for comparisons (Barlett et al., 2009).

Finally, it has been established that state aggression is very complex due to the emphasis it has on emotions, making it hard to measure (Larson, 2000). Despite hostility being conceptualised as an internal state variable (Barlett, Harris and Baldassaro, 2007), this did not account for it to act as a measurement of the whole of state aggression. Moreover, it was found by Arraiga et al., (2006) when focusing on ‘the impact of violent computer games on state hostility, state anxiety and arousal,’ that video game violence can have an immediate effect on state hostility, however, it did not have the same impact on state anxiety (Arraiga et al., 2006). Consequently, this demonstrated a major limitation of using a hostility scale as a sole measure of state aggression. If state anxiety was not immediately affected by the video game violence, it just emphasis’s the suggestion that hostility alone cannot account for the whole of state aggression, but merely a component of it. A more reliable measure is needed to ensure an overall reliable measure of state aggression is gained.

Despite the state hostility scales limitations, it has highlighted some important factors for the future measurement of state aggression. For example, it has become apparent

that self report scales are not only effective at measuring aggression; but also at measuring emotional factors (Barlett et al., 2009; Zillmann, Johnson & Day, 1974). Furthermore, Barlett et al. (2007) noted when measuring hostility with a single question: 'How hostile do you feel?' (Barlett et al., 2007) that in order for the results to be effective, responses for the question must be provided immediately after reading (Barlett et al., 2007). Subsequently, it has been noted that due to aggressive thoughts being emotionally based, they can actually disappear four minutes after violent video game play (Zillmann, Chen, Knoblock & Callison, 2004). This suggested that when measuring state aggression, responses must be recorded within four minutes of manipulation to ensure a reliable measure.

Consequently, other forms of self report scales have been used in an attempt to gain a reliable measure of state aggression. For example, Bushman and Geen (1990) suggested that self report scales were effective due to their focus on the recall of events (Bushman & Geen, 1990), resulting in self report scales being associated with the basic priming function of violent stimuli (Bushman & Geen, 1990). Violent video games are an effective manipulation method for measuring aggression; therefore in theory, self report scales should effectively measure the behaviour after being manipulated due to the association between violent stimuli and recall. Within their research on cognitive-emotional mediators and media violence on aggression, Bushman and Geen (1990) used an Emotional Susceptibility scale to measure state aggression, due to its relevance to aggression emotionally (Capara, 1986). As within other research, a hostility scale was also used. Results showed a link between hostility and increased emotional aggression, again demonstrating the important link between the two, and demonstrating the effectiveness of self report scales (Bushman & Geen, 1990).

Despite the self report scales mentioned not measuring state aggression; as the current research aims to do, they do highlight the positive and negative aspects of using self report measures. This allows a good assessment of the evaluation of self report scales for the current research to focus on in the development of the current self report scale. Overall, self-report measures allow groups to be studied at the same time which is cost and time effective in relation to research compared to individual structured interviews (Felsten, 1996). They also allow the same level of information to be gained depending on the structure of questions (Felsten, 1996). Self report measures allow time and cost effective measures of aggression to be gained, unlike behavioural measures of aggression which can also lead to ethical implications (Farrar, Kramer & Nowak, 2006). However, without careful construction of the scale and reviews of previous literature prior to help with the creation of a self-report scale to ensure all current comprehensive measures are researched; the self-report measure can have limitations in the form of psychological weakness and lack of validity (Felsten, 1996). Furthermore, social desirability can become an issue within self report scales as the participant answers questions in a way they think makes themselves look better and therefore less aggressive (Krish, 1998).

Despite self report scales being demonstrated as an effective measure of trait aggression; and used for measuring aspects of state aggression, such as hostility, other methods have been used within research in an attempt to effectively measure state aggression. The Taylor competitive reaction time test is another method used within research to gain a measurement of state aggression (Chermack & Giancola, 1997). This is due to the validity the TCRTT appears to have in relation to measuring physical signs of aggression which can be related to emotional reactions (Chermack & Giancola, 1997). To ensure reliability, emotions were recorded several times throughout the trials

(Chermack & Giancola, 1997) using a two part scale to measure negative emotions and positive emotions (Chermack & Giancola, 1997) and them compared to the reaction times within the TCRTT (Chermack & Giancola, 1997). Despite finding an association between emotions and reaction time, it was criticised as not being sufficient evidence to demonstrate that emotions mediate relationship with the provocation of aggression (Chermack & Giancola, 1997). Furthermore, this test of state aggression was conducted on males alone and therefore cannot be generalised to the general population without females being taken into account when measuring (Chermack & Giancola, 1997).

Currently, past research has focused on the physiological measures of aggression alongside the cognitive elements due to the importance of these measurements and the ease of doing so (Goodson et al., 2010). Furthermore, it has been noted that psychometric measures of aggression would also show an influence from video game violence (Funk, Bechtoldt-Baldacci, Pasold & Baumgartner, 2004; Uhlmann & Swanson, 2004) yet to date a psychometric state aggression scale has not been produced. To date, story stems have been employed to measure aggression (Goodson et al., 2010; Anderson & Bushman, 2001; Barlett et al., 2007; Giumetti, & Markey, 2007).

Story stems are another established method within the measurement of aggression to attempt to gain a subjective, qualitative measure of state aggression. Story stems are small scenarios used within research that tell a story or explained a situation that a character may be in, for example in a car crash, or an argument (Anderson & Bushman, 2002). They can be used from previous research, or created by the researcher at the time of the research (Anderson & Bushman, 2002). Due to a successful use of story stems being used in research by Dill, Anderson, Anderson and Deuser (1997), and Rule, et al.

(1987) (Anderson & Bushman, 2002); Anderson and Bushman (2002) used the same open ended story stems in an attempt to measure aggression and hostile expectations on violent video games (Anderson & Bushman, 2002). Participants were asked to play either a violent or non violent game and then had to read an ambiguous story stem, ending with the phrase; ‘what happens next?’ (Anderson & Bushman, 2002). Each story stem consisted of a potential interpersonal conflict, consisting of a car accident, the character persuading a friend to do something or the character going to a restaurant (Anderson & Bushman, 2002). Participants were then asked to make a list of 20 things the main character may do, say, feel or think from reading the scenario (Anderson & Bushman, 2002). Results demonstrated that, as predicted, participants who had played the violent video game expected the main character in the story stem to react more aggressively than those who played the non violent video game (Anderson & Bushman, 2002). This demonstrates how aggression can effectively be measured from video game violence through story stem responses. This however, does not allow for a quantitative self report measure in the form of a psychometric scale to be used as a measure of aggression, it relies on a qualitative interpretation of a scenario.

Similarly, Barlett et al. (2007) employed story stems to measure state aggression while focusing on aggression and video games; however he used them in a slightly different manner (Barlett et al., 2007). Although the story stems were still open ended, Barlett et al. (2007) asked participants to respond to the story stems as if they were the character rather than just what the character will do next (Barlett et al., 2007). Alongside taking the point of view of the character, participants were asked to respond on a Likert scale. They had to mark how likely they would be to respond violently after a blatant negative action was made against them (Barlett et al., 2007). Story stems within this research consisted of sports stories, childhood stories and judge stories, all including some form

of aggressive act or conviction made against the main character; from which participants must take the point of view of (Barlett et al., 2007). Alongside the story stems, hostility was measured through a single question asking participants; ‘how hostile do you feel?’ (Barlett et al., 2007).

Results suggested that, in consistency with Anderson and Bushman (2002), violent video game play resulted in more negative reactions on story stems than non violent video game play (Barlett et al., 2007) demonstrating again the effective measure of state aggression using story stems. Furthermore, story stems were used by Rule et al. (1987) to examine the effects of temperature on aggression. Rule et al. (1987) focused on the cognitive state of the individual in relation to the temperature they were experiencing (Rule et al., 1987). This was done through the use of story stems; a current established measurement of aggression aiming to gain a state aggression measure (Rule et al., 1987).

Participants were asked to read and complete different story stems under hot and normal conditions (Rule et al., 1987). Some story stems were aggressive in nature; others were neutral, in the hope that a relationship between aggression and temperature would become apparent (Rule et al., 1987). Interestingly, heat appeared to increase the proportion of aggressive responses for the aggressive related story stems but had no influence on the neutral story stems (Rule et al., 1987).

Despite demonstrating an effective measure of state aggression using story stems, limitations did arise within the research. Firstly, it was difficult to separate the role of cognitive aggression from affective aggression through this measurement, resulting in an unclear indication of what area of aggression is being primed (Anderson et al., 1995). Furthermore, the use of story stems does not eliminate other confounding

variables within research, such as the participant's previous experiences (Anderson et al., 2005). If the story stem reflects an experience the participant has already been through, results for that participant will be different to results of someone who has had no experience within that situation and can only relate to the story stem through their imagination (Anderson et al., 1995). Social Desirability can also become an issue in story stems with closed ended questions. For example, Krish (1998) found social desirability to be an issue when focusing on intent (Krish, 1998). The first question regarding intent following the story stem was an open ended question which elicited more hostility responses following violent video game play, however when the question regarding intent was a closed ended question, the answer 'accidental' was found to be a more common response due to social desirability and not wanting to look like the participant was putting hostile attributions towards the character (Krish, 1998). However, in relation to social desirability, it is possible that the response 'accidental' would not have crossed the participants mind in relation to the open ended questions whereas in the closed ended question it was listed as a response and therefore would appear the most socially desirable response (Krish, 1998).

A further limitation of story stems is that they only measure how a person thinks they will react or how the character in the story will react (Giumetti & Markey, 2007). It does not measure an actual reaction. Putting participants in a characters position may decrease their own responsibility levels and therefore make them respond in a more aggressive manner. This is due to there being no consequence to their actions as it is not a real life situation and in some cases they are answering the story stem on how they think the character will react, not themselves (Giumetti & Markey, 2007).

Despite story stems having their limitations, they did however highlight the importance of taking the point of view of the character (Barlett et al., 2007). This was due to the individual becoming emotionally and psychologically involved within the situation, allowing state aggression to become apparent due to the individuals state during game play, consequently demonstrating the importance of state aggression (Anderson et al., 1995). When focusing on emotional and psychological indicators of game play, desensitisation becomes apparent (Anderson et al., 2010). Desensitisation occurs through increased exposure to violent content, therefore decreasing the emotional and psychological reactions to violence in real life (Thomas, Horton, Lippincott & Drabman, 1977). Through viewing violence within a video game or through the media, the individual subsequently becomes desensitised to viewing violence on a regular basis and therefore has less of a reaction when experiencing the violence in a real life situation. Consequently, the individual also experiences an increase in tolerance towards aggression (Arraiga et al., 2006). This notion is further supported by Smith and Donnerstein (1998) who state that “Media violence is meant to increase aggression by desensitizing viewers to the effects of real violence.” (Bartholow, Bushman & Sesitr, 2006, p. 532)

Real life evidence of desensitisation occurs in the form of soldiers and policemen (Bartholow et al., 2006). Through experiencing unpleasant situations involving possible violence and injury resulting in the exposure to blood within their line of work, soldiers for example, have aversive reactions to violence and blood which overtime can be overcome (Bartholow et al., 2006). This can however have social consequences to the individual such as reduced inhibitions against behaving aggressively within society, demonstrating an increase in state aggression through desensitisation (Bartholow et al., 2006).

The notion of desensitisation becomes more prominent as society increases in modernism, (Arraiga et al., 2006). This is due to virtual reality technology becoming more advanced, creating greater realism within the game (Arraiga et al., 2006). This could subsequently lead to a higher impact on the individual's emotional state during game play which would cause greater desensitisation within the real world (Arraiga et al., 2006). Due to the importance of cognitive and more importantly, emotional components of desensitisation (Bartholow et al., 2006), it demonstrates the importance of a measure of state aggression, which to date does not exist, rather than just trait aggression alone. This is due to emotions being extremely influential on the outcome of the experience.

It is important to mention current state self report scales that have been created to date such as the State Anger scale (Butcher & Spielberger, 1983). Several dictionaries were observed within the creation of this scale, to ensure a stable definition of state anger was gained, questions were then developed surrounding words that reflected this definition such as 'I feel furious' and 'I feel angry' (Butcher & Spielberger, 1983). The scale consisted of 20 statements from which participants were asked to report the intensity of this feeling at the present time (Butcher & Spielberger, 1983).

Internal consistency is impressive in relation to the State Anger scale, due to the items being identified dependant on their content validity (Butcher & Spielberger, 1983).

However it was tested on high school students which make it difficult to generalise to the total population due to the contribution of hormones as a confounding variable.

Furthermore, due to differentiation in the meaning of anger and aggression, the State Anger Scale cannot be used as a measure of aggression (Butcher & Spielberger, 1983).

Anger is thought to be an emotional reaction that can be demonstrated through

behaviour in the form of aggression, or just expressed as an internal feeling (Reber & Reber, 2001) whereas aggression is a thought or behaviour with the intention to harm another (Anderson & Bushman, 2002)

Furthermore, a State Trait Anxiety Inventory was introduced in 1970 to measure an individual's state and trait anxiety in the form of a self report scale (Gros, Simms, Antony & McCabe, 2007). It consisted of two 20 item self report scales; one to measure state anxiety and the other to measure trait anxiety. It included questions such as 'I feel at ease' or 'I feel upset' and was intended to measure an individual's anxiety level at the present moment (Gros et al., 2007). Despite proving to have excellent internal consistency (average as $>.89$), it was heavily criticised for measuring signs of depression rather than anxiety (Gros et al., 2007). Subsequently, it was adapted by Ree et al., (2000) and reintroduced as the State – Trait inventory for cognitive and somatic anxiety (STICSA) (Gros et al., 2007). The new scale consisted of 21 self report items measuring anxiety in terms of how often in general, the statement is true of the individual (Gros et al., 2007). The STICSA was highly regarded as a measure of state anxiety with strong internal consistency being demonstrated alongside factor analysis supporting the two factor structure (Gros et al., 2007). Despite this high regard, the STICSA to date has not formally been published (Gros et al., 2007). Subsequently, it is important to highlight that despite being a reliable measure of anxiety, it cannot be used in relation to state aggression. This is due to anxiety being regarded as a form of psychological distress and a fear of what the consequences of a situation or action could be (Williams, 2012). Furthermore, it is a classification of a mental disorder within the Diagnostic and Statistical manual for Mental Disorders (4th edition, text revision, 2000), whereas aggression is not. The notion of anxiety is thought to be an emotion characterised by fear of impending doom (Gros et al., 2007) whereas aggression is

known to be much more complex to define. It is most commonly thought to be an action or behaviour being carried out with an intention to harm another (Anderson & Bushman, 2002).

Biological factors such as memory are also empirical factors towards the development of a state aggression scale (Barlett et al., 2008) due to semantic associations being produced in the memory, word association tasks have proven an effective method of trying to gain a state measurement of aggression (Barlett et al., 2008). Within the memory structure, strong connections are made between closely semantically associated words such as 'gun' and 'knife' (Barlett et al., 2008). This would suggest that when an individual hears one of these words, which have been previously associated with an aggressive action or experience, the words will trigger the feelings felt at the time of the aggression, causing the individual to re-experience the feelings, just through a memory. During this time, the individual's state will be an aggressive state, due to the memory causing the feeling at that time.

Further highlighting the importance of memory when focusing on aggression is the cognitive neoassociation theory (Berkowitz, 1990). Cognitive neoassociation theory posits that there are strong connections within memory between aggressive thoughts, emotions and behavioural tendencies (Anderson & Bushman, 2002). Therefore unpleasant stimuli and experiences are recalled within memory and then create a negative impact for the individual in future similar situations (Berkowitz, 1990). These negative affects created by unpleasant stimuli automatically stimulate memories, thoughts and physiological responses that simulate a fight or flight response (Anderson & Bushman, 2002). The fight response can lead to feelings of anger whereas the flight response can lead to feelings of fear; both of which are thought to be influential on

aggressive behaviour and in turn could lead to an impulsive aggressive response in certain situations (Anderson & Bushman, 2002). Cues experienced at the aversive event can then become related to similar situations and cause similar reactions and emotional responses triggered in the initial event (Anderson & Bushman, 2002). This is influential on an individual state aggression due to the aggressive reactions being impulsive, based on their previous experiences and emotions surrounding that experience.

Furthermore, focusing on the biological perspective of aggression highlights the importance of measuring state aggression, rather than just trait aggression to gain an overall effective measurement of aggression (Coccaro, McClosky, Fitzgerald & Luan Phan, 2007). This is due to the great emphasis on the link between aggression and emotions (Coccaro et al., 2007). Stimulation of the amygdala promotes aggressive responses in both animals and humans (Adamec, 1991) and is critical at a neurofunctional level to regulate emotions and behaviour in humans (Coccaro et al., 2007). Subsequently, deterioration of the amygdala in humans has been associated with impulsive aggression (Van – Elst, Woermann, Lemieux, Thompson & Trimble, 2000). Furthermore, damage to the orbitofrontal reactivity within the pre frontal cortex can lead to impulsive aggressive behaviours, and little control over an individual's emotions (Coccaro et al., 2007). Subsequently, this demonstrates the importance of the brain when it comes to state aggression. If damage to an area of the pre frontal cortex can lead to aggressive behaviours and a lack of control over emotions, then surely a state reaction to aggressive stimuli can be imperative to the overall research on aggression.

Furthermore, research demonstrates how different areas of the brain are used in relation to different emotional experiences (Lewis & Critchley, 2003). Through the encoding of neutral words in different emotional contexts, Maratos, Dolan, Morris, Henson and

Rugg (2001) demonstrated the differences in brain activity on retrieval (Maratos et al., 2001). It was found that the left amygdala was activated for recall of neutral words within a negative emotional context whereas the bilateral orbito-frontal cortex was activated for the recall of neutral words in a positive emotional context (Maratos et al., 2001). This demonstrates how the brain can influence a reaction depending on the situation the individual is in. A more negative environmental context can activate the amygdala which is closely linked to emotions and consequently causes an emotional reaction to the situation. Research on brain activity in relation to aggression therefore demonstrates the importance of state aggression, due to the impact of manipulation or damage to areas of the brain on emotions and aggressive behaviour.

Focusing further on the neural impact of the brain on aggression, mood dependant memory is an essential component when focusing on the shift in states of aggression (Lewis & Critchley, 2003). The theory of mood dependant memory suggests that there is an important link between an individual's mood and cognition, also referred to as the 'semantic network approach' (Lewis & Critchley, 2003). This notion suggests that different aspects related to emotions such as expressive behaviours, autonomic responses and descriptions of situations that may lead to an emotion are connected to emotion specific memory nodes (Lewis & Critchley, 2003). In terms of state aggression, the emotion related memory nodes could cause aggression when influenced by a trigger, such as an expressive behaviour (Lewis & Critchley, 2003). Consequently, in terms of mood dependant memory, the shift in states will appear when aggression is manipulated, causing the retrieval of a memory to influence the individuals state, to a similar state to that experienced at the time of encoding (Lewis & Critchley, 2003), therefore demonstrating the shift in states.

Moreover, research into memory and mood further supports the notion that state aggression is influenced through emotion related memory nodes (Lewis & Critchley, 2003). Erk, Kiefer, Grothe, Wunderlich, Spitzer and Walter, (2003) demonstrate that the probability of recall being correct in a situation is highly correlated with the strength of context at the time of recall in relation to the emotional context at the time of encoding (Erk et al., 2003). Therefore, if a situation leads to a trigger of a memory, an aggressive reaction is more likely to occur on impulse if the emotional context is similar to a previous situation experienced where an aggressive feeling occurred.

Research conducted with animals regarding brain structures and aggression has led researchers to believe that there are two influential components of the brain that could contribute to aggressive reactions in humans (Geen, 2001). These are referred to as the limbic system, or 'old' brain and the cerebral cortex (Geen, 2001). The limbic system directly links higher and lower centres of the nervous system together and is thought to be the area related to emotional experiences (Geen, 2001) due to the close link with inputs from the sensory system. It is thought that these inputs initiate primitive emotions that are inherited from individual's ancestors (Geen, 2001). It is suggested "the function of ancient emotional systems is to energize and guide organisms in their interactions with the world, but their power arises from their intrinsic nature in the brain" (Geen, 2001, p 14). Ultimately the limbic system allows primitive aggressive reactions to occur, which are inherited from previous ancestors, but are triggered from current external stimuli (Geen, 2001). Moreover, it is thought that the limbic systems involvement in aggressive reactions is due to a lack of the central neurotransmitter serotonin (Geen, 2001). This can result in an organism reacting impulsively to aversive stimuli, for example reacting in an aggressive manner towards a bystander due to an unexpected physical pain (Berkowitz, Cochran and Embree, 1981).

Furthermore, the cerebral cortex is thought to contribute to aggressive behaviour due to the mediation of cognitive processes (Geen, 2001). These cognitive processes involve awareness and meaning of provocation, the judgement concerning the motives of the person responsible alongside the recall of previous coping strategies from past experiences (Geen, 2001). All of cognitions involved in the cerebral cortex influencing aggression result in the individual creating a suitable response for the situation they are in; they are in control of the response given whether it is in the form of aggression or not (Geen, 2001). Consequently, the cerebral cortex allows an individual to reflect on their past experiences and therefore act accordingly in a similar situation. They can evaluate their previous reactions and adapt their behaviour accordingly depending on how they felt the outcome of the situation went (Geen, 2001). Subsequently, unlike the limbic system, the cerebral cortex could be seen to contribute to an individual's trait aggression levels (Geen, 2001). It allows the individual to evaluate previous situations and therefore react in future situations in a way that they feel appropriate, whereas the limbic system creates a more impulsive aggressive reaction (Geen, 2001) which could be referred to as state aggression.

From reviewing previous research, four important factors become apparent when focusing on the measurement of state aggression. The first of these four factors was hostility. Hostility was thought to be a major motivation towards aggressive behaviour due to the desire in individuals to produce fear in others (Barlett et al., 2008) As demonstrated, hostility was already an established component in the measurement of aggression and anxiety (Barlett et al., 2007; Barlett et al., 2008) in the form of a single question (Barlett et al., 2007) and hostility scale (Barlett et al., 2009), suggesting that to

incorporate it into a state aggression scale as an important factor would be empirical to future research. Furthermore it is an established sub scale of the Buss – Perry aggression questionnaire, again highlighting its significance towards to the measurement of aggression (Colwell & Payne, 2000).

Hostility appeared to be an important factor when measuring state aggression, due to it being an unplanned motivation, impulsive and driven by anger (Bushman & Geen, 1990), all of which are important components to a state experienced at the time of measurement, as state aggression is. Furthermore, hostile thoughts were a form of cognition which as demonstrated in areas of mood dependant memory and the biological perspective, is an important component in the measurement of state aggression (Bushman & Geen, 1990). Finally, it has been established by Arraiga et al., (2006), that a positive association was already apparent between an individual's heart rate and state hostility (Arraiga et al., 2006). As physical attributes such as heart rate were already proven to be linked with aggressive thoughts and behaviour, this was an important component when focusing on ways to measure state aggression. As hostility increases, so does the individual's heart rate (Arriaga et al., 2006).

Impulsivity was the second factor identified as important in the measurement of state aggression. Impulsivity is closely linked with hostility, due to the drive to gain what an individual wants; the notion of acting without thinking (Bushman & Geen, 1990).

Impulsivity appeared to be an important factor due to its prominent role in understanding various forms of psychopathology and major mental illness (Arriaga et al., 2008). This, therefore closely links with the importance of brain function of aggression and how damage and manipulation of areas within the brain can cause aggressive tendencies (Coccaro et al., 2007). It was an established variable associated

with dominance, sexual jealousy and aggression (Colwell & Payne, 2000), therefore appeared to be influential in the measurement of state aggression.

The third factor established for the state aggression scale was frustration. It was thought that a motivation towards aggression is actually a fear of getting frustrated (Anderson & Bushman, 2002). Frustration occurred when a block appears in an aim to achieve a goal (Bushman & Geen, 1990). It was suggested by Eastin (2006) that aggression actually originates as a response to frustration (Eastin, 2006), therefore making it an important component within the measurement of state aggression. Furthermore, it was already an established measurement of aggression in Barlett et al. (2007) through asking participants how frustrated they felt (Barlett et al., 2007).

The final factor that appeared important in the measurement of state aggression was competition. Competition was thought to be an individual tendency to push one's own ideas forward in order to achieve a goal (Geen, 2001). Again, it was thought to be a motivation towards aggression (Geen, 2001). It was thought to be a planned method of achieving a goal (Berkowitz, 1993) and was an established variable of aggression (Colwell & Payne, 2000). Not achieving the goal can lead to aggressive tendencies and frustration (Geen, 2001). Similarly to the other identified factors, competition was already used within the measurement of aggression. It was an important component of the violent content hypothesis within the GAM (Anderson & Carnagey, 2009), and an important component of the Taylor Competitive reaction time task as participants have to allocate a noise/ shock to another participant if they lose a task (Bartholow et al., 2006). This contained an element of competition as the participants were competing against one another to be the best and therefore did not receive the electric shock

(Bartholow et al., 2006). This demonstrated the importance of competition within the measurement of state aggression.

Researchers such as Barlett et al., (2008) and Anderson and Carnagey (2009) have attempted to effectively measure state aggression, whether alongside trait aggression, or through the methods established to measure trait aggression. To date, an effective psychological scale to measure state aggression on does not exist, yet due to the biological importance and factors established it appears empirical to future research on aggression. The current research therefore aimed to develop a psychological, self report scale to measure the shifts in states of state aggression on, using the four factors identified as a basis for the scale.

Method

Participants

177 Participants were recruited through an opportunity - based sample from various sources such as the University of Huddersfield and the general public to allow generalisation for the questionnaire (Coolican, 2004; Gavin, 2008). Participants consisted of mixed gender (47.5% male and 52.5% female) with ages ranging from 18 to 72 (Appendix A). The Mean age of participants was 1.53, $SD = 0.5$ and the range was 54, suggesting that the average age category of participants was ages 30 – 39. Participants were from a variety of socioeconomic backgrounds consisting of students, those in full time employment and those who are unemployed. This was to ensure validity with the notion that when the scale was fully established it could be used on a more specific sample to measure effective state aggression. The School of Human Health Sciences ethics panel, School Research and Ethics Panel (SREP) approved the study. Participants provided informed consent (Appendix B) and were informed at the beginning they had the right to withdraw from the study at any time. Furthermore, they were informed that if any questions on the scale made them feel uncomfortable or they did not want to provide an answer for any reason it was fine to leave it unanswered (Appendix C). Participants were informed they were participating in a current mood research and therefore the scale measured current mood. This was to eliminate experimental bias and social desirability (Coolican, 2004). They were asked to complete the first questionnaire given to them, followed by the second questionnaire and then were fully debriefed to ensure all ethical protocol was followed effectively and to eliminate the notion of deception (Appendix D). Participants were informed within the debrief that the scales were attempting to measure state aggression, not current

mood and this was fully explained to them. Furthermore, they were reminded of their right to withdraw from the research.

Initial selection of items

Based on previous research, questions were developed in the form of a self report scale to allow for a cost effective, ethical and reliable psychometric measure of state aggression (Farrar & Kremar, 2006). Furthermore, pen and paper measurements have been found to have strong correspondence with behavioural counterparts (Carlson, Marcus-Newhall and Miller, 1990) enhancing reliability of the self report scale. A Likert style format was employed to enable participants to answer the questionnaire quickly and effectively (Becker, 2007). A five point scale was used to enhance validity of the scale; five options allow clear classification of answers for participants to choose from (Robins, Fraley & Krueger, 2007). The anchoring scheme chosen for the Likert scale was strongly disagree to strongly agree. This was due to this scheme effectively representing the phrasing of the questions and relating to the individual (Robins et al., 2007).

Questions were allocated to four categories, identified through focusing on previous research based on state aggression. The categories were: impulsivity, frustration, competition and hostility; all of which were highlighted as important features of aggressive behaviour from a review of previous literature (Bushman & Geen, 1990; Arriaga et al., 2006; Eastin, 2006; Berkowitz, 1993). The influences of the four factors initially allocated were reinforced through a preliminary factor analysis; allowing an initially subjective approach to become more objective through using previous research to gain an understanding of the influences of aggression and therefore analysis these to create four more appropriate factors to measure aggression from.

When focusing on previous research using heart rate as a physiological measure of aggression, it became apparent that when measuring the short term effects of video game violence on aggression that there was an important allocated time to gain a reliable measure of heart rate in relation to aggression (Barlett et al., 2009). This was due to participant's heart rate being higher than baseline until four minutes after initial manipulation of aggression (Barlett et al., 2009). This therefore suggested that to effectively measure state aggression, the measure must take place immediately to ensure a trait measurement is not recorded. If the response takes longer than four minutes than the result would effectively be a measurement of trait aggression rather than state (Barlett et al., 2009). Subsequently, questions were written to be answered immediately, and participants were told to leave the question unaccounted for if they did think about a response. This therefore increased the reliability, ensuring a state measurement of aggression was being gained with no thinking required.

Furthermore, questions were phrased so that they represented the present, rather than relating to the past or future. They were also phrased so they related to the individual in a personal way. This was to ensure the participants responded to questions depending on their own feelings and emotions rather than taking the perspective of anyone else. To eliminate the notion of social desirability, participants each filled in two questionnaires; one designed to gain a baseline measure of aggression and one designed to measure state aggression after manipulation (Appendix E). This set up, alongside the instruction of answering immediately without thinking, allowed for an instinctive answer to be provided.

To ensure reliability and validity, questionnaires were designed to be representative of one another; however, to eliminate order effects, each questionnaire consisted of

differently worded questions. Furthermore, counterbalancing was used to eliminate extraneous variables such as order effects; ensuring participants were given the questionnaires in different orders alongside questions of the questionnaires being in different orders to ensure all questions are fairly answered (Coolican, 2004). Ultimately, each question on the questionnaire one should correlate highly with a question on questionnaire two, to allow an effective measure of state aggression to be gained and to provide reliability to the scales.

Procedure

Following recruitment of participants, each participant was allocated a number to ensure confidentiality throughout. All ethical protocol was followed throughout the study and participants were told to answer each questionnaire immediately, without thinking to ensure it was their state aggression that was being measured. They were told to miss out any questions that they had thought about an answer for. Questionnaires were given to each participant and the study lasted approximately 20 minutes in total. As the aim was to create a questionnaire, participants were allowed to fill in both questionnaires at the same time, however, when the final questionnaire is produced, the intention is to fill in one questionnaire to gain a baseline measure of state aggression, following this, the individuals aggression levels will be manipulated, then the second questionnaire will be administered to ensure a comparison of the individuals aggression levels are gained.

Once the allocated time frame was complete, participants were asked to stop writing and hand in the questionnaires, whether they were complete or not. Participants were fully debriefed and all questions were answered. They were thanked for their time and data was collated for analysis.

Factor Analysis

Principle component analysis was the form of factor analysis conducted on the questionnaire data to identify clusters of variables; to ensure the questions were appropriate for the topic the questionnaire was testing alongside reinforcing the use of the correct factors suggested (Field, 2009). It was essential that questions correlated effectively with their allocated factor to ensure appropriate measurement was conducted, alongside the two questionnaires correlating with one another (Field, 2009). Principle component analysis was the chosen multivariate technique to identify the components for the variables (Field, 2009). Subsequently, principle component analysis allowed questions to be allocated to each factor, ensuring the questionnaire was produced successfully (Field, 2009).

To ensure the sample size was adequate, KMO and Barlett's test of sphericity was selected. KMO level must be higher than 0.5 to ensure that the sample size used was adequate to ensure reliability of the questionnaire (Field, 2009). As four factors were initially identified as important towards the measurement of state aggression, it was essential that four factors were extracted within the analysis (Field, 2009). This was therefore stated within the extraction section. Following this extraction, the procedure was repeated without allocating a specific number of factors to extract. This was to identify how many factors would be extracted without allocation to gain a true indication of relevant factors (Field, 2009). Within rotation of factors, varimax with Kaiser Normalization was the method chosen due to the factors being independent of one another (Field, 2009). This further allowed each factor to be simplified, allowing each variable to give either strong loadings or no loadings to each factor (Robins et al., eds, 2007). To ensure the optimal solution of factors within data was searched for

sufficiently, the maximum iterations for convergence was set at 25; the allocated level for the data size (Field, 2009).

In relation to scores within factor analysis, the regression method was allocated to this sample, due to correlations being acceptable between factor scores (Field, 2009). This process was repeated on numerous questionnaires as questions were adapted and improved, depending on results gained from previous principle component analysis on earlier questionnaires (Field, 2009). Validity of the scale was not tested due to the development of the scale not getting to that state; a scale was not fully developed to test for validity.

Results

Questionnaire 1

Factor analysis using orthogonal rotation (varimax) in the form of principle component analysis (PCA) was conducted on the 70 items from the first questionnaire produced (Field, 2009) to reduce the large set of variables into smaller dimensions which are easier to work with (Robins et al., eds, 2007). To ensure reliability of the questionnaire and to confirm sampling adequacy, Kaiser – Meyer – Olkin (KMO) was measured and produced a score of $KMO = .61$ (Field, 2009). This score was classified as a ‘mediocre’ sampling adequacy level; according to Field (2009) (Hutcheson & Sofoniou, 1999) suggesting that results will be produced at a standard level of stable factor analysis rather than a strong level (Robins et al., 2007). Although it is not classified as a strong level of sampling adequacy, it is sufficient enough for research to go ahead and create reliable results (Field, 2009). Despite this score being classified as ‘mediocre’ (Field, 2009) a problem arose when focusing on the KMO values for individual items. This was due to many items being <0.5 whereas to ensure reliability individual scores must be >0.5 (Field 2009). Barlett’s test of sphericity $\chi^2 (2415) = 6030.96, p <0.001$, demonstrated that correlations between items were sufficiently large for PCA to be an appropriate measurement.

An initial analysis was run to obtain eigenvalues for each component in the data. As initially stated in the factor extraction, four factors were extracted within the analysis and accounted for 28.34% of the total variance. This is demonstrated in Table 1 (Appendix F). After orthogonal rotation (varimax), the percentage of eigenvalues for each factor extracted was equalised. This was to allow mathematical definitions of factors to be focused on to see which variables define which factor to gain an insight

into the space surrounding each factor extracted and the influences each variable has on the factor (Robins et al., 2007). Following the orthogonal rotation (varimax), factors had a variance of between 4% and 8% compared to the initial variance ranging from 13% to 3%; accounting for a total of 24.14% of variance. The average number of communalities is $19.854/70=0.29$. This figure was <0.7 ; the recommended extraction level by Joliffe's criteria is to retain all communalities >0.7 to ensure the correct variables were discarded (field, 2009). However, when focusing on the scree plot, it became apparent that there were four clear factors that must be retained (see figure 1; Appendix G). These retained factors, as expected, were hostility, frustration, competitiveness and impulsivity respectively. To assess the fit of the model it was essential to focus on the differences between the observed correlations and the correlations based on the model (Field 2009). For a good model, residuals should be highly proportioned at <0.05 (field, 2009). The reproduced correlations the residuals for this data set was $1268>0.05$. Consequently, 52% of residuals were >0.05 which was a cause for concern as the difference between the observed correlation coefficients and the predicted correlation coefficients from the model is large (Field, 2009) when for a reliable representative model, this difference should be minimal (Field, 2009).

After orthogonal rotation (varimax) of the factors was carried out, it became apparent which variables loaded onto each factor (see table 2; Appendix H). Factor loadings less than 0.4 have not been displayed as they were suppressed during input. Subsequently, any factor loading <0.4 would not have been a strong enough correlation to effectively use within the data. When focusing on the rotated component matrix (Table 2, Appendix H), it became apparent that very few variables (questions within the questionnaire) loaded onto the factors due to very weak correlations; <0.4 was not demonstrated in the table. This would suggest that the questions themselves needed

further work to ensure they were an effective measure of state aggression and subsequently load efficiently onto a factor (Figure 1, Appendix G). The first factor identified; hostility had 10 of the 70 variables loading on to it. 60% of these loadings were questions developed under the notion of frustration, including questions such as 'I feel agitated' (question F10b at .59) and 'I often feel ill from worrying' (question F8b at .52). 30% of the questions loading onto hostility were initially hostility based questions including 'I remain frustrated unless I hit out' (question H7b at .69). This question was the strongest factor loading within the data at .69 however this was not a very strong correlation despite being the strongest within the data. 10% of the hostility factor loadings were impulsivity based questions such as 'If someone hurt you would you hit out?' (Question I2b at .42) and no competitiveness based questions loaded onto the factor hostility. Interestingly, all the factor loadings for hostility came from the second questionnaire, again demonstrating the weakness of the questions as they didn't correlate strongly with one another from both questionnaires.

Factor 2 was identified as frustration with 11 out of 70 variables loading onto it. The highest factor loading for frustration was a hostility based question at .65; 'I will do anything to get my own way' (question H7a). The factor loadings for frustration only included 3 other hostility based questions such as; 'I can manipulate anyone' (question H9a at .63) and 'I always get revenge on those that hurt me' (question H8a at .55). Other factor loadings included impulsivity based questions such as; 'I would take what I can to get what I want' (question I7a at .58) and competitiveness questions such as; 'I feel like I always need to be the leader' (question C6a at .55). Despite a variety of variables loading onto the factor frustration, only one initial frustration based question loaded effectively with a weak correlation of .47 (question F10a 'other people always seem to get the breaks').

The third factor identified, with only 7 out of 70 variables loading weakly onto it was identified as competitiveness. The highest of these factor loadings was an initial impulsivity based question, loading with a correlation of .50 (question I7b 'I like to stay in the background'). Subsequently this is a weak correlation despite it being the highest factor loading within the category. All other factor loadings were <0.5 , with the lowest being another impulsivity based question; loading at .41 (question I4b 'I am quite irrational when it comes to decision making').

The final factor identified within the rotated component matrix was impulsivity with 6 factor loadings. These factor loadings were slightly stronger than those from competitiveness as the highest was a hostility based question as .63 (question H5a 'I always walk away from fights'). Interestingly, no initial impulsivity based questions loaded onto this factor, whereas frustration and competitiveness both did. The frustration based question; 'I often worry about my achievement levels (F3a) loaded at .55 and competitiveness was the lowest loading at .45 (question C4a 'Competition makes me stressed').

From looking at the data developed from questionnaire 1 (Appendix E), it was concluded that the questions were not correlating strongly enough with factors to enable a reliable questionnaire to be developed. Furthermore, questions in questionnaire A (Appendix E) and questionnaire B (Appendix E), which were supposed to represent one another and therefore be very strongly correlated with one another were not and often did not even load onto the same factor within the rotated component matrix. Finally, out of 70 potential variables, only 34 loaded onto a factor and were all still quite weak correlations. Subsequently, a new questionnaire was developed based on the results

found to try and develop a more reliable method of the measurement of state aggression (Appendix I).

Questionnaire 2

Following the initial results, the questionnaire was adapted and new questions were developed, based on the factor loadings gained in the previous data (Appendix I). A principle component analysis (PCA) was conducted on the new 56 item questionnaire results. Again, the method of orthogonal rotation (varimax) was adopted to allow the factors to be simplified allowing easier interpretation of variables loading onto each factor (Field, 2009). To ensure reliability and sampling adequacy of the new questionnaire, KMO was measured and produced a 'great' score of .805 (Hutcheson & Sofoniou, 1999). This therefore demonstrated an improvement on sampling adequacy going from mediocre in the first analysis to great in the second. However, when focusing on the individual KMO scores, many were again <0.5 , suggesting poor reliability which could create a limitation in the overall development of the scale itself (Field, 2009). Barlett's test of sphericity χ^2 ($1540 = 5689.80$, $p < 0.001$) did however demonstrate that correlations between items were sufficiently large enough for PCA to be an appropriate measure therefore factor analysis was complete to see if further research on the scale would be relevant to develop a psychometric state aggression scale.

Corresponding to the previous analysis, eigenvalues were obtained in an initial analysis of the data, as demonstrated in table 3 (Appendix J). Unlike the previous analysis where four factors were selected during input, no factors were selected within this analysis; despite the researcher seemingly allocating questions to expected factors. This was due

to the weak correlations and factor loadings gained from the previous research.

Subsequently, without allocating a specific number of factors to extract, results showed the extraction of 15 factors in total, accounting for 70.14% of the total variance as demonstrated in table 3. Despite 15 factors being extracted, factor one held considerably more variance than any other; 24.38% (table 3, appendix J), whereas factor 15 only held 1.85% of the total variance. After orthogonal rotation (varimax), the percentage of eigenvalues for each factor extracted was equalised, creating a total variance of 70.41%. Factor one now accounted for 15.01% of the total variance which was evidently still a large proportion of the overall variance (Table 4, Appendix K).

To validate the number of factors extracted, the average number of communalities was worked out; $39.276/56 = 0.70$. This figure was >0.7 suggesting that a decent number of communalities were retained within the analysis as recommended by Joliffe (Field 2009), therefore supporting the extraction of 15 factors. However, further focus must be placed on the notion that factor one held a significantly larger percentage of variance than the other 14 factors extracted. Consequently, the scree plot explained this further (Figure 2, Appendix L). The scree plot was quite complex, as expected due to 15 factors being extracted with large differences in variance. Initially, there was a large difference between factor 1 and factor 2, therefore supporting the large variance difference between factor 1 and the other factors. There was a further point of inflexion following factor 3 on the scree plot and the curve did not reach an area of stability until factor 11 (Figure 2, Appendix L). This would suggest that although 15 factors were extracted, it would appear that factor 1 was effectively the strongest extracted factor and therefore would be an important component in the measurement of state aggression. Following the initial allocation of factors prior to data analysis from previous research, factor 1 was allocated as hostility.

As with the previous analysis, the differences between the observed correlations and the correlations based on the model are of key importance (Field 2009) to ensure that the residuals are highly proportioned at <0.05 to ultimately assess the fit of the model (Field, 2009). When focusing on the reproduced correlations, unlike the previous data set which proved a cause for concern, this data set had only 17% ($227 > 0.05$) of residuals >0.05 which is classified as good (Field 2009) suggesting that differences between actual correlation coefficients and predicted correlation coefficients from the model were low (Field, 2009).

After identifying that Hostility was the highest loading factor of the 15 extracted, it was important to ascertain which variables loaded onto this factor alongside the other 15 factors to enable an effective measure of state aggression to be developed. Again, the factors were rotated using orthogonal rotation (varimax), to create a rotated component matrix and allow the variables to be focused on in smaller dimensions making them easier to work with (table 4, Appendix K) (Field, 2009). Factor loadings <0.4 were suppressed to avoid weak correlations being demonstrated, therefore allowing focus to be applied to the stronger correlations. As with the previous data set, factor loadings were left blank within the rotated component matrix due to correlations being <0.4 . The strongest correlation apparent was .87, loading onto factor 14 and representing variable 53 (I4b: If I were to write something on facebook about someone else and found out right now that they were hurt by this, I would feel regret). Despite this high correlation, factor 14 only had one other factor load onto it (Variable 54) with a factor loading on .63, demonstrating the weakness of this factor in relation to developing a reliable scale. Factor one on the other hand, as previously demonstrated in the scree plot (Figure 2, appendix L) had a total of 18 factor loadings, therefore suggesting it was the strongest factor to focus on when developing a measure of state aggression.

Although factor one's highest correlation was only .80 (variable 1) compared to factor 14 (.87), it had the highest number of factor loadings compared to any other factor, which all consisted of quite strong correlations. 11 of the 18 factor loadings were under the factor initially classified as hostility; 6 of the 18 factor loadings were frustration based and only one factor loading was initially classified as impulsivity. Overall due to the lack of reliability found within factor analysis and due to the lack of loadings onto the initially predicted four factors, it could be suggested that a psychometric state aggression scale cannot be developed. Furthermore, due to the predominance of factor one; referred to as hostility, it may be that hostility alone could be a sufficient measurement to represent state aggression.

Discussion

Following an in depth review of literature investigating the measurement of aggression, the current research aimed to develop a psychological measure of state aggression in the form of a self report scale, which to date has not been created. The self report scale was to consist of four subscales; hostility, frustration, competitiveness and impulsivity, all of which were previously identified as important aspects of state aggression within previous research (Barlett et al., 2007; Buss & Perry, 1992; Buss & Durke, 1957).

Factor analysis was conducted on the data in the form of principle component analysis; this indicated that the construction of a state aggression scale may have major limitations, due to the underlying theories of aggression.

From analysis of data, it became apparent that although four subscales were allocated to create the scale, due to their importance within previous research (Barlett et al., 2007; Buss & Perry, 1992; Buss & Durke, 1957), only one factor became predominant. This was hostility, accounting for 15 % of the factor loadings created compared to the other 15 factors that were extracted from the component matrix. Due to the nature of the results, it was important to focus on the questions used within the scale to evaluate how they may or may not relate to the measurement of hostility and any other areas of aggression that may be important within future state aggression research and measurement.

Firstly, when focusing on the results, it became apparent that 18 of the 56 variables created loaded on to factor 1; identified as hostility. Although this figure appears to be quite small in relation to the scale of the research, when comparing it to the other 15 factors that were identified, it became a significant area of investigation. The highest factor loading under hostility was .80, representing question H2b ('right now I feel

agitated’). This question was allocated as a hostility based question following the factor loadings of the first questionnaire developed, therefore effectively loaded onto the expected factor within the questionnaire. There were ten other questions that were initially hostility based, loading onto the appropriate factor within the results. The other hostility based factor loadings consisted of questions such as ‘at this present moment, I feel frustrated’ (H1a .72); ‘I feel quite hostile’ (H10b .59) and ‘I feel annoyed’ (H13a .73). Unexpectedly, the other factor loadings consisted of six initially frustration based questions such as ‘right now I feel irritated’ (F4b .74); ‘I feel nervous’ (F11a .63) and one initially based impulsivity question which was ‘right now I wish I was alone so no one would notice me’ (I2b .44). Interestingly, no competition based questions loaded onto the factor of hostility which is unusual due to competitiveness already being identified as a manipulator of hostile behaviour and aggression (Buss & Perry, 1992; Barlett et al., 2007), due to the innate fighting instinct that humans share (Enticott & Ogloff, 2006).

It is important to highlight the fact that these questions were initially allocated to their factors through factor analysis of the preliminary questionnaire, based on the factor loadings present. A key issue was a lack of consistency in factors within this research and a lack of correlations between factors as they were allocated based on previous factor analysis. This could have suggested that the factors identified were influential on the aggression being measured however; there was a predominant factor when focusing on measurement. It may be that frustration, impulsivity and competitiveness are factors that can impact an individual’s state aggression but ultimately the aggression occurs due to how hostile the individual feels at the time of measurement.

Importantly, questionnaires were designed to correlate highly with one another to ensure the questions were representative, in order to gain a reliable measure of state aggression before and after experimental manipulation. Despite factor analysis of the preliminary questionnaire to ensure that questions were allocated to the correct factor in the second questionnaire, questionnaires A and B did not correlate with one another at all. Consequently, questions that were meant to be the equivalent of each other had a very low correlation with one another, and most did not even load on to the equivalent questions factor. For example, the highest factor loading onto hostility was question H2b ('right now I feel agitated') with a factor loading of .80. According to the factor analysis of the preliminary questionnaire, this question (H2b) should have correlated perfectly with the equivalent question H1a ('at this present moment, I feel frustrated'). However, despite loading onto the same factor, they did not correlate with one another as expected ($H2b = .80$ and $H1a = .72$). They would have correlated if they had been representative of one another. Furthermore, question F4b ('right now I feel very irritated') loaded effectively onto the factor hostility (.74) despite being initially allocated to the frustration category, however the equivalent question F3a ('if I was held beyond my will, I would feel very agitated') loaded onto factor 5, not hostility with a much lower correlation of .55. Again the two questions did not correlate with one another as expected. This demonstrates that even questions that were meant to be representative of one another lacked meaningful correlations and sometimes did not even load onto their equivalent factor.

Consequently, this in itself demonstrated a categorical problem with defining state aggression to measure psychologically. If a clear definition cannot be produced, then the basis of questions becomes uncertain, therefore without duplicating questions in both questionnaires, they cannot be representative of one another. Subsequently, asking

the same questions in both questionnaires would not be appropriate as it could lead to order effects (Coolican, 2004), which would impact the results therefore they must be representative of one another for the state aggression scale to be a valid measure.

The analysis clearly indicated which items load onto each factor, mainly focusing on hostility being predominant in the analysis. It was important to explore how the four initially allocated factors could impact and influence one another so that an explanation could be proposed as to the level of factor loadings on hostility. This may also facilitate the explanation as to why it was not possible to construct the psychological state aggression scale.

As previously discussed in the introduction the four factors initially identified; hostility, competition, impulsivity and frustration, all linked together in numerous ways suggesting their importance to the current research. Hostility, alongside frustration was already an established measurement of aggression within previous research (Bushman & Geen, 1990; Barlett et al., 2007). This is due to them being driven by anger and a fear of experiencing the feelings surrounding frustration (Bushman & Geen, 1990).

Impulsivity is closely linked to hostility due to both factors being driven to gain what an individual wants (Bushman & Geen, 1990). Both factors influence the individual to act without thinking with the motivations of greed being behind the actions (Bushman & Geen, 1990). Finally, competition is closely linked with the other three factors. It is linked to hostility due to the feelings experienced towards the competition, usually hostile thoughts and an urge to want to beat the individual (Bushman & Geen, 1990). A fear of losing can also link with hostile thoughts and can occur due to a fear of getting frustrated (Geen, 2001). Impulsiveness is a factor due to the individual acting on

impulse; due to the competition they do not think before acting, their ultimate goal is to not lose therefore they do what they can to achieve that goal (Bushman & Geen, 1990).

It appeared that all four factors were not only closely linked to one another, but also very closely linked to hostility itself, due to this relationship it was demonstrated that hostility was the predominant factor. All four of the factors can lead to feelings of hostility whether it is through aiming to achieve a goal or through a fear of losing or getting frustrated (Bushman & Geen, 1990). Consequently, despite the current research indicating just one main factor, it would seem most likely that the other factors are all influencing this factor being so predominant, therefore through measuring hostility alone, an actual measure of all the factors is gained through hostility. The results suggested that when an individual's state aggression is measured, in a neutral state, it should correlate perfectly with their trait level of aggression, therefore suggesting that an individual's trait aggression could in fact be an indication of their state aggression, along with their level of hostility.

The analysis indicated that hostility was an important component in the measurement of state aggression, it is important to focus on the theoretical basis of hostility in order to evaluate whether a state aggression measure would actually be flawed. Alternatively a measurement of an individual's hostility levels alone may well be sufficient to contribute to an accurate overall measure of state aggression. As mentioned in the introduction, mood dependant memory is an important factor to consider when evaluating the measurement of aggression (Lewis & Critchley, 2003). It focuses on the brain activity associated with creating and influencing aggressive reactions, behaviours and shift in states, suggesting that memory nodes are related to emotional triggers which could cause aggressive reactions (Lewis & Critchley, 2003). Furthermore, mood

dependant memory is an effective way of explaining hostility due to hostile thoughts being cognitions, which are an important aspect of mood dependant memory (Bushman & Geen, 1990).

Research investigating mood dependant memory dates back to 1917 (Lewis & Critchley, 2003), demonstrated that at any given time, an individual's mood has a strong influence on which part of the environment appears most important, which in turn will influence how they react in that environment, possibly due to past experiences. There are two mood effects; mood congruence and mood dependence, which influence what is encoded from the past and present situations (Lewis & Critchley, 2003). When applying these theories of mood effects to examine the current research, it becomes apparent that the mood of an individual can affect their hostility levels towards a certain event (Lewis & Critchley, 2003).

Mood congruence is when an individual's mood is similar to the emotional content of the memory (Lewis & Critchley, 2003), allowing the emotional material to be remembered in a reliable manner. This would suggest, in relation to the current research, an individual's hostility score on the scale may have been higher if they began answering the questions feeling slightly apprehensive rather than relaxed. For example, if the participant began the questionnaire in a relaxed manner, the questions should not have impacted their emotional state. As the individual was answering the question immediately, their responses would have been relaxed and neutral, therefore recording their trait levels of aggression. However, if they began the questionnaire feeling tense or apprehensive, questions such as 'I feel relaxed' and 'I would feel annoyed if I was told I had done this questionnaire wrong' would generate more emotional responses. In terms of the current research, these emotional responses would have shown in terms of

hostility. The more apprehensive the participant felt prior to the questionnaire, theoretically the higher their hostility level should have been due to the questionnaire measuring their current state (Lewis & Critchley, 2003).

Alternatively, mood dependence is defined as when the individual's mood at retrieval of a memory influences the mood at encoding (Lewis & Critchley, 2003) therefore remembered material usually has an unbiased emotional valence (Lewis & Critchley, 2003). In terms of mood dependence the current research demonstrates that if a question leads to retrieval of a memory with hostile feelings, their responses would have been more hostile on the scale than a neutral retrieval. If the question on the scale triggered a memory that was not a hostile experience, their state should be neutral therefore not triggering any emotions that the individual experienced at the time the memory was created.

When focusing on mood dependence, it would appear that the state aggression scale should have effectively measured an individual's state as predicted. This is due to memories impacting the responses provided; if a question on the scale led to feelings of distress or anger, a more hostile response would be provided on the scale however, if there were no negative emotions triggered from a question; the memory had no negative impact, therefore, their baseline state aggression level would be measured which in effect would be their trait aggression level. As the current research suggests that a state aggression scale was not possible to construct, the notion of hostility becomes influential. Rather than investigating mood dependence from the perspective of state aggression, it is important to evaluate it solely from a hostility perspective. Focusing further on this perspective, it would suggest that an individual's hostility score could be linked with their trait aggression score, if no hostile feelings are retrieved through the

questions asked, this would measure their baseline hostility score which in effect would be their trait aggression score; it would focus on the individual's personality and aggressive tendencies due to no external trigger influencing their state. However, if the questions led to memories influencing their emotions, then a more hostile response would be recorded therefore suggesting that the scale had effectively measured the individual's state, in the form of hostility.

Consequently, the hostile feelings apparent in the measurement of the aggression actually appeared due to the feelings of aggression at the time the original memory occurred. If the individual had never experienced anything similar to the question being asked, therefore no previous feelings would arise suggesting their answers would be less hostile. This is, unless mood congruence has an effect, suggesting that the mood the individual is experiencing while answering the questions would impact their responses (Lewis & Critchley, 2003). If the individual completed the questionnaire feeling anxious, their responses may indicate more aggressive feelings than if they were relaxed on commencing. Overall, this would suggest that a measure of state aggression is actually a measure of an individual's trait aggression alongside any hostile feelings they may have about previous experiences. As previous experiences shape an individual's personality (Bandura, 1983) theoretically, an individual's trait and state aggression are very closely linked. This would therefore support the current research's findings in that hostility must be measured to gain a state perspective of aggression; otherwise the only measure recorded is trait aggression. It is due to previous experiences and memories that can cause higher levels of hostility in an individual's response.

It is essential to consider neural activity to decipher which area of the brain is active in relation to different emotions such as hostility, to support further the notion that a self report measurement of hostility alone is sufficient to represent a valid measure of state aggression. Using a subsequent memory effect analysis (SME) Erk (2003), demonstrated which area of the brain is active in association to specific emotional contexts (Lewis & Critchley, 2003). They suggested that negative encoding demonstrated activity in the right amygdala (Erk, 2003), which has previously been associated with negative emotion (Baxter & Murray, 2002). This supports the current finding of hostility being a predominant state when focusing on state aggression as the amygdala is known to be the area of the brain linked with fear and anxiety (Davis, 1992). Due to the close link between frustration and hostility, the notion of activity in the amygdala during negative encoding supports the proposal that hostility would be the main factor apparent in measuring state aggression due to memories of feelings during previous experience's and a fear of experiencing those feelings again (Bushman & Geen, 1990; Lewis & Critchley, 2003).

Through in depth evaluation of the neurobiological influences of aggression, it becomes more apparent why a psychological measure of state aggression may be less important and an effective measure of trait aggression is more important alongside an effective measure of hostility (Geen, 2001). This is to gain an effective overall measure of aggression through focusing on the limbic system and the cerebral cortex (Geen, 2001). The limbic system is classified as the 'old' part of the brain (Geen, 2001). It is closely linked to emotional experiences and is usually demonstrated at a lower level of emotion (Geen, 2001). It is suggested that despite external events influencing feelings, activities of ancient brain processes inherited from our ancestors are the actual cause of emotions arising (Geen, 2001); external stimuli only trigger prepared states (Geen, 2001). In

terms of the current research, feelings of primitive anger and hostility are initiated due to sensory systems being provoked due to previous experiences and therefore send inputs to the limbic system (Geen, 2001). This theory again supports the notion that trait aggression is essential in the measurement of overall aggression as an individual's baseline however, due to primitive reactions and the influence of external stimuli, hostile feelings can arise and impact an individual's state. For example, the current research will have gained an effective measure of the individual's trait aggression, hostility scores will have been increased due to the questions acting as external stimuli, leading the individual to remember previous experiences and feelings, therefore increasing their hostile state.

Furthermore, an increase of awareness of the cause of a feeling can lead to more hostile feelings that are classified as cognitive processes (Geen, 2001). This occurs in the cerebral cortex that is an influential area of the brain in terms of human aggression (Geen, 2001). The cerebral cortex is involved with taking control of the primitive old brain within the limbic system through cognitive awareness and attributing meaning to the memories and thoughts (Geen, 2001). The motives responsible for the behaviour and recall of previous strategies of dealing with situations are taken into account within the cerebral cortex prior to the behaviours occurring (Geen, 2001). In this sense, when a question on the self report scale triggers an emotional response, the limbic system initially takes control causing the hostile reaction due to fear. However, when the cerebral cortex steps in, the brain becomes more aware of the situation, and therefore releases its primitive nature and assesses the situation effectively allowing an appropriate emotional response to occur (Geen, 2001). External factors such as previous experiences and how effectively the individual had previously dealt with these experiences, if at all, may be influential on the individual's response when the cerebral

cortex is activated (Geen, 2001). In terms of the current research, it is likely that if the individual had learnt to deal effectively with emotional situations their scores will have been less hostile, however, if this was not the case it was likely that the limbic system may have taken control of their responses causing a more hostile score.

The notion of the limbic system and the cerebral cortex acting to impact an individual's aggressive reactions would indicate an explanation as to why hostility appeared to be the primary factor within the current research. A self report scale would not be an appropriate measure of state aggression alone if cognitive processes were the influence on responses. This would need the individual to process the reaction and relate it to the appropriate social situation; in the current research the questions needed answering immediately so no thinking about the context of the questions was required. This would suggest that hostile feelings towards events from the old brain were being activated therefore representing how the individual may react but not allowing for the social situation of events to be influential. However, when the cerebral cortex took control, the individual would have been reading the question and any memories or feelings associated with that question will have been recorded. If the individual held hostile feelings towards a specific social situation and the question led to memory recall of this, their responses would have been more hostile. If they were able to rationalise feelings and assess the social situation appropriately, or of course had not experienced a similar situation, then effectively their trait aggression levels would have been recorded in the self report scale. This relates directly to the notion of mood dependence in mood dependant memory (Lewis & Critchley, 2003).

Furthermore, the individual's perception of previous experiences may have played an influential role in individual's responses to the current state aggression scale. Due to the

internal motivation of perception, individuals respond either in a cooperative manner or a hostile manner to external situations (Tzafestas, 1995). If an individual perceives an external event to be a hostile situation, they will respond in a hostile manner (Tzafestas, 1995). Moreover, if a question on the self report scale led the individual to recall an event which they perceived as a hostile or unpleasant experience, they were more likely to have responded in a more aggressive manner to the question. Consequently this would have led to a higher hostility level on the scale through their responses loading onto the factor hostility. It is further suggested by Tzafestas (1995) that perception is highly influenced by an internal degree of satisfaction (Tzafestas, 1995). If this degree of satisfaction exceeds the norm, then an event will be perceived as more pleasurable to the individual than if their level of satisfaction decreased or even stayed at a neutral level (Tzafestas, 1995). The actions of individuals in social situations are directly influenced by their perceptions of similar situations they have experienced (Tzafestas, 1995).

This theory could be effective in explaining why the state aggression scale demonstrated a strong hostility influence. The participants may have been influenced by the questions to answer, due to their perceptions of an event they had experienced previously. Therefore, this perception would influence how high on the aggressiveness scale their responses were. This would suggest that responses do not necessarily reflect the individual's state aggression levels, but more so how they perceive events that are recalled when prompted by a memory. Similarly to the notion of mood dependant memory (Lewis & Critchley, 2003), the theory of perception reinforces the notion that an individual's responses should be neutral unless manipulated by previous experiences. This implies that an individual's 'state aggression' will reflect their trait aggression. Therefore, to gain an effective measure of aggression, 'matching agent

motivations' need to be put in place for the individual to perceive through memory recall and therefore create feelings felt in the first instance of the experience (Tzafestas, 1995). How an individual perceives this experience initially would be reflected in their aggression levels in the future within similar circumstances. Through understanding an individual's initial perception of an event and their trait aggression score, through effectively measuring their hostility level their overall aggression score could be calculated based on their hostile state, how they perceive events and their trait aggression score.

Furthermore, the theory of perception is supported further when evaluating the instinctive fear system within the brain (Brynes, 2012). This is as a result of hostility occurring due to the brain perceiving some form of danger (Brynes, 2012). The amygdala responds immediately to assess the situation and the response of the individual is dependent upon how the thalamus perceives the event (Brynes, 2012). If the event is perceived by the thalamus as dangerous, the information is immediately sent back to the amygdala to produce an appropriate action, such as hostile behaviour (Brynes, 2012). This would further suggest that the inability to create an effective state aggression scale is directly related to how the individual perceives previous events. Moreover, if the questions within the questionnaire did not lead the individual to think about a situation they had previously experienced, then a neutral or non aggressive response will have been selected. However, if they had previous experience of a situation, their previous reactions and perceptions of that situation would have influenced the responses. If the individual felt strong emotions such as anger or fear, then their responses are likely to be more hostile for that question compared to an individual who was relaxed in a situation or didn't recall any memories of perceived fear or danger. Consequently, an individual's hostility score appeared to be related to

their previous experiences and perceptions of an event, otherwise their response should be neutral.

Focusing further on the notion of memory being influential on hostility becoming a prime focus within the current research, cognitive neoassociation becomes important to focus on (Anderson & Bushman, 2002; Berkowitz, 1990). The Cognitive neoassociation theory suggested that anger processes can change over time and initial emotional reactions are automatic responses (Berkowitz, 1990) that would indicate the importance of trait aggression but not necessarily state aggression or hostility.

However, the importance of hostility becomes apparent through the suggestion that a further automatic cognitive process is the interpretation of hostile cues (Smith & Waterman, 2003). This would suggest that hostility was such a predominant factor within the current research due to how the individual interpreted the questions within the scale. When this is considered alongside perception and memory recall, if the individual perceived the question as a fearful situation, or recalled an event where fear or anger was apparent, their responses would have been more hostile (Smith & Waterman, 2003). It is also important to note that feelings of anger are frequently associated with goal directed actions (Harmon-Jones, Gable & Peterson, 2010) that directly link into the notion of competition, which was initially allocated as a predicted factor within the current scale (Berkowitz, 1993). As mentioned previously, not achieving a goal can lead to frustration and a fear of failure (Geen, 2001) that in turn can lead to hostile feelings towards specific situations (Geen, 2001). Accordingly, throughout the questionnaire, the questions may have reminded the individual of a situation where they felt anger or frustration, for example, competition based questions such as; 'if someone cheated me right now, I would feel angry (question C9a), aimed to arouse feelings of competitiveness which in turn can lead to a fear of failure. Through

the question, the individual is reminded of a situation where they felt anger or fear and may feel they are recalling the memory, therefore hold hostile feelings towards the situation. This demonstrates the importance of hostility as a measurement of aggression as this can eventually lead into the aggressive reaction.

In general, cognitive neoassociation theory would suggest that aggression is an involuntary, automatic response brought up through interpretation of an immediate situation whereby controlled cognitions only play a very small role in the consequence (Berkowitz, 1990). This would suggest that although hostile feelings are aroused within a situation, it is not state aggression itself but rather hostile thoughts that eventually will influence an individual's trait aggression in the long term in similar situations, therefore supporting the current research findings. Depending on how the individual responds in a fight or flight situation will determine how they recall certain events (Anderson & Bushman, 2002). When a question within the current research leads to a memory recall in those who responded more hostile than others, it could be suggested that rather than state aggression being present, it is hostile feelings towards a specific event through the recall of a memory. This would suggest that state aggression should be measured through physiological measurements to identify arousal and increased heart rate (Anderson et al., 1995; Felston, 1996) rather than in a self report format. Hostility alternately, can provide a good indication of how the individual feels depending on whether previous memories have been triggered by an emotional cue (Anderson & Bushman, 2002). Without this emotional cue, responses would be neutral therefore relating to the individuals trait aggression level and demonstrating a lack of state aggression. If state aggression was measurable on a self report scale, based on the theoretical perspectives presented, the responses should have been higher than they appeared to be. This is due to the questions increasing the individual's state aggression

throughout the whole scale rather than just on questions that produced hostile recall.

This notion can be demonstrated in terms of schemas (Anderson et al., 1998) which is already an established method of measuring state aggression. Ultimately, the current research effectively measured individual state aggression levels through neutral responses and hostile measurements.

If the self report scale had been successfully developed, a criticism of the current research could be in relation to desensitisation (Anderson et al., 2010). Desensitisation occurs when an individual reacts in a less intense manner due to continuous viewing of violent stimuli (Anderson et al., 2010). Individuals become desensitised to the violence and therefore do not react in as much of an emotional or aggressive manner than someone who is experiencing the violence for the first time. The theory of desensitisation defies the notion that people react accordingly depending on their previous experiences and perceptions of events (Berkowitz 1993; Geen 2001). Particularly due to the extensive evidence supporting the notion such as the consistent use of virtual technology (Arriaga et al., 2006) alongside the evidence of police and soldiers showing desensitisation through constant exposure to blood and gore (Bartholow, Bushman & Sestir, 2006).

When focusing on desensitisation in relation to the current research suggesting that hostility is predominant in the measurement of aggression, it could be suggested that desensitisation actually decreases the individual's hostility levels. This would suggest that through constant exposure to either violent media or real life situations of violence, the individual does experience desensitisation and therefore would not react in an aggressive manner or show increased emotions when aggression is manipulated. Consequently, within the current research, a low hostility score would have been

produced from the self report scales if desensitisation came into play, therefore researchers would have assumed that the individual's trait levels of aggression are in fact quite low. This is due to no state reaction representing the individual's trait aggression. If a valid hostility scale were to be produced and used in correspondence with a trait aggression scale with the aim of measuring overall aggression level, a prior exposure questionnaire would be essential to eliminate desensitisation influencing results.

The general aggression model (the GAM) to date has been a productive measure of aggression as a whole, integrating mini theories of aggression to create an overall cohesive theory (Bushman & Geen, 1990). However, it has been suggested that due to the progression of media violence within current society, a more up to date measure of aggression was needed (Bandura, 1977; Berkowitz, 1989). The current research aimed to create a psychometric scale to measure state aggression. This was to allow a reliable, quick and easy measure of state aggression that could be combined and compared to an individual's trait aggression measure to gain a reliable overall calculation of one's overall aggression. The progression of violent media was to be used as a current manipulation of modern day aggression to gain an insight into the influence of state aggression on overall aggression. Through the self report scale it became apparent that hostility was a major influence on an individual's aggression. This suggests that an individual's hostile perceptions of events are influential on their overall trait aggression levels which in turn would support the notion of the GAM suggesting that many theories of aggression must be accounted for prior to an appropriate overall measure being gained (Bushman & Geen, 1990).

In relation to modern society and the increase of violent media impacting aggression, the hostile feelings found within the current research can be more ambiguous than previously expected, which in turn will be a huge influence on how aggression is focused on and measured in the future. This is due to the individual creating perceptions towards events that have not necessarily been experienced in person but viewed through media. This is due to the realism that can now be portrayed within society's media. In 1999 in the US, youths from the age of 8 were spending over 40 hours a week using some type of media (Rideout, Foehr, Roberts, & Brodie, 1999). This suggests that through playing violent video games, which is already an established manipulator of aggression within literature (Funk et al., 2004; Uhlmann & Swanson, 2004), individuals as young as 8 years old can develop hostile perceptions of events and feelings towards situations that may not have been experienced within real life but solely within the media they have witnessed. This suggests that hostile thoughts can impact an individual's aggressive feelings and tendencies through an imaginary situation.

The concept of the violent content hypotheses (Anderson et al., 2010) created through the GAM suggests that state and trait aggression interact with one another to create an overall aggression level (Barlett et al., 2007). This notion is supported through the current research. Hostility, which is representing what is referred to within the GAM as state aggression (Bushman & Geen, 1990), has a huge influence on an individual's trait aggression levels. Hostility within the current research represents the individual's perceptions of real life situational factors. If an individual perceives a situation to be worrying, dangerous or upsetting, then future views of this situation are more likely to be negative and therefore they are likely to review this situation in the future as hostile and react in an aggressive or hostile manner. This is due to the hostile perception of an event and the individual's trait aggression/persona interacting with one another within

the individual's internal state (Barlett et al., 2007). Subsequently, if an individual had no influential feelings about a previous event, or had not previously experienced a situation, when they are faced with that situation their internal state will have a neutral reaction to their trait aggression levels which will in turn create a reflection of the individual's trait aggression levels in their reaction. In theory, if individuals were to perceive initial events in a less hostile way, this could have an influence on a small aspect of their trait aggression. Consequently, through minimising the hostile perceptions individuals' experience, then over time these hostile thoughts will be less influential on the individual's trait aggression levels. Although this notion is plausible, theorists have found many other influences on trait aggression, such as evolution (Reber & Reber, 2003) and upbringing (Cody, 2006). However, this is a credible explanation in terms of the interaction between state and trait aggression as initially suggested by the GAM (Barlett et al., 2007).

Furthermore, it is suggested that the GAM was initially introduced to demonstrate how an individual's learning could be increased or inhibited through the interaction between the person and their environment (Butcher & Spielburg, 1983). Ultimately, each learning encounter leads to a further learning trial (Butcher & Spielburg, 1983) due to the mediation and interaction of three internal states (Butcher & Spielburg, 1983) referred to as; affect, arousal and cognition. This is due to internal states acting as motivations between the person and the situation which in turn will impact their responses, aggressive or non aggressive, to the interactions between the person and the situation. The current research supports this notion through highlighting hostility as an important factor influencing an individual's aggression. The more hostile the person feels at a time or how hostile they perceive a specific event to be will determine how aggressive their reaction will be. In terms of the three internal states, a situation such as

a question on a scale could cause cognition from a previous event experienced. This cognition will activate perceptions of this previous event and the affect it previously had on the individual. This in turn will influence their arousal level, in this case if the event was perceived as negative they would feel more hostile towards it, which in turn would affect their behaviour or reactions to the new event. However, if an individual has not experienced anything similar to what the question is suggesting, no hostile thoughts will be held and therefore a neutral response will be provided, which in turn will reflect the individual's trait aggression levels.

The notion of a hostile attribution bias is created within the GAM (Crick & Dodge, 1994) as; "The tendency to perceive harmful actions by others as intentional rather than accidental" (Bushman & Anderson, 2002 p 1680). The current research suggests that this notion would be more related to trait aggression measures. If an individual has a hostile perception of another, yet they have no previous relations or contact with this person, then their hostile perception is more than likely irrational and therefore a reflection of the individual personality. If no thoughts or perceptions are aroused from looking at another individual, then they are having a neutral response to that person. If hostile thoughts are activated towards the person, then this neutral response will reflect the individual's trait hostility levels which in turn could represent their trait aggression level, not their state aggression.

The GAM suggests that the focus on knowledge structures of aggression in the form of four dimensions is important: 'Degree of hostile or agitated affect present; automaticity; degree to which the primary (ultimate) goal is to harm the victim versus benefit the perpetrator; and degree to which consequences are considered' (Anderson & DeWall, 2011, p 5).

This is due to many aggressive acts involving mixed motivations driving the behaviour, which allows researchers to gain a clearer insight into aggression rather than using a singular approach. The current research aimed to include the suggested four dimensions within the scale to measure state aggression on through the four factors allocated to the research through factor analysis and previous literature. The GAM allows this dichotomous approach towards the measurement of aggression to take place due to the GAM being a dynamic model integrating theories from social, personality, cognitive and developmental psychologists (Bandura, 1977; Berkowitz, 1989). Consequently, the GAM suggests that aggressive behaviour occurs depending on how the perpetrator interprets their environment and how they perceive events (Anderson & DeWall, 2011). This notion was also found to be influential within the current research, therefore demonstrating a strong argument towards perception being influential within aggressive behaviour, as mentioned previously regarding hostile perceptions. This is due to how the individual perceives their environmental situations alongside how they have perceived an initial event that could trigger an aggressive response. Other cognitions appear to be important within the GAM such as how the individual feels they will cope in a situation and the expectations surrounding different events (Anderson & DeWall, 2011). In relation to the current research, this notion is highlighted further. Through reading questions on the state aggression scale, individuals will review the questions, noting any previous perceptions they had of this experience, how their trait personality will influence their response; whether they have the abilities to deal with the response appropriately, alongside their expectations or beliefs of how real the situation put forth is. Once these factors are reviewed by the individual's cognitions, a response will be put forward accounting for each cognition that will either be aggressive or non aggressive.

It could be argued however, that this response would be a relation of the individual's trait aggression levels as they are reviewing how they feel they would be able to cope in a situation, rather than expressing their emotions about the situation immediately. Through this review of how they may cope, their personality will be overriding their emotions.

Moreover, it may be that the knowledge structures are initially demonstrating state aggression but over time will impact the individual's trait aggression that relates back to the notion of script theory and schemas (Ferguson & Dyck, 2012). In relation to the current research, the more times a hostile response is triggered due to the individual's perception of a particular event this will eventually cause future perceptions to be hostile responses which would lead the individual to feel very hostile towards any similar events in the future. Rather than this hostility being a state of the individual it will become a trait, due to it being their natural reaction to an event similar to the initial event. This in turn will impact the individual's trait aggression; the hostile feelings may eventually form an aggressive part of the individual's personality in relation to similar events, due to the previous experiences and perceptions.

Although the GAM aims to focus on aggression as a whole, the current research would suggest that trait aggression is essential to focus on alongside hostility, rather than focusing on 'state aggression.' Hostile thoughts and perceptions, referred to as hostility, are actually more influential on an individual's future trait aggression. Despite the current research demonstrating it may not be possible to construct a psychometric measure of state aggression; it did reinforce the notion of self report scale being an effective measure of aggression. This is due to the focus self report scales have on the

recall of events (Bushman & Geen, 1990); which from reviewing the current research appears to be an important component in the measurement of aggressive feelings and emotions. Consequently, the current research suggests that without previous experience of an event, recall will not be possible which in turn will result in a neutral response being demonstrated which in effect is the individual's trait aggression level. Effectively, they are experiencing a neutral state so their personality takes over in the form of trait aggression levels.

As noticed from previous literature on the measurement of aggression, self report scales are already an established method of measuring aggression (Bushman & Geen, 1990; Arraiga et al., 2006; Barlett et al., 2008). This notion is reinforced within the current research due to the effectiveness of gaining a record of the individuals emotions immediately rather than them thinking about results alongside the in depth analysis that was enabled to be carried out in the form of factor analysis to focus deeply on influential factors of results. As mentioned previously, for an effective measure of an individual's state to be gained, results must be recorded immediately after manipulation (Zillmann et al., 2004). The format of a self report scale enabled researchers to effectively measure the individual's state immediately without them thinking about the answer. This was due to observations by the researcher and immediate responses being requested; if participants had a chance to think of a response the question was to be left out and unaccounted for. Furthermore, factor analysis was conducted on the self report scale answers. This was done in the form of principle component analysis allowing clusters of questions to be focused on creating reliable, valid quantitative data to be gained (Field, 2004).

One form of self report scale which has previously proven useful in an attempt to gain a measure of state aggression is the hostility scale (Barlett et al., 2008). However, within previous literature, it has been suggested that a hostility scale alone is not sufficient to represent a conclusive state aggression measure (Arraiga et al., 2006; Barlett et al., 2007). This is due to hostility being a large contributing factor to the overall measure of state aggression (Barlett et al., 2007). Nevertheless, results have also demonstrated that the state hostility scale had different effects on hostility, anxiety and arousal (Arraiga et al., 2006). The hostility scale appears plausible due to the format of questions being focused on the present rather than reflecting on past experiences, however the current research has enabled adaptations to be made to this. The possible emphasis on the use of a hostility scale may be more functional than previously thought. This is due to the current research suggesting an importance on the recall of events creating hostile or neutral perceptions. This therefore further emphasises the important role hostility takes on in the measurement of internal states, in the form of aggression. It may be a plausible explanation that not only is hostility an aspect of state aggression (Barlett et al., 2008) but more so an influential aspect of the measurement due to its significance on feelings of recalled events.

Additionally, the hostile attribution bias was created to explain the short term effects of viewing violent stimuli (Anderson & Bushman, 2012). It posits that through regular exposure, short term knowledge structures can be primed which in turn results in the individual expecting neutral experiences to be more hostile than they are (Anderson & Bushman, 2012). The current research supports this notion to an extent, suggesting that hostility is extremely influential in how an individual will react and perceptions of events can lead an individual to act in a more aggressive manner. This is due to previous experiences suggesting that even a short view of violence can influence an

individual's perception of an event that in turn can influence their future reactions within similar situations, potentially leading to hostility. This would indicate that the hostile attribution bias should be focused on further and could possibly be used as a plausible adaptation of the GAM to allow for state aggression to be accounted for fully within measurement.

Through focusing on current literature, it is apparent that hostility is already an established measure of aggression (Buss & Durkee, 1957) however; the current research has further highlighted the importance of hostility. Rather than attempting to gain a measure of state aggression, similar to trait aggression, the current research would suggest that a measure of hostility could be representative of an individual's state aggression and therefore sufficient as a measure alongside trait aggression.

Similarly to the adaptation of the BDHI in the form of the BPAQ, the current research used a likert format to allow for quick answers and easy data interpretation (Lange et al., 1994). Furthermore, in attempt to address the concept of social desirability (Marlow & Crowne, 1960) through careful construction of the questions to allow justification of an aggressive response alongside two questionnaires that were representative of one another being given out. This was to eliminate social desirability as one questionnaire was to be conducted prior to aggressive manipulation and the other was to be done after manipulation. Questions had to be answered immediately to attempt to gain a reliable measure of the individual state therefore social desirability would be difficult to influence. This is due to each participant having to remember previous answer for both questionnaires to correspond together therefore making social desirability unlikely within the current scale. To continue the elimination of social desirability, the hostility scale would need to be carried out in a similar format to allow answers to be given

immediately. However, rather than two questionnaires representing one another being filled in, a trait measure of aggression could be sufficient to gain a measure of the individuals hostile attributions and to highlight the impact their personality has on their aggressive behaviour. This would then allow the hostility measure to be reliable, indicating how their hostile perceptions influenced their aggressive responses.

Furthermore, the BDHI measure of hostility has been criticised as being a personality measure of hostility. The current research has addressed this issue by ensuring answers are provided immediately. This therefore represents the state side of aggression rather than trait due to answers being provided within 4 seconds that has already been established as an important component of state aggression (Zillmann et al., 1974; Barlett et al., 2009). Furthermore questions are phrased to relate to the individual personally rather than be representative of anyone by using pronouns to involve the individual.

Unlike the BDHI, the TCRTT uses physical measures in an attempt to represent a state measure of aggression alongside the trait measure that the scale was created for (Cherek et al., 1997). Despite this appearing to be a plausible way of representing state aggression, the use of a self report scale would provide a much easier, quicker psychological measure, similar to the measures of trait aggression (Barlett et al., 2008). The current research attempted to do this and despite being unable to create a psychometric state aggression measure, has highlighted a way forward following these principles. Through using hostility as a measure of state aggression, which the current research has demonstrated to be plausible, an efficient psychometric scale could be created. This would allow a reliable representative measure of state aggression through measuring the individual's hostility levels without having to use the time consuming

and expensive method of physiological measurements. Furthermore, this would allow for a more ethical measure of state aggression without involving deception and possible physical discomfort that can occur in the TCRTT. Despite recording heart rate and other physiological measures (Cherek et al., 1997) the TCRTT is not an effective measure of state aggression. This is due to reaction time being recorded, meaning it focuses on reaction time rather than the emotional impact relating to state aggression.

Similarly to the state hostility scale, the current research was presented to participants as a current mood scale to eliminate experimental bias. All participants were fully debriefed at the end of the research to eliminate any ethical issues and ensure they fully understood what they had taken part in. Due to previous research finding a relationship between physical measures of state aggression and an individual's hostility score (Anderson et al., 1995), the current research did not take physical measurements to validate results. Subsequently, due to the importance of hostility found within the current research, and previous literature demonstrating the relationship between hostility and physical representations of state aggression (Anderson et al., 1995), it could be suggested that a physical measurement will not be necessary alongside a new hostility scale.

Previously, the state hostility scale was criticised as measuring an aspect of state aggression in the form of hostility rather than state aggression as a whole; as it initially aimed to measure (Barlett et al., 2008). However, the current research provides evidence against this criticism. Rather than hostility being an aspect of state aggression, the current research would posit that hostility is a representative measure of state aggression, due to the impact it has on how an individual reacts within a situation based

on their emotions. This would suggest that the state hostility scale could actually create an effective measure of state aggression if the limitations were overcome.

Through focusing on the limitations of the state hostility scale, the issue of not being able to relate the state hostility scale results to actual aggressive behaviour (Arraiga et al., 2006) was eliminated within the current research, due to two corresponding scales being used to measure the state aggression. The first scale represented a baseline measure of aggression and the second scale allowed a representation of the emotions surrounding the manipulation of aggression. Due to these factors, the state aggression scale remains incomplete; however, even with the highlighted importance of hostility representing state aggression, behaviour could be represented from a self report scale due to the comparison to an individual's trait aggression levels. This would allow a representation of hostile arousal in relation to their personality type. The limitation of ambiguous time influences on aggression in relation to the scale (Barlett et al., 2009) was eliminated within the current research due to the focus being primarily on state aggression. This meant there was no ambiguity surrounding the effects of aggression and the time taken to cause the effects. To eliminate this limitation within the future, precise time allocations need to be set out alongside clear understandings of what the scale is measuring at a given time.

The issue of social desirability is overcome through participants answering questions immediately and not being allowed to think of a response. The scale records their instinctual reaction and questions are worded in a way that relates to the participant rather than leading them to guessing the expectations or lead to any concerns of judgement from the researchers perspective. Despite the importance of hostility being

highlighted, the notion employed by Barlett et al., (2007) of using a single question to measure an individual's hostility levels would still be criticised. This is due to one question not focusing in enough depth on different areas of the individual's hostility therefore not allowing a representative measure.

Arraiga et al., (2006) criticised the use of a hostility scale as, within their research, violent video game violence had a different effect of the individual's state hostility as it did on their state anxiety (Arraiga et al., 2006). However, as previously mentioned, the definitions of anxiety and aggression differ slightly, the notion of anxiety is thought to be an emotion characterised by fear of impending doom (Gros et al., 2007) whereas aggression is known to be much more complex to define. It is most commonly thought to be an action or behaviour being carried out with an intention to harm another (Anderson & Bushman, 2002).

Therefore in an attempt to gain a reliable measure of state aggression, the current research can dispute this criticism and demonstrate that hostility can be used as a representative measure. Furthermore, the current research supports previous research by Bushman and Geen (1990), who through their emotional susceptibility scale found a causal link between hostility and emotional aggression. Consequently, highlighting the importance hostility can have on a state aggression measure.

The current research used a similar format as the already established state anger scale (Butcher & Spielberger, 1983) and the unpublished state anxiety scale (Gros et al., 2007). This is due to both scales being highly regarded for their format of questions to represent the state side of measurement (Butcher & Spielberger, 1983; Gros et al., 2007). The state anger scale was heavily criticised for being difficult to generalise

alongside the differentiation between anger and aggression (Butcher & Spielberger, 1983). It does however create a good baseline to focus the state aggression scale on due to it having good internal consistency (Butcher & Spielberger, 1983). This creates reinforcement in the current research finding hostility to be so influential due to the format of the scale.

The state trait anxiety inventory was also highly regarded in terms of internal consistency but was criticised for measuring aspects of depression rather than anxiety (Gros et al., 2007). Similarly to the state anger scale, it allowed a basis for the current research to focus the state aggression scale development on. To prevent criticisms similar to the state trait anxiety inventory, alongside differentiation in definition, the current research accounted for four different influential factors established within aggression, based on previous literature (Bushman & Geen, 1990; Arriaga et al., 2006; Eastin, 2006 and Colwell & Payne, 2000), therefore represents aggressive state. This allows validity towards the notion of hostility being representative towards a measure of state aggression as many factors were taken into account prior to the development of the scale. Furthermore through factor analysis, hostility became prominent; possibly due to the influence hostility has on the other factors used. It could also be suggested that anxiety, which is measured within the state trait anxiety inventory, can lead to aggression due to the frustration element of feelings (Gros et al., 2007) that has been accounted for as an aspect of the current research in the form of the factor frustration.

In relation to the use of story stems being used as a measure of state aggression, many limitations were highlighted in relation to social desirability and validity (Krish, 1998;

Anderson et al., 2005). Despite these criticisms, the notion of story stems is reinforced within the current research due to cognitive motivations being highlighted. This is due to the intent behind the story stem, not the measure itself, and occurs due to the relation the story stem has with the individual alongside the focus they have on cognitive motivations (Rule et al., 1987). This notion relates to mood dependant memory and how previous experiences can impact future reactions (Lewis & Critchley, 2003).

Furthermore, the influence of the limbic system on aggressive reactions within the brain relates to the notion of story stems (Geen, 2001). This is due to the scenario within the story stem leading to the retrieval of memories from previous experiences. The individual will then relate the scenario to past experience and therefore react accordingly. If aggressive behaviour occurs, it will be due to the individual holding hostile thoughts towards the previous experience and therefore relating them to the scenario. Alternately, if the individual has not experienced a situation similar to the scenario, then they will not hold any hostile thoughts towards the event, therefore in effect; their trait aggression levels would be measured. Unlike story stems, self report scales allow the participant to relate events to themselves and therefore create a sense of personalisation which will create a sense of validity within the results. This is due to participants answering the questions in relation to how they would react and not being able to put the responsibility of an aggressive response on a fictional character; as could occur within story stems. Consequently, the current research aimed to develop a self report scale.

Within the introduction it was stated that motivations behind the aggression are essential to allow the definition to be less one dimensional (Reber & Reber, 2001). The

current research has indicated the importance of hostility as a motivation alongside the already established personality type as a factor influencing an individual's aggression (Reber & Reber, 2001). If an individual's trait aggression is low; therefore they do not have an aggressive personality, the current research has indicated that for an aggressive reaction to occur the individual should hold hostile feelings towards the event. This could be due to previous experience or simply perceptions of what the event could entail, however hostility as a motivation appears very influential towards an individual's overall aggressive response. In conclusion, despite the current research aiming to develop an effective psychometric self report scale measure of state aggression, a reliable trait aggression scale was completed alongside an effective measure of hostility due to a lack of hostile response being representative of a trait aggression level. Ultimately, through focusing on the theoretical basis of state aggression, the current research has highlighted implications on psychometric quantification. Overall, it would appear that hostility alongside trait aggression could provide an effective, valuable psychological measure of state aggression due to the relationship between them both. Furthermore, through focusing on the theoretical basis of state aggression, the current research has highlighted the implications surrounding a psychometric quantification.

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Appendix A

Descriptive statistics

Sex

Mean	Standard Deviation
1.53	0.51

Sex	Percentage %
Male	47.5
Female	53.5

Age

Mean	Standard Deviation
2.80	1.40

Age	Percentage %
18 – 29	23.2
30 – 39	22.0
40 – 49	23.7
50 – 59	13.6
60 +	17.5

Appendix B

Informed Consent

**THE DEVELOPMENT OF A STATE AGGRESSION SCALE****ASHLEIGH COLLIGAN****Questionnaire consent form**

I have been fully informed of the nature and aims of this research and consent to taking part in it.

I understand that I have the right to withdraw from the interview at any time without giving any reason, and a right to withdraw my data if I wish

I understand that the completed questionnaire will be kept in secure conditions

I understand that no person other than the researcher will have access to the recording.

I understand that my identity will be protected by the use of pseudonym in the research report and that no information that could lead to my being identified will be included in any report or publication resulting from this research.

Name of researcher **Ashleigh Colligan**

Date:

Signature

Participant signature:

Appendix C

Participant's information

The purpose of this study is to create a scale that aims to measure the mood of an individual at the present time. To achieve this, all questions need to be answered within the space of 5 seconds. No thinking is required for each question, just mark the first answer that comes into your head. This will allow your initial response to be recorded, creating a more reliable overview of your current mood.

It is important to state that the answers to the questions have no consequences at all and will you remain anonymous throughout. The aim of this research is to validate a questionnaire. This means that under no circumstances will anyone become aware of who has answered the questions.

To ensure confidentiality remains throughout this research, you will be allocated with a unique number prior to the study commencing. You should keep this number safe as this is the number you will be referred to throughout the research. If at any time you want to withdraw your data from the study, you should contact the research on the details provided below stating either your name or number. Your information will be removed and destroyed immediately and no reason is needed for the withdrawal of your data. You can withdraw from the study at any point during or after the research has been carried out.

Researcher contact information: NAME: Ashleigh Colligan

EMAIL: u0752341@hud.ac.uk

PHONE: 07817914564

Appendix D

Debrief

Thank you very much for taking part in this research. The aim of the research was to create a valid scale to see measure the mood of the individual at the time of filling it in.

If you wish to see the results of the research please contact me on the email address below. Within the email ensure to write your name, or the number allocated to you to ensure you can be identified by the researcher.

If you feel you have been affected in any way by the research please send an email to the address below with your name or number and you will be advised on the correct help needed.

Please remember the right to withdraw your information from the research is available at any point. If you feel you wish to withdraw your information please email the address below with your name or the number you were allocated with. Your information will be removed from the research with immediate effect.

Thank you again your participation in the study, all information will remain confidential and anonymous.

Ashleigh Colligan

EMAIL: u0752341@hud.ac.uk

Appendix E

Questionnaire 1A

Please answer all the questions below, with the first answer that most represents you. You do not need to think about what the question is asking, answer each question within 5 seconds to ensure a reliable response. Any question that you feel is inappropriate, or you do not feel comfortable answering, please just leave blank.

Using the scale below, rate each statement on how true they are in relation to you.

1 2 3 4 5

(1 = strongly disagree, 3 = neutral, 5 = strongly agree)

1. If someone pushed me, I would push them back?

1 2 3 4 5

2. I react negatively if someone pushes in front of me?

1 2 3 4 5

3. I always think before I act.

1 2 3 4 5

4. I often worry about the consequences of my actions

1 2 3 4 5

5. I often get involved in things that do not concern me.

1 2 3 4 5

6. I wouldn't think twice about retaliating to someone that hurt me

1 2 3 4 5

7. I would take what I can to get what I want.

1 2 3 4 5

8. I like to be the best at everything I do.

1 2 3 4 5

9. I would feel very frustrated if I failed a test.

1 2 3 4 5

10. I think it is easier to give up at a task than keep trying

1 2 3 4 5

11. Competition makes me stressed

1 2 3 4 5

12. Cheaters make me angry

1 2 3 4 5

13. I feel like I always need to be the leader.

1 2 3 4 5

14. Sometimes I feel I have gotten the raw deal out of life.

1 2 3 4 5

15. I feel relaxed.

1 2 3 4 5

16. If I couldn't leave when I wanted I would get very agitated.

1 2 3 4 5

17. I often worry about my achievement levels.

1 2 3 4 5

18. I would feel annoyed if I was told I had done this questionnaire wrong

1 2 3 4 5

19. I feel even tempered

1 2 3 4 5

20. I feel relaxed when completing complicated tasks.

1 2 3 4 5

21. I like to keep trying and never give up, no matter how hard the challenge may be.

1 2 3 4 5

22. I get easily annoyed if I cannot do something I should be able to do

1 2 3 4 5

23. I am quite a laid back individual.

1 2 3 4 5

24. Other people always seem to get the breaks

1 2 3 4 5

25. I don't often feel angry

1 2 3 4 5

26. I am known to hold a grudge

1 2 3 4 5

27. I would still feel calm even if I had just witnessed a robbery

1 2 3 4 5

28. I feel irritated

1 2 3 4 5

29. I always walk away from fights

1 2 3 4 5

30. I am jealous of those higher than me

1 2 3 4 5

31. I will do anything to get my own way

1 2 3 4 5

32. I always get revenge on those who hurt me.

1 2 3 4 5

33. I can manipulate anyone

1 2 3 4 5

34. I sometimes feel like people are laughing at me behind my back

1 2 3 4 5

35. I am suspicious of overly friendly strangers

1 2 3 4 5

Questionnaire 1B

1. I give everyone a fair chance even if their first impression annoys me

1 2 3 4 5

2. People who lie make me angry

1 2 3 4 5

3. I am very forgiving

1 2 3 4 5

4. I believe in second chances

1 2 3 4 5

5. I like to stay in the background

1 2 3 4 5

6. I never get where I want to be, no matter how hard I work

1 2 3 4 5

7. I remain frustrated unless I hit out

1 2 3 4 5

8. I am good at calming down and relaxing

1 2 3 4 5

9. When frustrated I tend to cry rather than show it through anger

1 2 3 4 5

10. Everyone deserves a second chance

1 2 3 4 5

11. Hitting out relieves stress

1 2 3 4 5

12. I always receive bad luck.

1 2 3 4 5

13. I feel better if I get worked up rather than just stay calm the whole time

1 2 3 4 5

14. It makes me feel better if I hit out or break an object when things are
tough.

1 2 3 4 5

15. Quitters are pathetic

1 2 3 4 5

16. I am good at staying calm

1 2 3 4 5

17. I feel very stressed.

1 2 3 4 5

18. I don't mind having to start again when I do a task wrong.

1 2 3 4 5

19. I often feel ill from worrying

1 2 3 4 5

20. I am very laid back

1 2 3 4 5

21. I feel agitated.

1 2 3 4 5

22. Others always seem to get it easier than me

1 2 3 4 5

23. I get annoyed if someone takes over.

1 2 3 4 5

24. I agree with playing fair

1 2 3 4 5

25. I am very competitive

1 2 3 4 5

26. I get annoyed when I face a difficult challenge

1 2 3 4 5

27. I tend to let frustration take over my actions

1 2 3 4 5

28. If I lost I would feel angry

1 2 3 4 5

29. I always get my own way

1 2 3 4 5

30. If someone hurt you would you hit out?

1 2 3 4 5

31. I keep myself to myself

1 2 3 4 5

32. I am quite irrational when it comes to decision making

1 2 3 4 5

33. I sometimes regret the decisions I make

1 2 3 4 5

34. I never wait my turn

1 2 3 4 5

35. I lose my temper quite easily

1 2 3 4 5

Thank you very much for your time

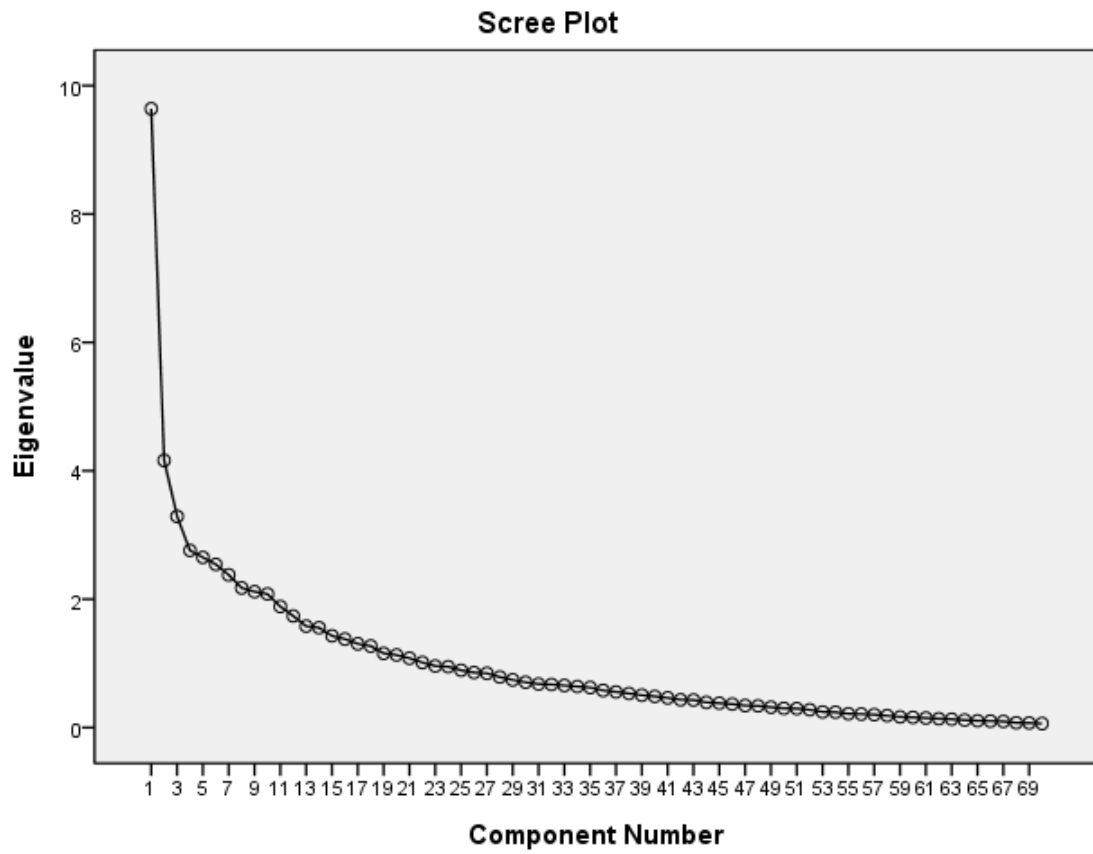
Appendix F

Table 1: Percentage of eigenvalues at extraction and rotation total variance explained

Component	Extraction sums of Square loadings. % Of variance	Rotation sums of square loadings. % of variance
1	13.77	8.107
2	5.946	7.394
3	4.700	4.512
4	3.942	4.487

Appendix G

Figure 1: Scree plot demonstrating principal component analysis for Questionnaire 1



Appendix H

Table 2: Rotated component matrix

Variable	Component			
	Hostility	Frustration	Competitiveness	Impulsivity
H7b I remain frustrated unless I hit out	.685			
F10b I feel agitated	.589			
H4b I believe in second chances	-.576			
H10b Everyone deserves a second chance	-.563			
F8b I often feel ill from worrying	.522			
F9b I am very laid back	-.505			
F6b I feel very stressed	.493			
F2b I feel better if I get worked up rather than just staying calm the whole time	.487			
F7b I don't mind having to start again when I do a task wrong	-.460			
I2b If someone hurt you would you hit out?	.424			
H4a I feel irritated				
F1a I feel relaxed				
F1b I always receive bad luck				
H8b I am good at calming down and				

relaxing				
C2b I get annoyed if someone takes over				
I6b I never wait my turn				
C1b Others always seem to get it easier than me				
H1b I give everyone a fair chance even if their first impression annoys me				
F7a I like to keep trying and never give up, no matter how hard the challenge may be				
F9a I am quite a laid back individual				
H7a I will do anything to get my own way		.649		
H9a I can manipulate anyone		.626		
I7a I would take what I can to get what I want		.579		
C6a I feel like I always need to be the leader		.550		
H8a I always get revenge on those that hurt me		.549		
C7b If I lost I would feel angry		.511		
C4b I am very competitive		.471		
I1b I always get my own way		.471		
F10a Other people always seem to get		.467		

the breaks				
H6b I never get where I want to be no matter how hard I would		.459		
C1a I like to be the best at everything I do		.401		
I6a I would not think twice about retaliating to someone that hurt me				
F4a I would feel annoyed if I was told I had done this questionnaire wrong				
H2a I am known to hold a grudge				
C5b I get annoyed when I face a difficult challenge				
C3a I think it is easier to give up at a task than keep trying				
I5a I often get involved in things that do not concern me				
H9b When frustrated I tend to cry rather than show anger				
H5b I like to stay in the background				
I7b I lose my temper quite easily			.502	
H11b Hitting out relieves stress			.481	
C6b I tend to let frustration take over			.476	

my actions				
F5b I am good at staying calm			-.454	
F3b It makes me feel better If I hit out or break an object when things are tough			.447	
C7a Sometimes I feel I have gotten the raw deal out of life			.425	
I4b I am quite irrational when it comes to decision making			.417	
C3b I agree with playing fair				
I3b I keep myself to myself				
I5b I sometimes regret the decision I make				
F4b Quitters are pathetic				
I3a I always think before I act				
H1a I do not often feel angry				
I1a If someone pushed me I would push them back				
H5a I always walk away from fights				
H10a I sometimes feel like people are laughing at me behind my back				.632
F3a I often worry about my achievement levels				.547

F8a I get easily annoyed if I cannot do something I should be able to do				.515
H3a I would still feel calm even if I witnessed a robbery				-.500
H2b People who lie make me angry				.498
C4a Competition makes me stressed				.451
H6a I am jealous of those higher than me				
C5a Cheaters make me angry				
F5a I feel even tempered				
C2a I would feel very frustrated if I failed a test				
F2a If I couldn't leave when I wanted to I would get very agitated				
I4a I often worry about the consequences of my actions				
F6a I feel relaxed when completing complicated tasks				
H11a I am suspicious of overly friendly strangers				
I2a I react negatively if someone pushes in front of me				
H3b I am very forgiving				

Appendix I

Questionnaire 2A

Please answer all the questions below, with the first answer that most represents you. You do not need to think about what the question is asking, answer each question within 5 seconds to ensure a reliable response. Any question that you feel is inappropriate, or you do not feel comfortable answering, please just leave blank.

Using the scale below, rate each statement on how true they are in relation to you.

1 2 3 4 5

(1 = strongly disagree, 3 = neutral, 5 = strongly agree)

1. At this present moment I feel frustrated

1 2 3 4 5

2. I feel quite unlucky

1 2 3 4 5

3. I feel like a nuisance

1 2 3 4 5

4. At this present time I feel like I can achieve anything

1 2 3 4 5

5. At this moment if I received a text saying my friend had got a mobile upgrade, I would have to go and get a better phone also

1 2 3 4 5

6. If I quit right now, others would think I was pathetic

1 2 3 4 5

7. If I witnessed a fight right now, I would get involved

1 2 3 4 5

8. Currently, I am thinking about what I will do next

1 2 3 4 5

9. If I was held now beyond my will I would feel very agitated

1 2 3 4 5

10. I like to have my own way

1 2 3 4 5

11. I feel like everyone else is more successful than me

1 2 3 4 5

12. I feel like I could easily lose my temper right now

1 2 3 4 5

13. I feel relaxed

1 2 3 4 5

14. Right now I feel very competitive

1 2 3 4 5

15. I feel nervous

1 2 3 4 5

16. If I looked at facebook right now and saw than someone had written something bad about me I would feel like breaking something in anger

1 2 3 4 5

17. I feel anger to those who get more help than me

1 2 3 4 5

18. If someone cheated me right now, I would feel very angry

1 2 3 4 5

19. I feel very carefree

1 2 3 4 5

20. If someone upset me right now I would forgive them

1 2 3 4 5

21. I feel annoyed

1 2 3 4 5

22. Right now I feel jealous of those who look better than me

1 2 3 4 5

23. I feel like giving up

1 2 3 4 5

24. Right now I feel like others are looking at me

1 2 3 4 5

25. If someone lied to me now, I would feel angry

1 2 3 4 5

26. I feel apprehensive

1 2 3 4 5

27. I have an urge to do something

1 2 3 4 5

28. If someone hit me right now, I would instantly retaliate

1 2 3 4 5

Questionnaire 2B

1. Right now I feel agitated

1 2 3 4 5

2. If I found out that my friend had got a smart phone, I would have to go and get a better one right now

1 2 3 4 5

3. I am worried about the results of this questionnaire

1 2 3 4 5

4. I feel quite hostile

1 2 3 4 5

5. Right now I feel like quitting is the easiest option

1 2 3 4 5

6. Right now, I wish I was alone so no one would notice me

1 2 3 4 5

7. If I were to write something on facebook about someone else and found out right now that they were hurt by this, I would feel regret

1 2 3 4 5

8. Right now, I feel very irritated

1 2 3 4 5

9. I feel quite impatient

1 2 3 4 5

10. Right now I feel like I could easily lose control of my actions???

1 2 3 4 5

11. I feel worried

1 2 3 4 5

12. I am stressed right now

1 2 3 4 5

13. Right now I feel calm

1 2 3 4 5

14. I feel quite aggressive

1 2 3 4 5

15. I feel like crying

1 2 3 4 5

16. If I witnessed a mugging right now, I wouldn't be bothered

1 2 3 4 5

17. Right now I feel proud of what I have achieved

1 2 3 4 5

18. I feel tense

1 2 3 4 5

19. Right now I would say I am untroubled

1 2 3 4 5

20. I currently feel quite irritated

1 2 3 4 5

21. Right now I feel I am the best due to my fashion sense

1 2 3 4 5

22. If I received a text right now from my partner by mistake, saying he/she loved someone else, I would feel very angry

1 2 3 4 5

23. I am not happy

1 2 3 4 5

24. If someone was overly friendly to me right now, I would feel very suspicious

1 2 3 4 5

25. I agree with fair chances

1 2 3 4 5

26. Right now I feel like acting spontaneously

1 2 3 4 5

27. Right now I would prefer to be unnoticed and in the background

1 2 3 4 5

28. If someone posted an embarrassing photo of me on facebook and I noticed it right now, I would instantly un-tag myself no matter what I was doing.

1

2

3

4

5

Thank you very much for your time

Appendix J

Table 3: % of eigenvalues at extraction and rotation total variance explained

Component	Extraction sums of square loadings % of variance	Rotation sums of square loadings % of variance
1	24.378	15.012
2	6.400	5.582
3	5.947	5.495
4	4.582	5.011
5	3.888	4.832
6	3.569	4.748
7	3.060	4.128
8	2.734	3.613
9	2.648	3.526
10	2.558	3.412
11	2.280	3.314
12	2.205	3.232
13	2.064	2.808
14	1.977	2.749
15	1.847	2.668

19		.744													
20		.588			.422										
21		.562													
22		- .459													
23			.810												
24			.778												
25			.628												
26			- .533												
27			.440												
28				.772											
29				.638											
30					.645										
31	.407				.602										
32					.549										
33															
34															
35						.769									
36						.598									
37						.508									
38						.406									
39							.786								
40							.552								
41							.493								

Key: Questions in relation to their number and code for table 4

1	H2b	Right now I feel agitated
2	F4b	Right now I feel very irritated
3	H13a	I feel annoyed
4	H1a	At this present moment I feel frustrated
5	H7a	I feel relaxed
6	H5a	I feel like I could easily lose my temper right now
7	F11a	I feel nervous
8	F10b	I feel quite aggressive
9	H10b	I feel quite hostile
10	H4b	Right now I feel like I could easily lose control of my actions
11	H12b	I currently feel quite irritated
12	F8b	I feel quite impatient
13	H9a	I feel quite unlucky
14	I2b	Right now I wish I was alone so no one would notice me
15	H18b	I am not happy
16	F13a	I feel very carefree
17	F1a	I feel like a nuisance
18	F5a	At this present time I feel like I can achieve anything
19	F12b	I feel like crying
20	F2b	I feel worried
21	H6b	I am stressed right now
22	H8b	Right now I feel calm
23	H16b	If I received a text right now from my partner by mistake, saying he/she loved someone else I would feel very angry
24	C14b	I agree with fair chances

25	C8b	Right now I feel proud of what I have achieved
26	H14b	Right now I feel I am the best due to my fashion sense
27	C9a	If someone cheated me right now I would feel very angry
28	F14b	Right now I would say I am untroubled
29	F7a	I like to have my own way
30	C7a	I feel anger to those who get more help than me
31	H15a	Right now I feel jealous of those who look better than me
32	H3a	I feel like everyone else is more successful than me
33	C4b	Right now I feel like quitting is the easiest option
34	F9a	Right now I feel very competitive
35	I3a	Currently, I am thinking about what I will do next
36	C3a	If I quit right now, others would think I was pathetic
37	C13a	If someone lied to me now I would feel angry
38	I5a	I feel apprehensive
39	I1a	If I witnessed a fight right now, I would get involved
40	F3a	If I was held now beyond my will, I would feel very agitated
41	I9a	If someone hit me right now, I would instantly retaliate
42	C6b	If I witnessed a mugging right now, I would not be bothered
43	C12b	If someone was overly friendly to me right now, I would feel very suspicious
44	C11a	Right now I feel like others are looking at me
45	C1a	At the moment, If I received a text from my friend saying they had got a mobile upgrade, I would have to and get a better phone also
46	C2b	If I found out my friend got a smart phone, I would have to go out and get a better one right now

47	I6b	Right now I feel like acting spontaneously
48	I7a	I have an urge to do something
49	I10b	If someone posted an embarrassing photo of me on facebook and I noticed it right now, I would instantly un-tag myself no matter what I was doing
50	I8b	Right now I would prefer to be unnoticed and in the background
51	H17a	I feel like giving up
52	C5a	If I looked at facebook right now and saw that someone had written something bad about me I would feel like breaking something in anger
53	I4b	If I were to write something on facebook about someone else and found out right now that they were hurt by this, I would feel regret
54	F6b	I am worried about the results of this questionnaire
55	H11a	If someone upset me right now, I would forgive them
56	C10b	I feel tense

Appendix L

Figure 2: Scree plot for principle component analysis for questionnaire 2

