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UNIVERSITY OF SOUTHAMPTON

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES

School of Psychology

Volume 1: Risk factors for aggression in childhood and adolescence

Volume 2: Selective attention to emotional facial expressions in aggressive adolescent males

By

Philip Anthony Matthew Horton, BSc(Hons), MSc, MA

17,012 words

Thesis for the degree of Doctor of Educational Psychology

May 2009

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

Faculty of Medicine, Health and Life Sciences

School of Psychology

Doctor of Educational Psychology

**SELECTIVE ATTENTION TO EMOTIONAL FACIAL EXPRESSIONS IN
AGGRESSIVE ADOLESCENT MALES**

Philip Anthony Matthew Horton BSc(Hons), MSc, MA

This thesis consists of two volumes. The first is a literature review exploring the development of aggression in adolescent males with a summary of research that outlines a complex multi-factor trajectory across the lifespan towards aggression in males. The literature review focuses on how flawed social cognitive processes act as a proximal mechanism that facilitates aggressive and violent responses during social interactions and how a social information processing model has been proposed to explain aggression in adolescent males. The second paper presents findings for an empirical study of adolescent males with either high or low levels of aggression who completed a visual probe task with emotive facial image stimuli. The paper represents the first study employing a visual probe design with a sample of adolescent males identified with high levels of aggression. Findings revealed evidence of reduced attentional bias to angry expressions (angry) in those with high levels of aggression compared to non-aggressive controls. Implications for social information processing theory are discussed.

| | |
|--|-------------|
| THESIS ABSTRACT | II |
| LIST OF CONTENTS | III |
| LIST OF TABLES | V |
| LIST OF FIGURES | V |
| DECLARATION OF AUTHORSHIP | VI |
| ACKNOWLEDGEMENTS | VII |
| ABBREVIATIONS | VIII |
| | |
| CHAPTER 1: LITERATURE REVIEW ABSTRACT..... | 10 |
| 1.0 Introduction..... | 11 |
| 1.1 Overview..... | 11 |
| 1.2 Gender differences in aggression..... | 11 |
| 1.3 Anti-social behaviour and youth violence | 13 |
| 1.4 Aggression and violence in school | 14 |
| 1.5 Defining aggression | 15 |
| 1.6 Reactive and proactive aggression..... | 16 |
| 1.7 Risk factors that predict the development of aggressive behaviour | 17 |
| 1.7.1 Biological factors | 18 |
| 1.7.2 Social, cultural and educational factors | 19 |
| 1.7.3 Parenting style and the home environment..... | 21 |
| 1.7.4 Witnessing aggression and violence in the home | 24 |
| 1.8 Developmental models and the interaction of risk factors in aggression | 25 |
| 1.9 The Social Information Processing Theory | 27 |
| 1.10 Cognitive and emotional processes..... | 32 |
| 1.11 Executive functioning processes..... | 34 |
| 1.12 Visual probe paradigms | 35 |
| 1.13 Research evidence from child and adolescent populations..... | 37 |
| 1.14 Research aims | 40 |
| 1.15 Hypotheses | 41 |
| 1.16 Contribution to Educational Psychology knowledge and practice | 42 |
| | |
| CHAPTER TWO: EMPIRICAL PAPER ABSTRACT..... | 44 |
| 1.1 Introduction..... | 45 |
| 1.2 Method | 50 |
| 1.2.1 Participants..... | 50 |
| 1.2.2 Materials and apparatus. | 51 |
| 1.2.2.1 The Teacher Report Form (TRF)..... | 51 |
| 1.2.2.2 Visual probe task..... | 52 |
| 1.2.2.3 State Trait Anxiety Inventory and the Profile of Mood States .. | 52 |
| 1.2.3 Procedure. | 53 |

| | |
|--|----|
| 1.3 Results | 54 |
| 1.3.1 Group allocation..... | 54 |
| 1.3.2 Data preparation..... | 56 |
| 1.3.2 Data analysis. | 56 |
| 1.4 Discussion | 58 |
| | |
| APPENDIX A: TABLES AND FIGURES | 65 |
| A1. TABLE 3: Frequency data for participants' TRF aggression syndrome scale raw scores..... | 65 |
| A2. FIGURE 3: Frequency distribution for participants' TRF aggression syndrome scale raw scores | 66 |
| A3. TABLE 4: High-aggression and low-aggression group's mean reaction time scores and standard deviations for angry, happy and frightened facial images. | 67 |
| | |
| APPENDIX B: MEASURES | 68 |
| B1. The Teacher's Report Form (TRF) | 68 |
| B2. The edited short version of the TRF..... | 69 |
| B3. The scoring key for the edited short version of the TRF | 71 |
| B4. The State Trait Anxiety Inventory for Children State/Trait form. | 73 |
| B5. The Profile of Mood States State form..... | 74 |
| B6. The Profile of Mood States Trait form..... | 75 |
| | |
| APPENDIX C: LETTERS AND CONSENT FORMS | 76 |
| C1. Parental information letter and opt in consent form..... | 76 |
| C2. Teacher information letter | 78 |
| C3. Teacher's Report Form covering letter | 79 |
| | |
| REFERENCES | 80 |

LIST OF TABLES

TABLE 1: Group characteristics 55

TABLE 2: Group's mean reaction times for each SOA and emotional expression
..... 57

LIST OF FIGURES

FIGURE 1: The reformulated social information-processing model of child social
adjustment 28

FIGURE 2: High and low aggression group's mean reaction times (RT) for facial
images 57

DECLARATION OF AUTHORSHIP

I, PHILIP ANTHONY MATTHEW HORTON

declare that the thesis entitled

**AN INVESTIGATION OF ADOLESCENT MALES' REPSONSES TO
COMPUTER BASED PRESENTATIONS OF EMOTIONAL FACES**

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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ACKNOWLEDGEMENTS

I would like to first thank my supervisor Dr Matt Garner at the University of Southampton for his continued support throughout my thesis. I would particularly like to thank the children, parents and teachers at all of the schools for their support and involvement in the study. To my family and friends, I would like to thank them all for their invaluable support along the way and especially to my fiancée Dr Anna Navarro. Last but not least I would like to thank my colleagues with Hampshire Educational Psychology Service and fellow Trainee Educational Psychologists for their advice and support.

ABBREVIATIONS

ANOVA: Analysis of variance.

ANCOVA: Analysis of covariance.

CBCL: Child Behaviour Checklist.

BESD: Behavioural, emotional and social difficulties.

KS: Key stage.

POMS: Profile of Mood States.

RT: Reaction time.

SOA: Stimulus-onset-asynchrony.

STAI: State Trait Anxiety Inventory.

STAIC: State Trait Anxiety Inventory for Children

TRF: Teacher's Report Form.

SIP: Social Information Processing.

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Literature review abstract

Adolescent aggression and violence in the United Kingdom is of growing concern for policy makers and professionals. This literature review will consider how aggressive and violent tendencies in adolescent males develop over the life course with specific consideration being given to the social cognitive processes that facilitate aggressive behaviour.

A Social Information Processing (SIP) theory has been proposed by Crick and Dodge (1994) to account for the mechanisms facilitating aggression in adolescent males. Of interest to the current paper are those biological, social and environmental risk factors that impact on the developing child to increase the likelihood that they will mature into adolescence and adulthood with a propensity for responding aggressively in social contexts. It will be argued that the interaction of risk factors propels the developing child along a trajectory of life experiences that promote the development of flawed social cognitive structures. Studies that have employed social vignette and interview designs to explore SIP theory's predictions regarding aggressive child and adolescent samples have focused on how aggressive individuals monitor for threatening social cues during interactions.

The qualitative designs employed to date with this population, however, have failed to isolate and measure underlying perceptual and cognitive processes that SIP theory proposes are influential in the maintenance and manifestation of aggression. Research examining anxious populations' attentional bias and vigilance-avoidance of threatening stimuli using visual probe designs will be considered to outline a rationale for employing a similar quantitative design to explore vigilance and attentional mechanisms for high-aggression and low-aggression adolescent male samples.

1. Introduction

1.1 Overview

This literature review will examine the development of aggressive and violent behaviour in adolescent males. The prognosis for delinquent youths within the population is poor as behaviours characteristic of delinquency have been shown to be stable across time and are associated with limited economic and social opportunities and poor life outcomes (Lochman and Wells, 2002; Loeber & Farrington, 1998). Cognitive behavioural interventions have been shown to have some positive effects with youth populations with aggression and conduct problems (Pearson, Lipton, Cleland & Yee, 2002) and have focused on addressing the social cognitive processes that facilitate aggressive behaviour.

Social Information Processing (SIP) theory was developed by Dodge (1986) and subsequently reformulated by Crick and Dodge (1994). SIP theory proposes that observed variation in behaviours exhibited in social situations are accounted for by individual differences in the mental processing of social information (Dodge, 1986). Deficits in social information processing are thought to be central in the manifestation of aggressive behaviour during individual and group interactions. It will be argued that experimental designs examining attention to or avoidance of emotive faces could provide data to test hypotheses supporting the initial two stages of Crick and Dodge's (1994) six stage SIP model, namely the encoding and interpretation of social information during interactions. The extent to which SIP theory (Crick and Dodge, 1994; Dodge, 1986) provides a plausible model to understand those mechanisms involved in the occurrence and development of aggressive behaviour will be determined by evaluating evidence from research studies that examine the effect of trait aggression on attention towards and interpretation of emotive facial expressions.

1.2 Gender differences in aggression

Violence and criminality within the youth population are issues of growing concern, specifically the reported increase in trend for knife crime fatalities within the young male population (Home Office Research, Development and Statistics Directorate of Social Research, HORDSDSR, 2009).

Kipnis (2001) has noted that males tend to demonstrate more chronic behaviour difficulties than females. Incidents of aggressive and violent behaviour in schools also appear to be increasing, perpetrated predominantly by young males (Department for Children, Schools and Families, 2008).

It has been suggested that mechanisms that facilitate aggression in males may be different from those identified in females (Brennan, Hall & Bor, 2003). Crick and Grotpeter (1995) have highlighted gender differences in human aggression noting females are more inclined to demonstrate covert relational aggressive behaviours rather than overt expressions of aggression and violence as observed in males. Relational aggressive acts have a detrimental impact on others through manipulation of peer relationships and the damaging of social reputations. Such acts include gossiping, subtle verbal disparaging comments and orchestrating social exclusion from peer groups, so isolating the recipient from support networks and reducing their social status. Males, however, are observed to be more overt in their aggressive behaviours, demonstrating a higher frequency of verbal and physical aggression during hostile social interactions than females (Kipnis, 2001).

Bandura (1961, 1983) identified gender differences in the aggressive behaviour of young children, reporting that boys demonstrate more than twice as many aggressive behaviours in a social context compared to girls. Bandura's findings may account for the observed gender differences in recorded figures for permanent and fixed period exclusions for challenging behaviour in school age populations. For the 2006/2007 academic year 6,850 males and 1,790 females were permanently excluded from English and Welsh schools for behavioural problems, males accounting for 79% of the total number of permanent exclusions for the year. Exclusion rates for males have also remained stable over the previous five years, representing a ratio nearly four times higher than that for females (Department for Children, Schools and Families, 2008).

A similar gender difference is also reported for fixed period exclusions. In 2006/07 the fixed period exclusion rate for males was approximately three times higher than that for females, with males accounting for 75 per cent of the total number of fixed period exclusions for the year (Department for Children, Schools and Families, 2008).

In view of the apparent differences in mechanisms that facilitate aggression in males and females and reported frequency of behavioural problems in school, the focus of this literature review shall be upon male aggression. For a review of models of female aggression see Brennan, Hall and Bor (2003).

1.3 Anti-social behaviour and youth violence

The British Crime Survey (BCS, HORDSDSR, 2009) reports overall violent crime has decreased by 41% since a peak in 1995. However, figures for years prior to the 2007/2008 BCS survey did not include data for those aged 16 years and under. Anti-social and offending behaviour perpetrated by young people is increasingly a problem within the United Kingdom (Blackburn, 2001). Media reported aggressive and violent acts within the youth population and perceived levels of threat of victimisation within the wider population are common with adolescent male fatalities as a result of knife crime being a major concern (HORDSDSR, 2009).

A Mori survey commissioned by the UK Government's Youth Justice Board has highlighted this worrying trend of knife possession within the youth population. The survey with male and female pupils reported 29 per cent of secondary school children (i.e. 11 to 16 years of age) admitted to carrying a knife in the street at some point (Centre for Crime and Justice Studies, 2007). The findings appear to correspond with the increasing prevalence of young people being the victims or perpetrators of crime and violence involving knives (BCS, 2008).

In 2007/2008 there were a reported 22,000 crimes of attempted murder, Grievous Bodily Harm (GBH) and robbery involving knives or sharp implements in England and Wales (HORDSDSR, 2009). Violence with knives accounted for one-in-five of all recorded violent offences during that year, the use of sharp implements during an assault representing approximately 40% of serious wounding crimes and just over a third of all recorded homicides.

The probability of exposure to violence is the greatest for young people in society. Knife violence within the young male population during assaults and gang violence is a growing concern. Young men aged 16-24 years in particular

are most at risk of being victims of violence in England and Wales with the risks of victimisation being notably more severe in Scotland (HORDSDSR, 2009). The homicide rate for the 10 to 29 year age group in Scotland is 5.3 per 100,000, compared with 1 per 100,000 in England and Wales.

The majority of knife related UK crime has been concentrated around the cities of London, Manchester, Birmingham, Leeds, Newcastle and Glasgow. In London the Metropolitan Police report that knife crime fell by 16% in 2008. However, knife related violence still accounted for a total of 7,409 offences during 2008, with 22 teenagers dying in London during the year as a result of stab wounds inflicted by youths of similar ages. In total 34 teenagers were stabbed to death in England and Wales during 2008.

1.4 Aggression and violence in schools

Aggressive and violent behaviour is also reported to be on the increase in English schools (Blackburn, 2001). UK Government figures for 2007 show more than 1,000 children aged five and under received fixed term exclusions for physically assaulting other pupils in school. For pupils less than 16 years of age 65,390 received fixed term exclusions for assaulting pupils and 8,560 for assaulting school staff (Department for Children, Schools and Families, 2008). A survey published in the same year by the Association of Teachers and Lecturers found that three out of ten teachers had experienced physical aggression, three quarters reporting being threatened by a pupil and one in ten being injured by a pupil as a result of a violent assault (Association of Teachers & Lecturers, ATL, 2008).

Crime statistics for England and Wales corroborates this developing trend. For the 2007/8 academic year police were called to more than 7,300 reports of attempted or actual violent crime in schools across England. In London the Metropolitan police attended schools on 2,698 occasions. Whilst in the Thames Valley police involvement was requested 697 times by schools for violent incidents. The true figures for England are estimated to be nearer to 10,000 serious cases of violence in schools for the year, as not all violent incidents occurring in educational settings were reported to the police (HORDSDSR, 2009).

Of interest to this literature review is identification of those causal pathways that facilitate the development of aggressive and violent behaviour within some adolescent males. Fontaine and Dodge (2006) argue that exploring why one individual responds aggressively and another passively in similar social situations is of central importance to understanding the development of aggression in youth. Initially it is important to define aggression and to consider if it functions in different ways dependent upon context or individual differences.

1.5 Defining aggression

Definitions of aggression have focused upon the role of observable externalised behaviours aimed at achieving a personal goal, such as social dominance, defence or retaliation. Dodge (1991) defines aggression as behaviour deliberately aimed at harming other people or damaging objects. Farrington (2007) defines aggression as volitional behaviour that is intended to cause or that actually causes physical and/or psychological injury. Blackburn (2001), however, defines aggression as an individual's intentional behaviours aimed at gaining advantage over other people without necessarily involving physical injury. The experience of violence, therefore, and the possible physical or psychological harm that could result for a recipient is not necessarily a foregone conclusion.

Displays of aggressive behaviour present the recipient with evidence of an increased probability of risk of danger if they do not concede or act subserviently. The role of aggression could be viewed as one that serves to increase the likelihood of an individual achieving a personal goal in a social context through the demonstration of their physical attributes. Aggression operates as a pre-cursor to an escalation towards possible physical contact during a negative social interaction. Aggression, therefore, appears to represent a display of behaviours that signify and communicate the aggressor's potential to cause physical, emotional or psychological harm to others. The emphasis is upon the recipient's increased awareness of the aggressor's potential to cause some level of physical or psychological injury as a result of applying their physical attributes.

1.6 Reactive and proactive aggression

A distinction between two forms of aggression, facilitated in some part by an element of individual control is apparent. Aggression has been classified as impulsive and non-impulsive. The former is enacted in response to an immediate perceived threat and is reactionary in nature. The latter is planned and executed in an orchestrated manner in order to attain a pre-determined objective.

In the psychological literature aggression has also been dually classified. Some aggressive acts are identified as expressive, which means they are impulsive and are triggered by a state of high emotional arousal such as anger or fear (Blackburn, 2001). Other forms of aggression are classified as instrumental referring to behaviours that are non-impulsive in nature and are under the individual's control. Non-impulsive aggression is seen as being goal oriented (Blackburn, 2001) and is characterised by lower levels of physiological arousal. Antisocial individuals who perpetrate non-impulsive aggressive and violent acts have been shown to have lower levels of arousal measured by heart rate and skin conductance (Vitello & Stoff, 1997). A lower heart rate in individuals demonstrating aggression is thought to reflect under arousal, efficient cognitive processing and be indicative of planned instrumental behaviours aimed at securing goal attainment. In comparison, increased levels of arousal in the form of heightened heart rate and skin conductance are found to be highly related to impulsive aggressive acts that are reactionary in nature, are poorly planned and executed with instinctive actions and limited cognitive processing (Scarpa & Raine, 1997).

In line with this distinction Kempes, Matthys, de Vries and van Engeland (2005) have highlighted reactive and proactive aggression. Reactive aggression refers to impulsive reactionary behaviours that manifest as a response to a sudden perception of danger or as a response to another individual's behaviour that is perceived as threatening. Proactive aggression refers to behaviours that are planned and acted upon at a later point in time in response to a set of social circumstances. The latter is thought to represent an individual's attempts to achieve a pre-determined goal such as revenge, dominance or taking advantage of an opportunistic point in time when success is most likely to result.

According to Kempes et al (2005) reactive aggression is related to poor self-control, whereas proactive aggression is influenced by contingency management procedures, planning and social problem solving skills. The mechanisms integral to the interpretation of other's intentions appears to be central in reactive aggressive acts. Studies with aggressive children and adolescents have demonstrated that reactive and proactive aggression appears to correspond to different patterns of social information processing (Dodge et al, 1997).

Pettit and Mize (2007) note that information processing models of aggression focus on the social cognitive mechanisms of aggression in children and adolescents, with the processing patterns for reactive and proactive aggression appearing to differ as do the processing patterns observed in aggressive and non-aggressive samples. They argue that in order to understand why some young males behave aggressively in social situations it is imperative to explore the mechanisms supporting decision making during social interactions and how those mechanisms develop over time.

1.7 Risk factors that predict the development of aggressive behaviour

Longitudinal research examining the family environment has highlighted the interactional relationship of negative variables on child development and subsequent poor life outcomes for adolescents and adults (Sroufe, Egeland, Carlson and Collins, 2005). Evidence has been reported for a range of factors that correlate with the development of aggressive behaviour in young people (Dodge & Pettit, 2003). There appears to be a clear relationship between the development of aggression, violence and criminality in youth and the interplay of multiple detrimental factors. Evidence has been identified for genetic (e.g., Eaves, Rutter, Silberg, Shillady, Maes, & Pickles, 2000), hormonal (e.g., Brain & Susman, 1997), autonomic nervous system (e.g., Raine & Liu, 1998), temperamental (e.g., Caspi, Henry, McGee, & Moffitt, 1995; Rothbart & Bates, 1998), sociocultural (e.g., Wilson, 1987), family process (e.g., Patterson, Reid, & Dishion, 1992), stressful life events (e.g., Guerra, Huesmann, Tolan, Van Acker, & Eron, 1995), peer rejection (e.g., Asher, Rose, & Gabriel, 2001), deviant peer influence (e.g., Farrington, 1995; Thornberry, 1998), school climate (e.g., Werthamer-Larsson, Kellam, & Wheeler, 1991), cultural and situational

factors (e.g., Fagan & Wilkinson, 1997) and social-cognitive processing mechanisms (e.g., Dodge, 1986; Huesmann, 1988).

Dodge and Pettit (2003) argue an interactional relationship exists between risk factors (review above) that precipitate the development of aggressive behaviour and conduct problems in young males. Models attempting to explain the development of aggressive behaviour suggest multiple distal risk factors and varying paths facilitate the development of aggression and violence. Major and contributing categories of factors include biological, emotional, motivational, social and cognitive (Fontaine & Dodge, 2006).

1.7.1 Biological factors

The males of every mammalian species are observed to display more aggression than females (Petitt & Mize, 2003). Research has also indicated the prevalence of genetic heritability for aggression and antisocial behaviour in some families (Taylor, Iacono & McGue, 2000). Twin and adoption studies report that genetic factors appear to be related to children's externalised challenging behaviour (Eley, Lichtenstein, Stevenson, 1999), substance abuse (Cadoret, Yates, Troughton, Woodworth & Stewart, 1995) and to subsequent self-reports of adolescent delinquent behaviour (Rowe, 1985). It is argued that the relationship between genetics and aggression is a result of polygenetic factors, with inherited traits influencing the development of deviant and deregulated behaviour rather than solely aggression and violence. Thus some children and young people may have a genetically based propensity to manage social interactions inappropriately resulting in a greater risk for future conduct problems and aggressive responses.

Another important biological factor is prenatal exposure to toxins or a diseased prenatal environment. Evidence has been reported to indicate that children born having had exposure to toxins in utero can present with a hyper-persistent behaviour inhibition system (Fowles, 2001), autonomic nervous system hyperactivity (Scarpa & Raine, 2000), cognitive difficulties in attention (Hinshaw, 1994) and difficult temperament (Bates, Bayles, Bennett, Ridge, & Brown, 1991). De Cuba and Field (1993) reported that children exposed to diamorphine or methadone in the womb presented with conduct problems at 10

to 13 years of age. However, the interaction of other variables in the home or community alongside toxins may represent a dualistic influence on a child's learning of inappropriate behavioural responses in social contexts. Also, not all young people presenting with conduct problems have experienced a toxic pre-natal or home environment (Sroufe et al., 2005) suggesting other factors are influential in facilitating the development of aggressive tendencies.

1.7.2 Social, cultural and educational factors

Social and cultural factors that impact upon the development of children and young people include living in communities with a high prevalence of neighbourhood violence, poverty and high residential mobility. Such early contexts of disadvantage have been shown to be related to poor life outcomes and are associated with predictive risk of relationship, mental health and aggression and conduct problems in later life (Sroufe et al., 2005).

The school and classroom context appears to be an influential factor on developing attitudes towards aggression and challenging behaviour. Schools that have a high incidence of aggression between peers, and classrooms with a high proportion of aggressive children have been shown to report an increased frequency of aggressive behaviour amongst the school population as a whole. Pupils attending schools with high levels of overall pupil aggression also appear to develop positive attitudes towards the use of aggression in social situations and report the benefits of being aggressive during social interactions (Henry, Guerra, Huesmann, Tolan, VanAcker & Eron, 2000; Stormshak, Bierman, Bruschi, Dodge, Coie, 1999).

School failure also appears to represent a risk factor for the development of antisocial and aggressive behaviour in children and young people (Roeser & Eccles, 2000). Moffitt, Gabrielli, Mednick, & Schulsinger (1981) reported that the timing of a child's first experiences of academic failure and how it was managed by teachers and parents predicted the likelihood of conduct problems manifesting later during the educational career, more so than measures of intelligence. Similar findings for early school failure have been noted where academic failure and disillusionment with education appear to be much stronger

predictive factors for adolescent aggression than low intelligence (Hinshaw, 1992).

The quality of care in after-school activities has also been associated with the later development of conduct problems in young males (Flannery, Williams & Vazsonyi, 1999). Pettit, Laird, Bates, & Dodge (1997) reported that children who were regularly unsupervised after school each week during their early years of schooling were at an increased risk of developing behaviour problems in early adolescence. Subsequent research has highlighted that children who are unsupervised after school in their early years go on to spend increased time in unsupervised activity with delinquent peers during adolescence (Colwell et al., 2001), which increases the risks of alcohol consumption, criminality and other anti-social behaviours characteristic of conduct problems as a result of the influence of poor peer role models (Pettit, Bates, Dodge & Meece, 1999).

Pre-school care experiences during the early years are also identified as having an important influence on the development of aggression and conduct problems in adolescent males. Belsky (2001) reported that exposure to high rates of out-of-home day care in the first 5 years of life predicted teacher rated and peer-rated measures of aggression. High levels of out-of-home care also predict levels of observed aggressive behaviour in Early Years settings (Bates, Marvinney, Kelly, Dodge, Bennett & Pettit, 1994). Of specific interest is the nature of the experiences in day-care and pre-school settings that results in the development of aggressive tendencies.

Sinclair, Pettit, Harrist, Dodge, & Bates (1994) reported that the amount of exposure a child had to aggressive peers in day care or preschool was highly predictive of future aggressive behaviour. Similar to Pettit et al (1999) they suggest that in line with Bandura's (1961, 1983) Social Learning Theory, aggressive behaviour is modelled by peers in educational or community settings and learnt to be an acceptable response to achieve interpersonal goals and to maintain social status within the group.

However, Pettit, Clawson, Dodge, & Bates (1996) reported that children who were rejected and socially isolated from their peers in pre-school settings during the 2-year period prior to starting school were found to be more aggressive and less socially skilled. This suggests a lack of exposure to passive

role models and the detrimental impact of isolation is influential in the development of future conduct problems. Subsequent follow up research has highlighted that social rejection by peers during pre-school and the early years of school was a strong risk factor for adolescent conduct problems in later life (Laird, Jordan, Dodge, Pettit, & Bates, 2001). Those children who are identified as having been regularly rejected by peers during play activities for at least 2 or 3 years by the second year of school have a 50% chance of displaying clinically significant conduct problems later in adolescence, in contrast with just a 9% chance for those children who did not experience peer rejection (Dodge & Pettit, 2003).

Retention in a year group, whilst peers move up to the older year group class at the end of the academic year, is also a risk factor for future difficulties. The rationale for such approaches during the early years is to support the individual's acquisition of social, emotional and learning skills prior to transition if an individual's progress is viewed as being significantly below that of peers. However, meta-analyses data indicates that retention in a year group and delayed transition from pre-school and during the reception year in school can have a negative impact on future behaviour in spite of any potential academic benefits remaining in a lower year group may present (Holmes, 1989). Plummer and Graziano (1987) suggest children who do not make transition are viewed negatively by their peers and can subsequently be socially rejected by them.

1.7.3 Parenting style and the home environment

The socioeconomic status of parents, specifically their income, occupation and level of education at the time of the child's birth, has also been shown to be a strong and reliable predictor of future conduct problems in childhood and adolescence (Bradley & Corwyn, 2002). Being born to teenage parents (Morash & Rucker, 1989), single parent households (Ackerman, D'Eramo, Umyliny, Schuktz & Izard, 2001) and experiencing parental divorce have all been shown to predict conduct problems in later life (Amato, 2001).

Growing up in a family under such circumstances is not in itself the causal factor, but rather it is the parenting style and the quality of the

interpersonal interactions between the parents, siblings and the child that appears to be influential.

Snyder and Patterson (1995) found that 4 year old children who experienced negative reinforcement from mothers when they behaved inappropriately during social interactions with peers and adults were more likely to develop conduct problems later in life. Patterson (1995) has outlined the characteristics of such a mother child relationship and how it can result in challenging and aggressive behaviour in later life. He notes that a four step behavioural interaction between the mother and child facilitates an increased frequency of inappropriate behaviours in some children. First, the parent makes an intrusive request of the child. The child responds with aversive behaviour such as losing its temper, throwing a tantrum and screaming. The parent eventually capitulates in order to influence the child to stop their behaviour and ceases to make the intrusive request. The child subsequently stops the aversive response and achieves their objective in the social context and gains dominance over the mother. Patterson (1995) suggests that it is the contingent reinforcement by parents of a child's aggressive and antisocial behaviour that is a key life experience risk factor that facilitates future conduct problems in adolescence. The child learns how effective the application of aggression can be in social contexts to achieve interpersonal goals and continues to use similar strategies during social interactions with peers and adults.

However, contrary to the view that conceding to children's tantrums is detrimental, research has also highlighted the negative role of physically harsh discipline practices in the family home (Farrington & Hawkins, 1991). When verbally harsh discipline deteriorates to become physical discipline and abuse the effects appear to be severe in terms of increasing the likelihood that the child will develop aggressive and violent tendencies in later life (Deater-Deckard & Dodge, 1997; Rutter, Giller & Hagell, 1998).

The lack of a nurturing relationship between parent and child is another risk factor associated with antisocial behaviour (Bowlby, 2005; McFadyen-Ketchum, Bates, Dodge, & Pettit, 1996; Pettit, Bates, & Dodge, 1993). Dishion and Bullock (2002) referred to the positive maternal relationship as the Nurturance Hypothesis, with parents' emotional investment and approach to nurturing their child predicting future behavioural outcomes in later life. It is

suggested that such a parent-child relationship, representative of positive attention and monitoring and managing children's inappropriate behaviours effectively, provides a framework for teaching and modelling of affect regulation and appropriate pro-social behaviours in social contexts.

Pettit and Bates (1989) have commented on spontaneous teaching behaviours observed in those parents whose children do not present with aggressive behaviour. Elements of the teaching process include the parent telling a child why their behaviour is wrong or harmful, modelling how to perform tasks successfully and demonstrating rules of etiquette, manners, empathy and awareness of the needs of others. The apparent central factor underlying these activities is the amount and quality of time parents spend with their children during the formative years and through to later childhood and adolescence.

In terms of preparation for entering a social world during the early years, parent's approaches to social coaching and advice on how to interact and play alongside other children appears to be vitally important in younger children's initial social encounters in pre-school settings. Similarly, for older males parental advice, guidance and modelling of how to manage and handle potentially hostile and challenging scenarios is prevalent in families with older children and adolescents who demonstrate pro-social behaviour and positive emotional regulation strategies (Ladd & Pettit, 2002). Parents' proactive teaching of social skills in early childhood appears to predict lower levels of conduct problems and aggression in middle childhood and early adolescence (Pettit, Bates, & Dodge, 1997). Parents who undertake such an approach in the early years of the child's life also develop their approach as the child ages, monitoring the whereabouts of their children during unstructured time in the community and having knowledge and awareness of the other young people their child is socialising with (Pettit, Laird, Bates, Dodge, & Criss, 2001). Young males who demonstrate heightened levels of aggression and conduct problems do not seem to experience a parenting style of this nature, many socialising with youths their parents have no knowledge or familiarity with (Colwell et al., 2001; Pettit, Bates, Dodge, & Meece, 1999).

1.7.4 Witnessing aggression and violence in the home

The findings of the 1996 BCS (Walby & Allen, 2004) reported that Domestic Violence (DV) accounted for one quarter of all violent crimes in England and Wales. For the 2001 BCS inter-personal violence, referring to a broad definition of violence including DV was reportedly experienced by 3 per cent of people within the population, the majority of victims being female. The figures produced by the 1996 and 2001 BCS (Walby and Allen, 2004) serve to provide strong evidence to support the conclusion that DV is prevalent in a large number of homes in Great Britain. Research has also noted domestic violence is more prevalent amongst couples where young children are present (O’Leary, Barling, Arias, Rosenbaum, Malon, & Tyree, 1989; Fantuzzo & Fusco, 2007) and is thought to present a strong detrimental risk factor for future aggressive and violent behaviour in adolescent males (Davies & Windle, 2001).

Wolfe, Crooks, Lee, McIntyre-Smith and Jaffe (2003) published a meta-analysis examining the effects of children’s exposure to domestic violence. The impact appears to be multi-faceted, encompassing negative consequences across a number of domains of a child’s life and development. Compared to children from non-violent families, children exposed to DV experience negative effects for social, emotional and behavioural difficulties, health, psychopathology, cognitive functioning and poor school achievement (Fantuzzo & Lindquist, 1989; Fantuzzo & Mohr, 1999; Margolin & Gordis, 2000; Wolak & Finklehor, 1998).

Ybarra, Wilkens, and Lieberman (2007) examined the impact of witnessing DV on both children’s cognitive and behavioural functioning. They found that those who had witnessed DV had lower cognitive functioning (measured using the Weschler Preschool and Primary Scales of Intelligence-Revised, WPSSI-R) than non-exposed children. Ybarra et al (2007) also noted that witnessing DV impacted on the mother-child nurturing relationship as family members who were victims exhibited psychological and behavioural difficulties. Similarly, Margolin and Vickerman (2007) reported the prevalence of Post Traumatic Stress Disorder (PTSD) within the DV child witness population, suggesting the child witnesses of DV experienced chronic stress, lived in environments where unpredictable and intermittent aggressive and

violent episodes in the home were prevalent and witnessed severe violence, including weapon use and serious injuries. Margolin and Vickerman (2007) highlight a number of domains of impairment that can occur in child witness populations with PTSD symptoms, namely affect regulation, frustration and anger and problems controlling aggression in social contexts.

Further studies have highlighted how witnessing DV can influence the likelihood that aggression and violence will develop over the life course into late adolescence and adulthood. Murrell, Christoff and Henning (2007) reported males aged 18 to 65 years who had been arrested and convicted for violence towards female partners, towards children or general violence in the community had been exposed to violence as children. The severity and frequency of violence they perpetrated as adults was shown to relate to the severity of the violence they witnessed or were the victims of as children.

1.8 Developmental models and the interaction of risk factors in the development of aggression

The Principal of Equifinality suggests that the outcome of aggressive behaviour can be realised from the interaction of a range of distal factors, with no single profile of risk factors being paramount for conduct problems to develop and no single risk factor being more detrimental than another.

Additive, interactive and transactional developmental models have been proposed to explain the causal pathways and mediating relationship between distal risk factors and aggressive behaviour in youth. Deater-Deckard, Dodge, Bates and Pettit (1998) identified 20 predisposition, context and life experience factors in pre-school children that appeared to be strongly related to future aggression. They reported that eighteen were found to accurately predict later conduct problems at 5 years of age, with the risk factors identified accounting for 45% of the variance within the data.

Co-morbidity of life experiences and negative risk factors is also thought to lead to future conduct problems as a result of the interplay of biological predispositions within the child that mediate the impact of risk factors on their development and subsequent social experiences. A direct causal relationship between biological pre-disposition and social/environmental factors is

emphasised, with some children being at increased risk of developing aggressive and violent tendencies if they are exposed to certain risk factors in the home or community. Evidence for such an interactive model comes from research identifying a relationship between a number of factors and the development of conduct problems in some populations. One such area is interactions within cultural groups, specifically some ethnic groups, where different attitudes towards weapons, discipline and parenting are prevalent (Deater-Deckard et al., 1996). Gender also influences the impact of risk factors, with boys being more adversely affected by poverty (Elder, 1979), divorce (Needle, Su & Docherty, 1990), single parenthood (Hetherington, Camara & Featherman, 1983) and peer and parent coercion to be aggressive and assertive (McFadyen-Ketchum, Bates, Dodge & Pettit, 1996).

A criticism of the interactive model is that children exposed to risk factors do not always show aggression in later life. Protective factors are suggested as influencing outcomes in such circumstances, including positive peer acceptance in pre-school and school, pro-social behavioural modelling by peers in the community during adolescence and effective after school supervision and monitoring by parents (Pettit, Laird, Bates, Dodge, & Criss, 2001; Pettit, Bates, & Dodge, 1997).

Pettit and Mize (2003) have proposed a transactional developmental model to conceptualise how the range of risk factors could mediate the development of aggressive behaviour in youth. The model employs a biopsychosocial framework outlining the interaction of distal factors that promotes the development of flawed social cognitive mechanisms.

The transactional model proposes that children with certain biological predispositions behave in a certain manner in response to stimuli in their environment and in return experience particular reactions from parents, siblings, peers and adults. A challenging temperament, possibly a result of behavioural inhibition as a result of biological constraints, may result in a parent becoming frustrated or angry with the child and using harsh parenting and overly strict and punitive discipline. Conversely the parent may acquiesce to the child's demands in order to calm the situation. The child's challenging behaviour in pre-school and school may also result in rejection by peers and conflict with adults. The child may subsequently experience a range of negative life experiences as a

result of home and community context variables during its early years in response to its own actions and the responses of others.

It is suggested that distal social and cultural factors interact with biological predispositions in what Rossman (2000) has referred to as the 'adversity package', multiple stressors being prevalent at the same time in the lives of some children promoting the likelihood that they will develop social cognitive deficits that facilitate subsequent aggressive conduct problems during social interactions.

Similarly, Dodge and Pettit (2003) consider the life experiences of the child are the most crucial steps towards developing a conduct disorder with aggressogenic social cognitions the proximal cause of aggressive behaviour in young males, developing as a result of a complex relationship between distal risk factors and life experiences. These idiosyncratic knowledge structures and generalised social scripts for hostile or ambiguous scenarios are consolidated as a result of learned experience and facilitate flawed social cognitive processing and aggressive social interaction (Dodge, & Pettit, 2003). Deficits in this system are thought to be causal in the manifestation and maintenance of aggression in young males (Dodge, 1986; Crick & Dodge, 1994).

1.9 The Social Information Processing Theory

Social Information Processing (SIP) theory (Dodge, 1986; Crick and Dodge, 1994) has a prominent place in theoretical accounts of the development of aggressive behaviour. It offers a foundation for understanding the mechanisms that facilitate aggressive and anti-social behaviour in young children, adolescents and adults. The theory proposes that individuals who respond with aggression and violence in social contexts do so as a result of social-cognitive processing deficits. Aggressive individuals' selection, perception and encoding of social cues is biased towards judgements of threat to self as a result of SIP deficits, resulting in difficulties attending to and correctly identifying facial expressions, interpreting the intentions of others and generating and selecting appropriate pro-social responses. According to Crick and Dodge (1994) social behaviour is preceded by six sequential steps of information processing (see figure 1).

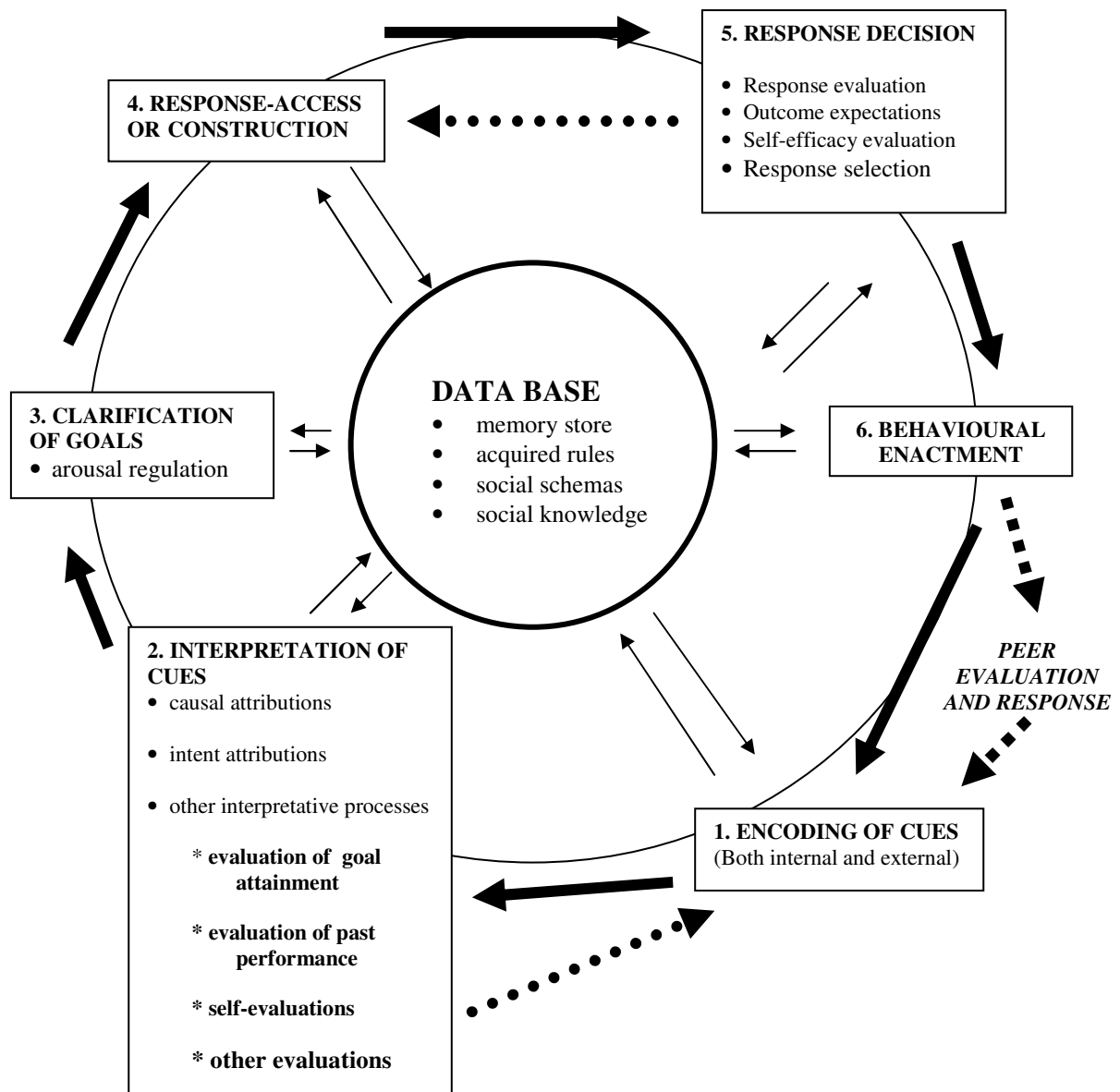


Figure 1. The reformulated social information-processing model of children's social adjustment. From Crick, N.R. & Dodge, K.A. (1994) A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 1, 74-101.

The initial step of the SIP model involves the encoding of social information, both in terms of selecting and attending to salient social cues in the immediate environment. Secondly, the encoded information is processed, represented and interpreted to form a meaningful abstraction of the situation. Thirdly, clarification of instrumental or interpersonal goals for the situation is undertaken based upon evidence drawn from stored information and outcomes

of previous social experiences. Fourth, existing learned social behaviours are drawn from memory or new strategies are generated to meet the specified interpersonal goals. Fifth, the various response alternatives are evaluated for outcome potential and one is selected for the final sixth stage, the enactment of the selected behavioural response. Atypical processing during any of the SIP steps is thought to be causal in the inappropriate manifestation of aggression (Dodge & Crick, 1994).

Reactive aggression is thought to be dependent upon inadequate encoding and individual attribution of hostile intent in others and is considered to result from deficits in processing during the initial two stages of the SIP model (Dodge et al, 1997; Crick & Dodge, 1994). Biased judgements are thought to have an influence on the thinking and decision making processes undertaken in social contexts and increase the likelihood that aggressive and violent behavioural responses will be selected and enacted. The subsequent selection and enactment of inappropriate behavioural responses is thought to result from previous experiences of using aggression and the personal evidence of successful outcomes and positive attitudes towards the benefits of behaving aggressively.

Pettit and Mize (2007) have placed Crick and Dodge's (1994) sequential six stage process in a social context. They propose that in a social situation such as a negative interaction criticism or provocation by peers, individual differences in selection and attention to specific salient social cues and the encoding of those cues results in the interpretation of the intentions of others as hostile. Subsequent behavioural responses are generated and evaluated as appropriate for enactment based upon judgements of their potential for achieving a successful outcome and interpersonal goal.

Dodge and Pettit (2003) suggest that the sequential steps of the SIP model guide thinking and behavioural outcomes during social situations with flawed processing of social information distinguishing between young people with high aggression and anti-social behaviour as opposed to low aggression and anti-social behaviour. They present an example of an adolescent male who is being teased by peers. Does he laugh and walk away or react and retaliate with violence during the interaction? The SIP model proposes that the individual's behavioural response occurs as a result of the emotional and mental processes

that unfold as he engages in the interaction. He selectively attends to what he has identified from past experience are key salient social cues, cues he has learnt he needs to monitor for to gauge a situation. His senses focus on facial expression, proximity, movement of hands and feet and shifting of bodyweight, size and intonation of voice and language used. His thinking may focus on whether his peers are laughing or sneering and whether they have the physical attributes to cause him harm.

He rapidly processes the information and draws conclusions, interpreting meaning and hypothesising about the probabilistic outcomes based on available information and learning from past experience. He interprets the encoded information and attributes intent to other's actions. Possibly he interprets their teasing as harmless or maybe as a provocation and humiliation, a threat to self, a loss of social status or an indication of a possible imminent assault.

He considers what he wants the outcome to be and accesses one or more potential behavioural responses from memory or decides that circumstances dictate the need for a new solution to the problem, which he rapidly develops based on the evidence available to him. Should he run away, attack the nearest person or laugh along with the others?

He subsequently evaluates the selected responses for potential for success and subsequent short term outcome and considers the implications of his decision against his existing moral code and his experience of the consequences for such actions. He finally enacts the selected response, subsequently re-evaluating his status and going through the six step process again rapidly as the scenario develops in response to his actions and the reactions of his peers. Dodge and Pettit (2003) suggest that during such an interaction selective attention to perceived hostile social cues, the attribution of hostile intent to others, the rapid and almost automatic accessing of aggressive and violent responses from memory and the positive view of those aggressive responses as being acceptable, positively regarded by peers and preferred over pro-social responses, increases the likelihood that aggressive behaviour will manifest.

Evidence to support the six steps of SIP theory has been published demonstrating how aggressive boys and adolescents differ from non-aggressive boys for all six sequential steps of the SIP model. Aggressive children have been shown to have distinct and consistent social cognitive patterns that process

emotional information in a biased way with a focus on judgements of perceived threat to self as revealed in studies using structured interviews examining four aspects of SIP (i.e., attribution of peer intent, generation of responses to scenarios, evaluation of generated responses, and level of emphasis for personal as opposed to social goals) (Dodge, Laird, Lochman and Zelli, 2002). Aggressive males have been shown to encode more hostile social cues, generate more hostile responses and demonstrate poor social problem solving skills compared to their non-aggressive peers within studies using videotaped vignettes of social scenarios (Matthys, Cuperus & Van Engeland, 1999; Lochman & Dodge, 1994). In similar designs aggressive adolescent males have also been shown to focus more on aggression relevant cues (Gouze, 1987) and to remember more aggressive details for descriptions of social situations (Dodge & Frame, 1982). They also attribute increased hostile intentions to others, have higher levels of anger and manage it less effectively than non-aggressive males for provocation vignettes with questions focusing on SIP strategies (Orobio de Castro et al, 2005).

Aggressive males also generate more anti-social goals than their non-aggressive peers and a higher frequency of aggressive responses to social situation vignettes. They also evaluate their aggressive responses more favourably in terms of how they are the best course of action to achieve interpersonal goals (Matthys et al, 1999) and they demonstrate more short-term estimations of the consequences of their actions and fail to see the long term repercussions for the outcome of their aggression and violence both for themselves and their victims (Gottfredson & Hirshi, 1990). Lochman & Dodge (1994) also report that delinquent adolescents indicated more happiness when discussing aggression and violence in response to provocation scenarios vignettes, but no more fear or anger than non-delinquents. Aggressive males have also been shown to emphasise the importance of dominance over peers and lack the necessary skills to develop positive relationships. They respond poorly in terms of how they interact and socialise in novel social situations and exhibit fewer non-aggressive social skills when compared to their non-aggressive peers (Waldman, 1996; Dodge, Pettit, McClaskey & Brown, 1986).

1.10 Cognitive and emotional processes

It is suggested that aggressive males develop idiosyncratic social knowledge about their world as a result of their experiences and that such knowledge structures guide and direct future social interactions (Dodge, & Pettit, 2003). SIP theory states that when presented with a peer interaction the individual uses social knowledge to guide the processing of social cues. The pattern of social information processing facilitates the selection and enactment of appropriate pro-social or anti-social aggressive behaviours. A number of cognitive mechanisms are suggested to mediate this effect, namely social knowledge structures, relational schema and social scripts.

Social knowledge structures are thought to develop as a result of learning from life experiences in social contexts. Bowlby (1982) suggested that children develop internal working models of their interpersonal relationships as a result of their experiences of interactions with adult carers. These working models direct future social interactions and expectations about how others will respond in social contexts. For those children who experience a range of risk factors during early life and poor social relations with adults and peers, they can develop social knowledge structures that emphasise a lack of trust, angry retaliatory behaviours when experiencing stress or anxiety in unfamiliar or novel situations and chaotic representations and beliefs about relationships with others (Sroufe & Fleeson, 1986).

Relational schema (Baldwin, 1992; Sherman, Judd, & Park, 1989) are believed to operate as cognitive structures that direct thinking and information processing in line with expected patterns of interpersonal contact. Dodge and Pettit (2003) note that “This knowledge has both declarative (i.e., semantic, abstract, and episodic) features and procedural (i.e., if-then rule-based) features, which guide subsequent processing of information and social behaviour” (p.361).

Abelson (1981) has described social scripts as information categorising constructs developed as a result of experience that summarises how social events typically transpire. This role of social scripts has been developed further by Huesmann (1988) who has outlined how they influence aggressive behaviour. Knowledge of social dynamics that develops as a result of life experiences can facilitate some individuals developing skewed beliefs and attitudes about how

aggressive behaviours function during social interactions. When the individual finds themselves in a social situation, attention to salient social cues can initiate a mentally represented sequential script of how the situation could unfold. The individual then moves rapidly through the script and uses the stored knowledge to draw inferences and make decisions on how best to respond and behave. Aggressive individuals are believed to respond with aggression more frequently in social contexts as a result of such skewed social scripts.

Baldwin (1992) has described how the sequential process of social knowledge structures influence social information processing. These include how aggressive males have selective attention to specific social cues; reach premature judgments about events transpiring in the environment; form biased interpretations of potentially ambiguous information as hostile and threatening and have a positive view that aggression will result in a rewarding outcome based on short term expectancies learnt in previously observed or enacted encounters. The view is that social knowledge structures are the outcome of life experiences and that the negative nature of their content directs the social information processing patterns of aggressive males. The selective attention to hostile peer cues, an attribution that others are being hostile toward the self, rapid accessing of aggressive responses, and positive evaluations of aggressive responses all increase the likelihood of aggressive behaviour occurring during a social exchange in those individuals with biased social knowledge structures (Crick & Dodge, 1994; Dodge, 1986).

Bowlby (1982) proposed that children in the early years of life have innate mechanisms of behaviour stimulated by the interpersonal characteristics and behaviours of those caring for them. These mechanisms include facial expression, eye contact, smiling, laughing and intonation of voice, tempo of movement and touch stimulation. All are elicited by the child to trigger appropriate pro-social and nurturing responses from parents. This has led to further theories suggesting that the mother-child relationship has a much wider biopsychosocial influence upon a child's development.

Of interest to understanding cognitive processes and internal structures that promote aggression in young males, Score (2003) has commented on the psychoneurophysiology of the developing infant brain, specifically the limbic system in the right hemisphere a possible source of the processing and

regulation of emotion. The mother-child attachment relationship is considered to be of centrality to the development of the limbic system, a complex set of structures including the hypothalamus, the hippocampus and the amygdala. The limbic system is believed to serve an evolutionary process common to a vast array of species, preparing offspring for future survival in a dynamic and potentially dangerous social world (Schoore, 2001a, 2001b).

Schoore's central proposition is that these structures develop and grow following birth in response to appropriate external stimulation (e.g. suitable care-giving and nurturing responses). In turn this serves to prepare the child with those basic internal structures required to function and learn in a dynamic social world supporting positive interaction and collaboration with others. The attachment relationship, therefore, serves not only to facilitate a secure bond but also mediates innate genetic processes to optimise brain development and enhance potential for social relations. This psycho-biological response serves as a framework within which a child starts to develop knowledge structures and schema through supported exploratory behaviour and social interaction with others in their environment. Individual experiences of social interactions results in the development of generalised expectations about social behaviour that direct and constrain the processing of social information. These generalised expectations and social information processing patterns are believed to account for the link between aggressogenic experiences and subsequent aggressive behaviour in childhood, adolescence and adulthood.

In terms of generalised cognitive structures, research evidence has also suggested that propensity for acting aggressively is related to executive functioning (Raine, Lencz, Bihrl, LaCasse, Colletti, 2000; Relkin, Plum, Mattis, Eidelberg, Tranel, 1996).

1.11 Executive functioning processes

The relationship between prefrontal abnormalities and increased prevalence of aggression and conduct problems is believed to be mediated by failure to use executive cognitive functioning structures appropriately (Giancola, 2000; Morgan & Lilienfeld, 2000). Imaging techniques have shown abnormalities in frontal lobe structures in individuals who have histories of

disinhibited aggressive behaviour and violence (Damasio, Grabowski, Frank, Galaburda & Damasio, 1994; Lapierre, Braun & Hodgins, 1995). Deficits in executive functioning are believed to be causal in those individuals with increased frequency and severity of aggressive behaviour in social contexts. Executive functioning represents higher order cognitive constructs, defined as “mechanisms by which performance is optimized in situations demanding operation and integration of a set of cognitive processes including working memory, inhibition, planning, active monitoring and set shifting” (Robbins, 1998; p.117).

Executive functioning provides humans with the potential to respond dynamically to situations and supports adaptation to shifting environmental circumstances and the generation of new strategies and solutions to problems. It is thought that the relationship between flawed executive functioning and aggressive behavior is a result of inefficiency in cognitive processing, ineffective strategy generation, lack of flexibility and increased impulsiveness (Dolan and Anderson, 2002; Pihl, Assaad & Hoaken, 2003). Deficits in this area are believed to interfere with other cognitive and perceptual abilities including problems attending to and interpreting social cues, such as facial expressions of emotion.

Evidence from neuroimaging studies has indicated that the prefrontal cortex plays a pivotal role in attention to and identification of emotive facial expressions (Phan, Wager, Taylor & Liberzon, 2002). Akhtar and Bradley (1991) have demonstrated that vigilance for social cues and misinterpretation of those cues can result in aggressive or violent responses in ambiguous social situations. Such deficits have been linked with other psychological difficulties (e.g. emotional disorders such as anxiety) and have been investigated with experimental designs using visual probe tasks for emotive and neutral stimuli.

1.12 Visual probe paradigms

As noted, SIP theory (Crick & Dodge, 1994; Dodge, 1986) suggests aggression in adolescent males occurs as a result of the flawed cognitive processing of social cue information. A similar view is proposed from research findings examining biases in information processing in psychopathology, for

example attentional processes characteristic of anxiety (review by Mogg & Bradley, 1998; Bar-Haim et al. 2007). SIP theory proposes that deficits in encoding and interpretation during the first and second stages of the SIP model facilitate misinterpretation of the intentions of others and subsequent aggressive and anti-social responses in social contexts. Research examining the underlying processing patterns of individuals with anxiety has focused upon a similar stage in a sequential process, namely preferential selection and attention to salient (i.e. threatening, anxiogenic) stimuli in their environment.

The central theme proposed in existing models of anxiety (Beck, 1976; Bower, 1981; Williams, Watts, MacLeod & Mathews, 1988; 1997; Mathews, 1990; Mogg & Bradley, 1998; Mathews & Mackintosh, 1998; Eysenck, Derakshan, Santos, & Calvo, 2007) is that an anxious individual's perceptual attention is directed to focus on salient cues in the environment perceived to be potentially threatening. As a result the individual experiences maintenance or increases in anxiety when exposed to salient cues, developing mechanisms whereby their attentional bias not only scans for threatening stimuli but also monitors and attends to stimuli that would be viewed as non-threatening in non-anxious populations. This subsequently results in anxious individuals developing an attentional system hyper-vigilant for threat in the environment and an increased number of anxiety triggering stimuli they monitor for compared to non-anxious individuals. Symptoms of anxiety subsequently manifest in response to prevalent stimuli, with an observable increase in the individual's attention to and interpretation of people, animate or inanimate objects as posing threat, danger and risk to self.

Mogg and Bradley (1998) have speculated that some anxious individuals develop mechanisms whereby their attention and selection of stimuli restricts exposure to threatening and potentially dangerous stimuli. They refer to this process as a vigilance-avoidant pattern of attention, the individual actively monitoring their environment for potential threat cues and selectively avoiding them once identified, either by diverting attention/gaze or leaving the environment.

Research examining attentional bias in anxious populations has used designs employing visual probe tasks to investigate attentional bias and vigilance-avoidance for stimuli including emotive words, pictures and facial

expressions. The visual probe tasks examine reaction time data to index a bias in selective attention to a critical stimulus (angry face) compared to a control stimulus (neutral face) within a face pair (angry-neutral, happy-neutral, frightened-neutral pairings) e.g. speed of response in identifying the orientation and lateral presentation of either a cursor arrow or dot that appears behind one of the two images. Attentional bias scores can be determined at various stimulus onset asynchrony (SOA) time-points, typically sampled at 500 and 1250 milliseconds, to examine predicted patterns of vigilance-avoidance in different populations (e.g. anxious vs. non-anxious).

Research has focused predominantly on anxious adult participants. They have been found to demonstrate vigilance for threat and danger when looking at visual stimuli, responding faster and with more accuracy for threatening rather than neutral visual probes (Broadbent & Broadbent, 1988; MacLeod et al., 1986; Mogg, Bradley, & Williams, 1995). Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg and van Ijendoorn (2007) have also reported increased selective attention for words and pictures during visual probe tasks for adult populations presenting with a range of anxiety oriented psychological difficulties (e.g., Generalised Anxiety Disorder, GAD; Post traumatic Stress Disorder, PTSD; social phobia, Obsessive Compulsive Disorder, OCD; panic disorders).

1.13 Research evidence from child and adolescent populations

In child and adolescent samples vigilance and avoidance for images of emotive faces has also been identified in clinically anxious populations. Waters, Lipp and Spence (2004) reported that clinically anxious children showed increased vigilance for negative pictures and emotional images. However, attentional bias for fear-related pictures did not differ significantly between the anxious and non-anxious sample, although the anxious children were shown to have a stronger attentional bias toward affective pictures in general.

Roy, Vasa, Bruck, Mogg, Bradley, Sweeney et al. (2008) also studied clinically anxious children, reporting vigilance for angry facial expressions in children and adolescents with Generalized Anxiety Disorder (GAD), social phobia and/or separation anxiety disorder compared with a non-anxious sample. Roy et al's (2008) results suggested that paediatric anxiety disorders were

associated with attentional bias toward threatening stimuli, with observed attentional bias for the angry faces representing selective processing of threat stimuli through increased vigilance for the threatening facial expressions.

Brotman, Rich, Schmajuk, Reising, Monk, Dickstein Brotman et al (2007) also investigated levels of vigilance for angry facial expressions in children with lifetime histories of anxiety and bipolar anxiety. Brotman et al., reported that children with bi-polar anxiety and previous histories of anxiety demonstrated the strongest level of attentional bias toward threat stimuli compared to non-anxious controls.

Waters, Mogg, Bradley and Pine (2008) found that anxious children with GAD demonstrated attentional bias toward both angry and happy faces and that there was an observed relationship between levels of reported anxiety, prevalence of social phobia and measurable attentional bias. Those children with milder anxiety and the control sample demonstrated no attentional bias during the study, although the mildly anxious children did demonstrate some avoidance of emotional faces. Waters et al concluded that highly anxious children with GAD appear to have an attentional bias for both happy and angry faces, whilst the mildly anxious children appeared to have developed alternative strategies that included vigilance-avoidance for some emotive stimuli. Attentional bias therefore appears to be related to severity of anxiety in some individuals, but those with lower levels of anxiety may have developed avoidant strategies rather than vigilance mechanisms in order to minimise levels of anxiety when exposed to stressful or perceived as threatening stimuli.

Monk, Telzer, Mogg, Bradley, Mai, Louro et al (2008) also examined children and adolescents with GAD. They found the adolescents with GAD demonstrated increased avoidant strategies when presented with angry facial images. Monk et al (2008) also noted from fMRI scanning that the adolescents with GAD showed greater right ventrolateral prefrontal cortex activation. Such a mechanism could serve as an instinctive defence mechanism by minimising attention to threatening and anxiety producing stimuli by directing an individual away from a potentially hostile social context.

Pine, Mogg, Bradley, Montgomery, Monk, McClure, et al (2005) also examined avoidance strategies in children with Post-traumatic Stress Disorder (PTSD). Pine et al (2005) found the children who had experienced severe abuse

and had a diagnosis of PTSD demonstrated increased levels of attentional bias away from threat images as compared to the control sample.

In aggressive child and adolescent samples vigilance and avoidance for facial stimuli has not been investigated with visual probe task designs. However, research has been conducted using structured interview designs with aggressive and non-aggressive adolescent males to determine the prevalence of differences in SIP.

Coralijn, Bram and Koops (2005) conducted research using the Social Information-Processing Interview (SIPI; Orobio de Castro, 2000) with a sample of incarcerated violent males and a control (mean age = 15 years 10 months). The SIPI is a process whereby participant's responses to audio taped social situation vignettes are recorded in order to identify the underlying cognitive processes directing their attention to elements of their scenarios, their interpretation of others' intentions and their proposed responses. Differences between samples based on indicators of levels of aggression did appear to correspond to differences in SIP for the social vignettes, the violent sample showing increased attention to and misinterpretation of presented information as threatening and provocative. Coralijn et al (2005) reported the incarcerated group identified more aggressive and threatening cues in the scenarios, generated fewer adaptive emotional-regulation strategies and demonstrated more externalised behaviour problems and reactive and proactive aggressive responses than the control group.

Losel, Bliesener and Bender (2007) studied a sample of adolescent males (mean age = 14 years) with histories of aggression and a control with written vignettes designed to explore aggression prone cognitive schema indicative of SIP deficits. Losel et al (2007) reported that reactive aggressive responses to the written scenarios correlated both with teacher reported and participant self-reported measures of aggression, violence and delinquent behaviour. Those participants identified as having the highest levels of verbal and physical aggression were found to identify, focus on and subsequently recall mainly threatening information from the vignettes. They also generated more aggressive responses and appeared to demonstrate aggressive-impulsive response schemata compared to the control sample suggesting the prevalence of SIP deficits.

In view of findings from experimental designs employing visual probe task with emotive facial stimuli it would be beneficial to examine the performance of aggressive samples in comparison to non-aggressive controls with a similar design. Research exploring SIP mechanisms with aggressive populations has used qualitative designs with social vignettes. The data gathered from such studies fail to provide evidence to outline the underlying perceptual and cognitive processes involved in the initial selection and encoding process, namely individual differences in attentional bias and vigilance for distinct social cues.

1.14 Research aims

The aim of the present study is to explore attentional bias for different facial expressions in adolescent males using a face visual probe task. For the current study aggressive and non-aggressive adolescent males will be recruited for a study employing a visual probe task. The task will require participants to indicate the orientation of an arrow cursor appearing following the presentation of emotive and neutral facial image stimulus pairs. Angry-neutral, happy-neutral and fearful-neutral male face pairs will be selected from the NimStim face set (Tottenham, Borscheid, Ellertsen, Marcus, & Nelson, 2002) and presented at two time presentations for stimulus-onset-asynchrony (SOA) between picture-onset and probe-onset. High and low aggressive males will be compared on SOA indices of initial orienting of attention (500ms) and maintained attention/avoidance (1250ms) to negative cues that signal attack (angry faces), possible victimisation (fearful faces), and positive cues (happy faces).

The visual probe studies (in child and adolescent anxiety) reviewed above have sampled children and adolescents with an age range of 7 to 19 years, with most reporting a mean age between 9 and 14 years. Noted research examining SIP in adolescent males using social scenario vignettes and interview designs have recruited samples with a mean age between 14 years and 15 years 10 months. The sample for the current study therefore will be National Curriculum Year 10 group males aged between 14yrs 6 months and 15 yrs 10 months.

The Teacher's Report Form (TRF, Achenbach, 1991; Verhulst, Van der Ende, & Koot, 1997) is a widely used teacher-rating measure of behaviour

problems in children and has been used in a number of studies examining aggression and social information processing in adolescents to allocate participants to groups (Coralijn, Bram, & Koops, 2005; Dodge, Laird, Lochman & Zelli, 2002). The test is standardised and has appropriate reliability and criterion validity. The TRF will be used for the current study to identify those participants within the sample with high levels or low levels of aggression.

Achenbach (1991) has suggested that syndrome scales of the TRF be used with a percentile range above 93rd reflecting individuals of clinical concern and above the 97th percentile as representative of deviancy and clinical concern. Dodge, Laird, Lochman & Zelli (2002) used the TRF alongside the parental version of the scale (i.e. the Child behaviour Checklist, CBCL) with a sample of children. They computed teacher and parent rated aggression scores, using the mean of the 25 aggression items to examine the relationship between ratings of aggression and observed indicators of social cognition (e.g. emotional understanding and interpretations of others actions, attributions of hostile intent, negative characteristics of interpersonal social goals, aggressive response generation, and positive evaluation of aggressive responses). Matthys, Cuperus & Van Engeland (1999) used the TRF to allocate participants to experimental and control groups on criteria of aggression outlined by Achenbach (1991).

For the current study the TRF Aggressive Behaviour syndrome scale will be used to allocate participants to either the experimental or control group. An enriched sample will be drawn from the complete sample, with the top 25% and the bottom 40% being identified. Those participants whose TRF scores are above the 75th percentile (i.e. raw score 9 or above) will be allocated to the high-aggression experimental group, and those who score zero will be allocated to the non-aggression control group.

1.15 Hypotheses

In light of SIP theory (Crick and Dodge, 1994, Dodge, 1986) vigilance or avoidance of emotive stimuli may indicate the prevalence of flaws in the encoding and interpretation stages of the six step SIP model. Increased attention in aggressive individuals for threatening facial images may result in an increased perception of danger and risk in the environment, facilitating reactive aggressive

responses during interactions. However, aggressive individuals may have experienced a higher frequency of aggressive and threatening scenarios during life compared to low-aggression individuals and may be desensitised to angry faces and threat stimuli. Thus they may demonstrate no significant levels of attentional bias or vigilance-avoidance for threat stimuli as observed in other populations compared to non-aggressive controls.

High-aggression individuals may also perceive happy and smiling faces as threatening as such emotive expressions could be misinterpreted as insulting or exhibiting humour at their expense. Increased initial orienting and prolonged maintenance of attention may be observed in such individuals to happy faces.

Fearful facial images could also elicit increased levels of initial orienting and prolonged attention in high-aggressive compared to the low-aggression individuals. Fearful faces could represent victimisation stimuli that high-aggressive participants may be vigilant for in social contexts as a response to their expectations and learning from past experiences when they have enacted aggressive and anti-social behaviours.

1.16 Contribution to Educational Psychology knowledge and practice

The findings of the proposed study could support Educational Psychologist's future approaches to assessment and intervention with aggressive adolescent males. The study's outcomes may inform future social skills training strategies for staff working with both aggressive children and adolescent males to prevent aggressive and violent episodes. The findings could also provide evidence to promote the development of individual or group therapeutic programmes that systematically target observed biases in information processing and social cognition (e.g. biases in selective attention) in schools or community agencies to reduce the frequency of aggressive and violent behaviour within at risk male populations.

UNIVERSITY OF SOUTHAMPTON

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES

School of Psychology

Volume 2: Selective attention to emotional facial expressions in aggressive adolescent males

By

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Thesis for the degree of Doctor of Educational Psychology

May 2009

Empirical paper abstract

The current study examined the prevalence of differences in attentional bias for emotive facial images in a sample of adolescent males ($n = 42$, mean age = 14 years 10 months) identified as presenting with either high or low levels of aggression. Adolescent males were recruited from a mainstream secondary school and three special educational provision settings catering for pupils with Behavioural, Emotional and Social Difficulties (BESD). Participants from this enriched sample were allocated to a high aggression sample ($n = 13$) or a low aggression control sample ($n = 18$) on the basis of scores for the Teacher Report Form Aggressive Behaviour syndrome scale. Participants completed a visual probe task which paired emotive-neutral facial images (i.e. angry, happy and fearful) over two stimulus-onset-asynchrony (SOA) timed intervals to determine initial orienting (i.e. 500msec) and prolonged maintained attention (i.e.1250msec).

Results indicated that low-aggression group showed a significant level of attentional bias towards angry facial stimuli, but not for happy or fearful faces. The high-aggression participants did not demonstrate significant attentional bias to any expression, and attended to angry faces significantly less than low aggression individuals.

Findings challenge SIP theory's prediction that adolescents with high levels of aggression have increased attentional bias for threatening social stimuli than adolescents with low levels of aggression and instead suggest other mechanisms, such as individual differences in exposure and habituation to negative environmental cues, may reduce the salience of social threat cues in aggressive adolescent males.

1.1 Introduction

Aggressive and violent behaviour is reported to be prevalent in English and Welsh schools (Department for Children, Schools and Families, 2008). UK Government figures for the 2006-2007 academic year indicated 65,390 pupils aged 16 years or under received fixed term exclusions for assaulting pupils, with 8,560 being excluded for assaulting school staff. Three out of ten teachers in UK schools report experiencing physical aggression, with three quarters being threatened by a pupil and one in ten being injured by a pupil as a result of a violent assault (Association of Teachers & Lecturers, ATL, 2008).

Aggressive and violent behaviour in schools appears to be perpetrated predominantly by males. For the 2006/2007 academic year 6,850 males and 1,790 females were permanently excluded for behavioural problems, males accounting for 79% of permanent exclusions for the year. Exclusion rates for males have remained stable over the previous five years representing a ratio nearly 4 times higher than that for females (Department for Children, Schools and Families, 2008).

A Social Information Processing (SIP) theory (Crick & Dodge, 1994; Dodge, 1986) has been proposed to explain why some individuals respond with aggression and violence and others calmly in similar social contexts. According to Crick and Dodge's (1994) SIP model all social behaviour is preceded by six sequential steps of cognitive processing: (1) the initial step involves the encoding of social information, both in terms of selection and attention to salient social cues in the immediate environment; (2) the encoded information is subsequently processed, represented and interpreted to form a meaningful abstraction of the social situation; (3) next, interpersonal goals for the situation are clarified based upon evidence drawn from memory and knowledge of outcomes from previous social experiences; (4) existing learned social behaviours are then drawn from memory to meet the specified interpersonal goals or new strategies are generated if it is a novel scenario; (5) various response alternatives are evaluated for outcome potential; and (6) a behavioural sequence is selected for the final sixth stage, the enactment of a response. As a scenario develops the individual continues to go through this six step process, responding to the other people's behaviours and changes in the wider social environment, adapting their

evaluation of the situation as new information becomes available. Atypical processing during any of the SIP steps is thought to be causal in the inappropriate manifestation of aggression and violence (Dodge & Crick, 1994).

SIP theory states that aggression and violence occur as a result of flaws in social cognitive processing mechanisms. Children and adolescents with high levels of aggression are thought to develop internally consistent attentional mechanisms hyper vigilant to threats to the self within a particular type of situation and patterns for encoding social cue information that become stable over time. Dodge and Pettit (2003) suggest aggressogenic social cognitions are the proximal causes of aggressive behaviour in young males, developing as a result of a complex relationship between distal risk factors (e.g. poverty, unemployment, marital divorce, low education, single-parent households, high residential mobility, and low income) and life experiences (e.g. exposure to harsh parenting, social rejection by peers in pre-school, witnessing domestic violence, school failure). These idiosyncratic knowledge structures and generalised social scripts for hostile or ambiguous scenarios are consolidated as a result of learned experience and facilitate flawed social cognitive processing and aggressive social interaction (Dodge, & Pettit, 2003).

Of interest to the current study is the initial stage of the SIP model in aggressive adolescent males, namely the encoding stage when social cues in the immediate environment are attended to. This initial stage could be viewed as the catalyst for subsequent flawed processing as it guides monitoring for salient social cues and processing of sensory information from those cues.

Previous research examining SIP in aggressive adolescent males has used semi-structured interview protocols with written, audio or video social situation vignettes to explore social cognitive processing differences between high-aggression and low-aggression male samples for the SIP model's stages (Crick & Dodge, 1994). High-aggression adolescent males have been shown to focus more on aggression relevant cues when reading social vignettes (Gouze, 1987), remember more aggressive details (Dodge & Frame, 1982) and focus on and recall more hostile social cues from videotaped vignettes compared to non-aggressive males (Matthys, Cuperus & Van Engeland, 1999; Lochman & Dodge, 1994). They also attribute increased hostile intentions to others in scenarios, demonstrate higher levels of aggression and anger to the vignettes and manage it

less effectively than their low-aggression peers (Orobio de Castro, Koops, Veerman & Bosch, 2005). High aggression adolescent males also primarily report short-term consequences for their actions and have a poor understanding of the long term repercussions of their aggressive and violent behaviour both for themselves and their victims compared to low-aggression males (Gottfredson & Hirshi, 1990). They also show more pleasure when discussing the use of aggression and violence during social interactions (Lochman & Dodge, 1994), lack pro-social communication skills and respond poorly in novel social situations compared to control samples (Waldman, 1996; Dodge, Pettit, McClaskey & Brown, 1986). High-aggression adolescent males also demonstrate increased aggressive response generation, fewer adaptive emotional-regulation strategies and higher levels of aggressive attribution to characters in social vignettes compared to low-aggression samples (Coralijn, Bram and Koops, 2005; Losel, Bliesener and Bender, 2007).

Although experimental designs using social vignettes have produced evidence to suggest SIP theory provides a useful framework to explore the processing and decision making steps integral in adolescent male aggression, a failing of such designs and their qualitative data collection methods is that the data generated is subjective, liable to response bias and could lack validity. Bias introduced as a result of the design of the vignettes including the content, language used and the presentation medium (i.e. written, audio or video), alongside the influence of the interviewer during the data collection process and the subsequent analysis methods used, could compromise conclusions drawn regarding attentional bias to social cues in high- and low-aggression samples. The data gathered fail to provide evidence to outline the underlying perceptual and cognitive processes of the initial selection and encoding process, namely individual differences in attentional bias and vigilance for distinct social cues.

The aim of the current study was to explore early stages of the SIP model and specifically examine attentional bias to a range of negative and positive social cues (facial expressions) in adolescent males with high levels of aggression, compared to low aggression controls (Crick & Dodge, 1994; Dodge, 1986) using an experimental attentional paradigm (computerised task) used widely in research studies that have examined attentional bias to emotional information in a range of populations (e.g. high relative to low anxious adults and children). The modified

visual probe produces objective data (derived from reaction times) to index attentional bias to a range of negative and positive social cues that can be compared within and between high-aggression adolescent males and low-aggression controls, rather than hypothetical descriptions of scenarios that involve imagery. While this has yet to be examined in aggression, a growing body of evidence is emerging from studies that have used visual probe studies to examine biases in selective attention to emotional material in child and adolescent anxiety (relative to non-anxious controls).

Cognitive models of anxiety propose that anxious individuals are hyper-vigilant for threat in the environment with a tendency to appraise mild stimuli as threatening and orient attention to anxiogenic stimuli, increasing and maintaining anxiety through prioritising the processing of cues that signal potential threat and risk to self (Beck, 1976; Bower, 1981; Williams et al. 1988; 1997; Mathews, 1990; Mogg & Bradley, 1998; Mathews & Mackintosh, 1998; Eysenck et al. 2007). Information processing models of anxiety share some similarities with SIP theory (Crick and Dodge, 1994) which explains aggression as behaviour mediated by hyper vigilance to perceived threatening social cues in the environment and impaired processing of that information when interpreting intentions of others and selecting appropriate behavioural responses.

Studies in child and adolescent samples (which have predominantly examined attentional bias in those with high relative to low anxiety) provide evidence of attentional bias for a range of negative stimuli including words and pictures during visual probe tasks, broadly consistent with evidence in adult samples (review by Bar-Haim et al. 2007).

Waters, Lipp and Spence (2004) found clinically anxious male and female children aged 9 to 12 years showed increased attention to negative pictures and emotional images during visual probe tasks. Roy et al (2008) also reported children and adolescents aged 7 to 18 years with Generalized Anxiety Disorder (GAD), social phobia, and separation anxiety disorder demonstrated increased attentional vigilance for angry threatening facial expressions compared to a control sample (for similar findings in children with bi-polar disorder and history of anxiety see Brotman et al. 2007, Waters, Mogg, Bradley & Pine, 2008). In addition to evidence of enhanced initial orienting to threat in child and adolescent anxiety Pollak and Sinha (2002) observed greater delayed disengagement in

maltreated children when presented with angry faces during a modified cueing task. Such evidence suggests anxious child and adolescent populations have perceptual mechanisms promoting hyper-vigilance for threatening social cues, those mechanisms argued to mediate the development and maintenance of anxiety symptoms in certain social contexts.

Finally, evidence of avoidance of social threat cues has been observed in children who had experienced severe abuse and had a diagnosis of PTSD compared to a non-abused control sample (Pine, Mogg, Bradley, Montgomery, Monk, McClure, et al (2005) with avoidance for angry faces also observed in children and adolescents with GAD compared to non-anxious controls (Monk, Telzer, Mogg, Bradley, Mai, Louro et al (2008).

Given promising evidence from visual probe paradigms in child and adolescent anxiety, the present study employed a modified visual probe task to test predictions from SIP regarding biases in selective attention to social cues in adolescent aggression. Reported visual probe studies have used a range of emotive facial image types with a focus on threatening angry faces. They have also sampled children and adolescents with an age range of 7 to 19 years, most reporting mean ages between 9 and 14 years. Previous research using social vignettes and interview designs to examine SIP in adolescent males has recruited samples with a mean age between 14 years and 15 years 10 months. This age range also corresponds closely to that when males are at the greatest risk of exclusion in English and Welsh schools for aggressive and violent behaviour. Approximately 54 per cent of all permanent exclusions are for male pupils between 13 and 14 years of age, corresponding with the National Curriculum Year Groups 9 and 10 (Department for Children, Schools and Families, 2008). In view of this the current sample was recruited from National Curriculum Year 10 males aged between 14 years and 15 years 8 months.

High and low aggression adolescent males completed a modified visual probe task that measured attentional bias to angry, frightened and happy facial expressions. Attentional bias scores were obtained at two time periods to examine measures of initial orienting of attention to critical (emotional) stimuli (500ms after face-pair onset) and maintained attention (at 1250ms). In light of SIP theory (Crick and Dodge, 1994, Dodge, 1986) vigilance or avoidance of emotive stimuli may indicate the prevalence of flaws in the encoding and interpretation stages of

the six step SIP model. Increased attention in aggressive individuals for threatening facial images may result in an increased perception of danger and risk in the environment, facilitating reactive aggressive responses during interactions. However, aggressive individuals may have experienced a higher frequency of aggressive and threatening scenarios during life compared to low-aggression individuals and may be desensitised to angry faces and threat stimuli. Thus they may demonstrate no significant levels of attentional bias or vigilance-avoidance for threat stimuli as observed in other populations compared to non-aggressive controls.

High-aggression individuals may also perceive happy and smiling faces as threatening as such emotive expressions could be misinterpreted as insulting or exhibiting humour at their expense. Increased initial orienting and prolonged maintenance of attention may be observed in such individuals to happy faces.

Fearful facial images could also elicit increased levels of initial orienting and prolonged attention in high-aggressive compared to the low-aggression individuals. Fearful faces could represent victimisation stimuli that high-aggressive participants may be vigilant for in social contexts as a response to their aggressive and anti-social behaviours.

1.2 Method

1.2.1 Participants

Following receipt of ethical approval from the University of Southampton Ethics Committee and Hampshire County Council Ethics Committee, the head teachers at four Hampshire schools were approached to discuss the research study. They included one mainstream secondary school, a special provision secondary school for adolescent males with a statement of Special Educational Needs (SEN) highlighting Behavioural Emotional and Social Difficulties (BESD) as their primary area of need, and two Pupil Referral Units (PRU) providing educational provision for excluded pupils.

Once agreement had been given by head teachers for the research to be undertaken in their school, the parents of all the male pupils in Year 10 cohorts

were sent a letter explaining the research and inviting them to give consent for their child to participate. The letter included a consent form and a stamped addressed envelope for postal return. In total 164 parental letters and consent forms were sent and 42 were returned with parental consent given, equating to a 26% return rate.

A total of 42 adolescent male pupils participated in the research study. The age range of the total sample was between 14 years and 6 months and 15 years and 6 months ($M = 14$ yrs 10 mths, $SD = 3.3$ mths). The sample was 100% Caucasian.

1.2.2 Materials and Apparatus

1.2.2.1 The Teacher Report Form (TRF)

In order to allocate participants to either the high-aggression or low-aggression control group class tutors for each participant were asked to complete a shortened version of the Teacher's Report Form (TRF, Achenbach, 1991). The TRF is a widely used teacher-rating measure of behaviour problems in children and adolescents and has been used in a number of studies examining aggression and social information processing in adolescent populations (Coralijn, Bram, & Koops, 2005; Dodge, Laird, Lochman & Zelli, 2002; Matthys, Cuperus & Van Engleland, 1999). The TRF is an assessment instrument developed to explore observed emotional, behavioural and social problems reported by teachers of students aged 6-18. The TRF contains 113 multiple-choice items and identifies eight syndromes, including Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Rule Breaking Behaviour, Attention Problems and Aggressive Behaviour syndromes. Teachers are asked to rate a pupil on each item on a 3-point scale (i.e. 0 = *not true [as far as you know]*, 1 = *somewhat or sometimes true*, and 2 = *very true or often true*).

For the current study the TRF scoring sheet was edited to incorporate only those items for the Aggressive Behaviour, Rule Breaking Behaviour and Attention Difficulties syndrome scales. This was to ensure that teachers were not burdened with an excessively long instrument to complete for each child (at the request of an Educational Ethics committee) and also because it was felt that

data from the three syndrome scales would be appropriate to permit appropriate allocation of participants to either the high-aggression or low-aggression group. Given research aims, the TRF scores for the aggressive behaviour syndrome scale were used to allocate participants to groups.

1.2.2.2 Visual Probe Task

For the visual probe task Angry/Neutral, Happy/Neutral and Frightened (fear)/Neutral pair-types from eight male models were selected from the NimStim face set (Tottenham, Borscheid, Ellertsen, Marcus, & Nelson, 2002). Face pairs measured 30 X 40 mm and were presented in colour either side of a white central fixation cross against a grey background.

The paired facial images were presented using Inquisit version 2 software. The computer was a DELL Preceptor laptop running a Pentium III 450 MHz processor with a 15" LCD monitor. Participants were required to indicate the position of the arrow cursor during the visual probe task with a custom built two button response box.

1.2.2.3 Measures of anxiety and mood: State Trait Anxiety Inventory and the Profile of Mood States

Upon completion of the visual probe task, participants completed the state and trait versions of the State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) and the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1981). The STAI and POMS have been widely used to examine state and trait anxiety in research and clinical settings for adolescents and adults. For the present study STAI and POMS data were recorded to examine whether any individual differences (and group differences) in anxiety might moderate or account for group differences in attentional bias to emotional expressions. The researcher read out scale items for all participants as some had literacy difficulties.

1.2.3 Procedure

Pupils whose parents returned signed consent forms were given individual verbal information on the study and the task they would be asked to undertake. They were each given the opportunity to confirm their participation or withdraw. All of the participants were tested individually in a quiet, dimly lit room. They were 60cm from the computer screen. Each participant was presented with written instructions on the computer screen prior to the task which were read out by the researcher. The participant's questions were answered by the researcher. The participant was then instructed to respond as quickly and accurately as possible during the task using the button box keys to indicate the arrow cursors location as either left or right. Participants completed 12 practice trials (2 per face pair x SOA condition) to familiarise themselves with the task and the apparatus, following which the researcher confirmed that the participant understood the task and what they had to do. Any questions were answered and the participant began the experimental visual probe task.

The task procedure for each trial started with a central fixation cross presented for 500ms. The fixation cross was followed by an emotive/neutral facial image pair presented next to each other laterally (distance 80mm between inner edges). Face pairs were presented at 2 presentation durations, 500ms and 1250msec after which the faces were replaced by a white visual probe (up or down arrow) that was displayed in the centre of one of the face stimuli. There were 192 experimental trials: 32 per face pair x SOA condition, within which the location of the critical (emotional) face (left vs. right), the location of the probe (left vs. right) and the probe type (up vs. down arrow) were fully counterbalanced. Trials were presented in a random order for each participant. Participants indicated the cursor's orientation as either up or down by pressing one of the two allocated buttons on the button box. Reaction time data was collected by the software for future analysis.

Participants also completed a short emotion classification task, the data for which is to be prepared for a separate manuscript. At the end of the testing session for both the visual probe task and the emotion classification task, participants completed the STAI and POMS self-report measures.

1.3 Results

1.3.1 Group Allocation

For the current study TRF aggressive behaviour syndrome scale scores were used to allocate participants to either the high-aggression or low-aggression group following visual probe task data collection for the complete sample. However, instead of adopting the procedure using the 93rd percentile cut off as suggested by Achenbach (2001, 1991) an upper quartile threshold within our enriched sample was identified.

Each participant had a TRF aggressive behaviour syndrome scale completed for them by a teacher in school who was familiar with them. The complete sample data set for the TRF aggression syndrome scale was then examined for homogeneity and the distribution profile was plotted (see Appendix A1, table 1 and A2, Figure 3). Participants with TRF aggression syndrome scale scores greater than or equal to 9 (upper quartile in current sample, 75th percentile), were allocated to the high-aggression experimental group (n= 13). For the low-aggression control sample those participants who scored 0 were identified. This equated to 43% of the total sample (n=18). Participants with only mild levels of aggression (TRF aggression scores between 1 and 8) were removed from subsequent analyses.¹

¹ Achenbach (1991) has suggested that the syndrome scales of the TRF should be used with percentile ranges corresponding to cut off levels for Clinical Concern, Deviancy or Normal. The borderline percentile range is set between the 93rd and 97th percentile. Scores within this range are representative of Clinical Concern, with scores above the 97th percentile being representative of Deviancy. Scores below the 93rd percentile are viewed as being in the Normal range and of no clinical concern. Previous studies have allocated participants to a high-aggression group if their TRF aggressive behaviour syndrome scores were above the 93rd percentile (i.e. raw score 12) representing the clinical concern range, with those with TRF aggression syndrome scores below this percentile level being allocated to a low-aggression control group.

The groupings used in the present study (i.e. upper quartile) mirror methods used in subclinical/analogue designs commonly used to reveal differences in information processing between high and low anxious individuals. Such studies typically pre-select participants and form groups if scores are above sample median, or upper tertile or quartile scores (varying across study). The recruitment strategy used in the present study ensured an enriched sample (i.e. favoured the selection of individuals with high levels of aggression, thus the upper quartile (within this enriched sample) was considered an appropriate operational definition of high aggression (when considered against the likely distribution of scores across the general adolescent population).

Independent sample t-tests were conducted to compare high and low aggression groups on trait, state anxiety (STAI and POMS) and aggression (see table 1).

Table 1: Group characteristics.

| | High-aggression (n=13) | | Low-aggression (n=18) | | <i>t</i> | <i>p</i> |
|------------------------------|------------------------|-----------|-----------------------|-----------|----------|----------|
| | <i>Mean</i> | <i>SD</i> | <i>Mean</i> | <i>SD</i> | | |
| TRF - Aggression | 22.5358 | 9.58832 | 0.00 | 0.00 | - | - |
| TRF - Rule Breaking | 10.0769 | 5.86603 | .1667 | .51450 | 72.239 | *.000 |
| TRF - Attention Difficulties | 26.0769 | 12.37916 | 1.8889 | 4.22721 | 13.068 | *.001 |
| STAI – State Anxiety | 32.0000 | 4.93288 | 34.7778 | 6.50390 | -1.292 | .206 |
| STAI – Trait Anxiety | 32.3077 | 5.82215 | 36.9444 | 5.56747 | -2.245 | *.033 |
| POMS – State Tension Anxiety | 3.0769 | 3.20056 | 5.0556 | 4.72132 | -1.307 | .202 |
| POMS – State Depression | 1.5385 | 2.84650 | 1.5556 | 1.854416 | -.020 | .984 |
| POMS – State Anger | 2.3077 | 3.49725 | 1.5000 | 2.20294 | .789 | .436 |
| POMS – State Vigour | 19.4615 | 13.09335 | 23.0000 | 11.50447 | -.789 | .432 |
| POMS – State Confusion | 5.0000 | 4.32049 | 5.3889 | 3.38055 | -.281 | .780 |
| POMS – Trait Tension Anxiety | 3.8462 | 3.31276 | 6.2222 | 4.51866 | -1.607 | .119 |
| POMS – Trait Depression | 1.5385 | 2.29548 | 3.5000 | 2.59524 | -2.177 | *.038 |
| POMS – Trait Anger | 5.9231 | 7.13514 | 4.5556 | 4.28708 | .666 | .511 |
| POMS – Trait Vigour | 31.5385 | 12.58713 | 32.6111 | 9.67799 | -.269 | .790 |
| POMS – Trait Fatigue | .0000 | .00000 | .0000 | .00000 | - | - |
| POMS – Trait Confusion | 5.5385 | 3.47887 | 6.7778 | 3.60646 | -.958 | .346 |
| Age | 14.9 yrs | 3.4 mths | 15.7 yrs | 2.5 mths | 1.657 | .108 |

Note. TRF: Teacher Report Form; STAI: State–Trait Anxiety Inventory; POMS: Profile of Mood States.

Results confirmed that the high aggression group had higher scores of aggression (across all sub-types). Results also revealed that low aggression participants reported significantly higher levels of trait anxiety and depression

compared to the high aggression group. Groups did not differ on any other measure.

1.3.2 Data preparation

Consistent with previous visual probe studies, reaction times from incorrect button responses were removed (3% of data with no significant difference between high and low aggression groups). The remaining correct response RT data for each participant was then inspected for outliers. Reaction times greater than 1200msec were identified as outliers (according to box and whisker plots) and removed. For each participant reaction times greater than 3 standard deviations above or below their mean reaction time (irrespective of trial type) were removed. Attentional bias scores were then calculated for each emotional face, for each SOA (i.e. 6 bias scores per participant) by subtracting the mean reaction time to probes that appeared behind the emotional face from those appearing behind the neutral face.

The group mean reaction times for each SOA and face type are shown in Table 2. Positive values for the bias scores indicate a greater attentional bias towards the emotional face (vigilance) relative to the neutral face, negative bias scores indicate a greater attentional bias away from the emotional face (avoidance), and zero represents no attentional bias.

1.3.3 Data analysis

Prior to analysis attentional bias scores were inspected using Kolmogorov test of normality and Box's test of equality of covariance. These analyses confirmed that data met assumptions for parametric analysis ($F(21, 2452.732) < .864$; $p > .640$).

Attentional bias scores were entered into a mixed design analysis of variance (ANOVA) with group (high vs. low aggression) as a between subjects factor, and emotional expression (angry, happy, fearful) and SOA (500 vs. 1250ms) as within subject factors. Results revealed a significant interaction between aggression group and emotional expression (see figure 2, and Appendix A3, table 3), $F(2, 58) = 3.34$, $p = .04$, all other results were non-significant, $F_s <$

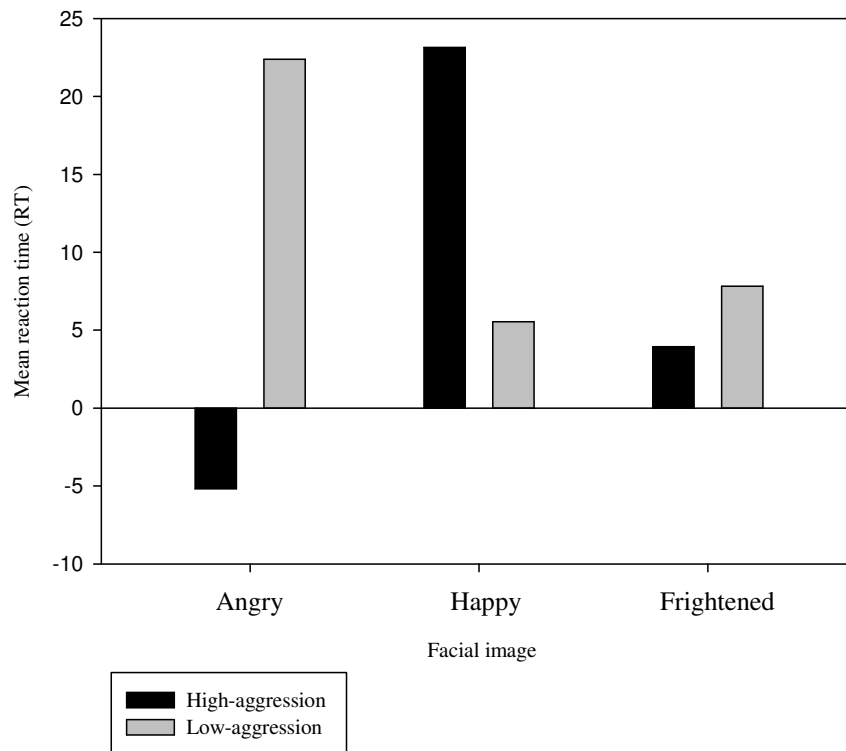
1 including the predicted interaction between aggression group, emotion and SOA, $F(2,58) = 1.462$, ns.

Table 2: Group's mean reaction times for each SOA and emotional expression.

| SOA | Emotional expression | High-aggression (n=13) | | Low-aggression (n=18) | |
|--------|----------------------|------------------------|----------|-----------------------|----------|
| | | Mean | SD | Mean | SD |
| 500ms | Angry | 4.4590 | 47.37085 | 19.2795 | 40.35412 |
| | Happy | 26.4028 | 51.28850 | -1.2455 | 39.26538 |
| | Fearful | -2.3712 | 49.14568 | 10.5491 | 39.72073 |
| 1250ms | Angry | -15.0554 | 43.59401 | 25.6663 | 34.34388 |
| | Happy | 16.9307 | 57.80079 | 14.4618 | 37.82792 |
| | Fearful | 8.0430 | 38.12699 | 6.6921 | 36.08901 |

Note. SOA: Stimulus onset asynchrony.

Figure 2: High- and Low-aggression group's mean reaction times (RTs) for facial images



To examine the source of the significant group x SOA interaction, follow-up independent sample t-tests were used to compare high and low aggression groups on their attentional bias to angry, happy and frightened faces (collapsed across SOA). Results revealed a significantly larger attentional bias towards angry faces in the low compared to the high aggression group $t(29) = 2.42, p = .02$. Groups did not differ in their attentional bias to either happy faces, $t(29) = 1.14, ns$, or fear faces $t(29) = 0.6, ns$. Follow-up one-way ANOVAs (examining the effect of expression within high and low aggression groups separately) did not reveal significant results [aggression group: $F(2,24) = 1.745, ns$; low aggression group: $F(2,34)=1.76, ns$].

One-sample t-tests, comparing attentional bias scores for each expression (collapsed across SOA) against zero (no attentional bias) revealed significant vigilance towards angry faces in the low aggression group, $t(17) = 3.07, p < .01$, all other results were non-significant (low aggression group: $t(17) < 1.37$; high aggression group: $t(12) < 1.77, ns$).

In view of published evidence that trait anxiety correlates with attentional bias to threat (Bar-Haim et al, 2007) and that in the present study the low aggression group was more anxious than the high aggression group, the above ANOVA was repeated with trait anxiety (STAI) entered as a covariate. Results from this ANCOVA replicated findings reported in the main text, namely a significant interaction between aggression group and emotional expression, $F(2, 56)= 3.06, p = .05$, with no other significant effects.

1.4 Discussion

Results from the present study revealed a significant attentional bias towards angry faces in the low aggression group compared to the high aggression group who did not selectively attend to emotional faces relative to neutral faces. The low aggression sample similarly did not demonstrate significant attentional bias for either the happy or fearful faces relative to neutral faces.

The aim of the current study was to explore the initial encoding stage of Crick and Dodge's (1994) SIP theory. The rationale was based upon the proposal from SIP theory that high-aggression adolescents have flawed social cognitive processing mechanisms that direct attention to threatening social cues and

facilitate aggressive and violent behavioural responses as a result of misinterpretation of other's intentions in social contexts. Thus they are more likely to enact aggressive or violent behaviours during social interactions compared to non-aggressive peers because they inappropriately attend to, evaluate and respond to social cues.

SIP theory would predict that the high aggression sample in the current study would demonstrate increased attentional bias for threatening social cues compared to the low aggression sample. Thus for the current study it was predicted that the high aggression sample would demonstrate increased levels of initial orienting and maintained attention for angry faces (and perhaps happy and fear faces) in comparison to the low aggression participants indicating the prevalence of differences in social cognitive processing for emotional expressions between the two groups.

The present study's findings, however, appear to challenge this view. SIP theory's prediction that aggressive individuals selectively attend to angry relative to neutral faces to a greater extent than non-aggressive individuals was not observed. The low aggression sample demonstrated a significant level of attentional bias to the angry facial stimuli but the high aggression sample did not. This finding contrasts with evidence from qualitative studies employing social vignettes that infer increased attention for threatening social cues in aggressive and violent adolescents from verbal reports of prevalent threatening cues and interpretations of written descriptions or audio or videotaped scenarios (Losel et al, 2007; Coralijn et al, 2005; Matthys et al, 1999; Lochman & Dodge, 1994; Gouze, 1987; Dodge & Frame, 1982).

However, it is not clear whether self-report evidence from vignettes reflect biases in attention, or instead biases in other aspects of cognition such as memory or interpretation. Indeed the qualitative interviews required participants to recall salient details and explain their perceptions of the scenarios depicted in the vignettes and thus arguably provided inadequate measures of specific cognitive mechanisms considered dysfunctional in high and low aggression samples. Indeed it would seem necessary given current findings to examine the relationship between subjective and objective measures of social information processing bias in aggression across both qualitative measures that provide contextually rich

social information, and more specific experimental measures of social cognition such as the visual probe task used in the current study.

What mechanism may account for the current observation that aggressive individuals lack the attentional bias to threat displayed by non-aggressive individuals? Identified risk factors for the development of aggressive and violent behaviour across the lifespan in males includes exposure to harsh parenting styles, growing up in households where aggression and hostility are a regular occurrence, attending school where aggressive behaviour within the pupil population and experiences of exclusion for challenging behaviour are high, and residing in communities where offending behaviour, substance use, and community violence are prevalent (Sroufe, Egeland, Carlson and Collins, 2005). Such risk factors suggest adolescents with aggressive and violent tendencies may have observed, witnessed, been victims of or perpetrated acts of aggression or violence to a much greater frequency than their low-aggression peers. While the present study did not examine in detail each individual's history of violence it is possible that aggressive individual's increased exposure to threat (angry) social cues throughout development may in part account for the present observation that aggressive individuals do not display the vigilance to threat. High aggression adolescents may have experienced frequent and varied hostile and conflict scenarios from early life onwards resulting in the development of a SIP system detuned (desensitized) to threat cues.

The sample recruited for the present study included adolescents from special educational provision for BESD. Such educational provision caters for young people with complex social backgrounds who have histories of involvement with a range of professionals including social care, law enforcement, health and education. Such agency involvement suggests young people in these settings may have had increased levels of exposure to a range of detrimental risk factors during their lives. As a result they may have acquired an extensive evidence base supporting the development of skewed knowledge structures and social scripts for a range of aggressive situations. Thus observed differences between the two samples could be indicative of disparity in participants' levels of exposure to aggression and hostile interactions over time, with those individuals with less exposure to threat cues (non-aggressive) remaining sensitive to threat cues in contrast to aggressive individuals who might be desensitized to these cues.

A related explanation for reduced attention to anger in aggressive individuals is provided when considering the appraisal mechanisms that drive attentional bias to threat, detailed in recent cognitive-motivational models of attention to threat in anxiety (Mogg & Bradley, 1998). In this model the appraisal and orienting of attention to threat has an evolutionary survival benefit, directing the individual to monitor for threat and take appropriate actions to minimise risk to self if hostile cues are identified. Anxiety prone individuals are thought to have a more reactive Valence Evaluation System (VES) that identifies a larger number of stimuli as potential threats compared to non-anxious populations, with subsequent attentional resources more likely to be rapidly allocated to such cues. Within this model an aggressive individual's lack of attentional bias to angry faces may reflect a VES that is less likely to pre-attentively evaluate these stimuli as threatening, salient and worthy of further processing compared to non-aggressive individuals. Thus a VES that is less active in response to anger cues (possibly as a result of an increased frequency of exposure to hostile and aggressive life experiences over time) would dissuade the attention system from selectively attending to these stimuli either initially (e.g. at 500ms in the present study) or at longer durations (1250ms). In contrast the VES in non-aggressive individuals may evaluate angry facial stimuli as threatening, worthy of additional attention to clarify potential for risk and danger and subsequently allocate attentional resources towards these threat cues both initially and at prolonged periods (as evidenced in the present study by attentional bias to anger in nonaggressive individuals irrespective of SOA).

However, while plausible, this explanation begs the question of what triggers aggressive behaviour in aggressive individuals if not as a result of an enhanced sensitivity to threat cues? It is therefore important for future studies to examine information processing biases in conditions that better model the social contexts in which aggressive behaviours are triggered, perhaps using additional sensory information e.g. auditory stimuli including volume and intonation of voice and language used; the addition of scenes incorporating different physical contexts and groups in dynamic social scenarios.

The present findings also revealed a non-significant trend for the aggressive individuals to selectively attend to happy expressions relative to neutral faces, a pattern not observed in the low aggression sample. Although

evident in figure 2, this pattern was not statistically significant (due to higher variance in the aggressive group perhaps as a result of lower numbers in this condition), and therefore requires replication in a larger sample. However, such a bias to happy expressions might be attributed to several factors. Aggressive individuals may attend to happy faces because they represent possible ambiguous cues of threat. The social experiences of aggressive adolescent males may involve spending time in groups with other aggressive, violent and anti-social individuals. Name calling, teasing and barracking between group members may be common and part of the mechanism by which the group bonds, communicates social value and maintains a social hierarchy with humour performing a posturing role for those who vie for group dominance and status. Thus aggressive males may preferentially attend to happy faces because the processing required to decide if a smile is an insulting smirk is more complex. An angry or threatening face is not ambiguous and it can not be misconstrued as happy. A smiling face, however, is context specific and could signal threat to self as it could indicate someone is laughing at you, or it could be genuine and in response to an innocent and non-threatening comment.

The current study found no evidence of a bias in selective attention to fearful faces in either group. This does not provide support for the possibility that aggressive individuals demonstrate a greater bias for fearful faces because they perceive a fearful face as signalling victimisation or subservience during an interaction. Again the high aggression sample's lack of attentional bias for fearful faces may be representative of a VES that considers social cues of fear and victimisation less salient in the absence of additional sensory and contextual information, though to be accepted this interpretation requires future studies to provide evidence of group differences in attention to fear faces

Evidence suggests anxiety is related to both attentional bias and vigilance-avoidance behaviour in anxious populations. The current design was based upon studies investigating social cognitive processing, attentional bias and vigilance-avoidance in anxious populations (Bar-Haim et al, 2007; Broadbent & Broadbent, 1988; Mogg et al, 1995; Waters et al, 2004; Roy et al, 2008; Brotman et al, 2007; Waters et al, 2008; Monk et al, 2008). It was therefore important to examine whether group differences in attentional bias to angry faces reflected greater levels of trait anxiety in the non-aggressive relative to the aggressive group. It is

interesting to note that results from ANCOVA (controlling for covariance between trait anxiety and attentional bias) still revealed a significant difference between aggressive and non-aggressive group's attentional bias to angry relative to happy and fear expressions. Thus, the observed group differences were not attributed to individual differences in trait anxiety but rather robustly associated with the teacher rated levels of aggression as indicated by participants' scores for the TRF aggressive behaviour syndrome scale.

The present study's design examined attentional biases to emotional expressions at two SOAs (500 and 1250msec, used in previous studies to index initial orienting and maintenance of attention respectively). Results reveal that attentional bias scores to emotional expressions did not differ across presentation times in either group. The similarity between bias scores at 500 and 1250 msec does not provide evidence of a vigilant-avoidant pattern of attentional bias, however future studies that provide more refined measures of bias throughout the attention trajectory (e.g. eye-tracking) are warranted.

Sample size and its influence on statistical power is another possible factor that could have influenced present findings. While a sufficient number of non-aggressive individuals were recruited, the number of aggressive individuals recruited into the study was lower than intended. While group numbers (e.g. 13 in the aggressive group) complement numbers recruited in studies that identify group differences in anxiety, it is important for future studies to replicate present findings in larger samples (particularly null results in the aggressive group).

To conclude, the current study found that there was a significant difference in attentional bias between high aggression and low aggression adolescent males. The group difference was focused on angry facial stimuli, with the low aggression group demonstrating vigilance to angry faces (across 500 and 1250ms). In contrast aggressive individuals did not selectively attend to emotional (angry, happy, fear) relative to neutral faces. This finding appears to challenge SIP theory's (Crick & Dodge, 1994; Dodge, 1986) argument that aggressive individuals attend to and encode threatening and perceived as aggressive and hostile social cues. However present findings may reflect reduced (cognitive-) motivation to selectively monitor for and evaluate social threat cues in aggressive individuals due to increased exposure to negative life experiences and hostile social interactions during development. Future research in this area should focus

on further exploring adolescent populations with conduct problems and aggressive and violent histories. If the mechanisms underlying aggression can be identified it may be possible to develop focused programmes of intervention aimed at educating young males on how to interpret the facial expressions and body language of others and how to socialise appropriately. Such research could help inform strategies aimed at reducing the frequency of aggressive and violent incidents both in schools and the wider community.

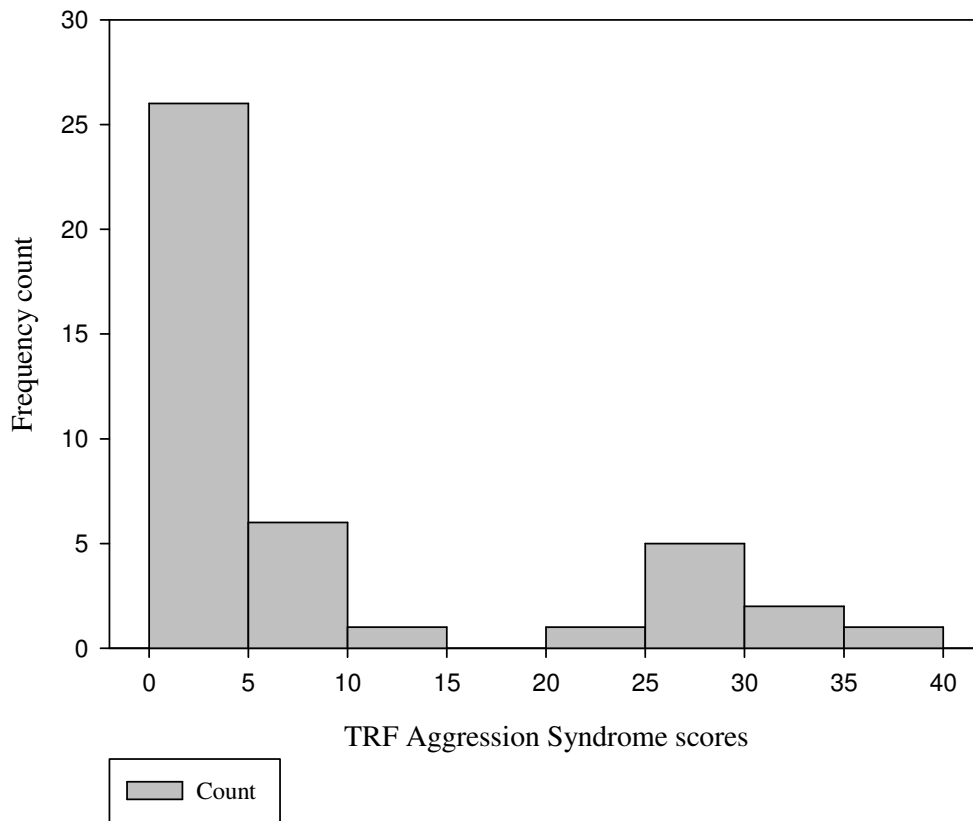
APPENDIX A: TABLE AND FIGURES

A1. Table 3: Frequency data for participants' TRF aggression syndrome scale raw scores.

| TRF aggressive syndrome score | Frequency | Percent | Cumulative Percent |
|-------------------------------|-----------|---------|--------------------|
| 0 | 18 | 42.9 | 42.9 |
| 1 | 4 | 9.5 | 52.4 |
| 2 | 1 | 2.4 | 54.8 |
| 3 | 2 | 4.8 | 59.5 |
| 4 | 1 | 2.4 | 61.9 |
| 5 | 1 | 2.4 | 64.3 |
| 7 | 1 | 2.4 | 66.7 |
| 8 | 1 | 2.4 | 69.0 |
| 9 | 3 | 7.1 | 76.2 |
| 13 | 1 | 2.4 | 78.6 |
| 20 | 1 | 2.4 | 81.0 |
| 25 | 1 | 2.4 | 83.3 |
| 26 | 1 | 2.4 | 85.7 |
| 27 | 2 | 4.8 | 90.5 |
| 28 | 1 | 2.4 | 92.9 |
| 30 | 1 | 2.4 | 95.2 |
| 34 | 1 | 2.4 | 97.6 |
| 36 | 1 | 2.4 | 100.0 |
| Total | 42 | 100.0 | |

Note. TRF: Teachers Report Form.

A2. Figure 3: Frequency distribution for participants' TRF aggression syndrome scale raw scores.



A3. Table 4: High-aggression and Low-aggression group's mean reaction time scores and standard deviations for angry, happy and frightened facial images.

| <i>Group</i> | <i>Angry/Neutral</i> | | <i>Happy/Neutral</i> | | <i>Frightened/Neutral</i> | |
|------------------------------------|----------------------|-------------------|----------------------|-------------------|---------------------------|-------------------|
| | <i>Mean</i> | <i>Std. Error</i> | <i>Mean</i> | <i>Std. Error</i> | <i>Mean</i> | <i>Std. Error</i> |
| High-aggression (<i>n=13</i>) | -5.193 | 9.313 | 23.148 | 10.666 | 3.942 | 7.705 |
| Low-aggression (<i>n=18</i>) | 22.397 | 7.813 | 5.538 | 8.948 | 7.822 | 6.464 |

APPENDIX B: Measures

B1: The Teachers' Report Form (TRF)

B2: The edited short version of the TRF.

| |
|------------------------|
| Identification number: |
|------------------------|

Teacher's Report Form

Pupil's first nameLast name.....

Below is a list of items that describe pupils. For each item that describes the pupil now or within the past 6 months please circle 0 if the item is not true of the pupil; 1 if the item is somewhat or sometimes true of the pupil; 2 if the item is very true or often true of the pupil.

Please answer all the items, even if some do not seem to apply to the pupil.

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True/Often True

| Item number | | Score (please circle a response) | | |
|-------------|---|-------------------------------------|---|---|
| | | 0 | 1 | 2 |
| 1 | Acts too young for his age | 0 | 1 | 2 |
| 2 | Hums or makes other odd noises in class | 0 | 1 | 2 |
| 3 | Argues a lot | 0 | 1 | 2 |
| 4 | Fails to finish things he starts | 0 | 1 | 2 |
| 6 | Defiant, talks back to staff | 0 | 1 | 2 |
| 7 | Bragging, boasting | 0 | 1 | 2 |
| 8 | Can't concentrate, can't pay attention for long | 0 | 1 | 2 |
| 10 | Can't sit still, restless, or hyperactive | 0 | 1 | 2 |
| 13 | Confused or seems to be in a fog | 0 | 1 | 2 |
| 15 | Fidgets | 0 | 1 | 2 |
| 16 | Cruelty, bullying, or meanness to others | 0 | 1 | 2 |
| 17 | Daydreams or gets lost in his thoughts | 0 | 1 | 2 |
| 19 | Demands a lot of attention | 0 | 1 | 2 |
| 20 | Destroys his own things | 0 | 1 | 2 |
| 21 | Destroys property belonging to others | 0 | 1 | 2 |
| 22 | Difficulty following directions | 0 | 1 | 2 |
| 23 | Disobedient at school | 0 | 1 | 2 |
| 24 | Disturbs other pupils | 0 | 1 | 2 |
| 26 | Doesn't seem to feel guilty after misbehaving | 0 | 1 | 2 |
| 28 | Breaks school rules | 0 | 1 | 2 |
| 37 | Gets in many fights | 0 | 1 | 2 |
| 39 | Hangs around with others who get in trouble | 0 | 1 | 2 |
| 41 | Impulsive or acts without thinking | 0 | 1 | 2 |
| 43 | Lying or cheating | 0 | 1 | 2 |
| 49 | Has difficulty learning | 0 | 1 | 2 |
| 53 | Talks out of turn | 0 | 1 | 2 |
| 57 | Physically attacks people | 0 | 1 | 2 |

| | | | | |
|-----|---|---|---|---|
| 60 | Apathetic or unmotivated | 0 | 1 | 2 |
| 61 | Poor school work | 0 | 1 | 2 |
| 63 | Prefers being with older children or youths | 0 | 1 | 2 |
| 67 | Disrupts class discipline | 0 | 1 | 2 |
| 68 | Screams a lot | 0 | 1 | 2 |
| 72 | Messy work | 0 | 1 | 2 |
| 73 | Behaves irresponsibly | 0 | 1 | 2 |
| 74 | Showing off or clowning | 0 | 1 | 2 |
| 76 | Explosive and unpredictable behaviour | 0 | 1 | 2 |
| 77 | Demands must be met immediately, easily frustrated | 0 | 1 | 2 |
| 78 | Inattentive or easily distracted | 0 | 1 | 2 |
| 80 | Stares blankly | 0 | 1 | 2 |
| 82 | Steals | 0 | 1 | 2 |
| 86 | Stubborn, sullen or irritable | 0 | 1 | 2 |
| 87 | Sudden changes in mood or feelings | 0 | 1 | 2 |
| 88 | Sulks a lot | 0 | 1 | 2 |
| 89 | Suspicious | 0 | 1 | 2 |
| 90 | Swearing or obscene language | 0 | 1 | 2 |
| 92 | Underachieving, not working up to potential | 0 | 1 | 2 |
| 93 | Talks too much | 0 | 1 | 2 |
| 94 | Teases a lot | 0 | 1 | 2 |
| 95 | Temper tantrums or hot temper | 0 | 1 | 2 |
| 96 | Seems preoccupied with sex | 0 | 1 | 2 |
| 97 | Threatens people | 0 | 1 | 2 |
| 98 | Tardy to school or class | 0 | 1 | 2 |
| 99 | Smokes, chews, or sniffs tobacco | 0 | 1 | 2 |
| 100 | Fails to carry out assigned tasks | 0 | 1 | 2 |
| 101 | Truancy or unexplained absence | 0 | 1 | 2 |
| 104 | Unusually loud | 0 | 1 | 2 |
| 105 | Uses alcohol or drugs for nonmedical purposes (<i>don't</i> include tobacco) | 0 | 1 | 2 |
| 109 | Whining | 0 | 1 | 2 |

B3: The scoring key for the edited short version of the TRF.

Teacher's report form scoring table

| |
|------------------------|
| Identification number: |
|------------------------|

School:

| Item number | Syndrome Scale Scores | Percentile Score | Group Allocation |
|-------------|-------------------------|------------------|------------------|
| | Attention problems | | |
| 1 | | | |
| 2 | | | |
| 4 | | | |
| 7 | | | |
| 8 | | | |
| 10 | | | |
| 13 | | | |
| 15 | | | |
| 17 | | | |
| 22 | | | |
| 24 | | | |
| 41 | | | |
| 49 | | | |
| 53 | | | |
| 60 | | | |
| 61 | | | |
| 67 | | | |
| 72 | | | |
| 73 | | | |
| 74 | | | |
| 78 | | | |
| 80 | | | |
| 92 | | | |
| 93 | | | |
| 100 | | | |
| 109 | | | |
| Tota | | | |
| | | | |
| | | | |
| | Rule-breaking behaviour | | |
| 26 | | | |
| 28 | | | |
| 39 | | | |
| 43 | | | |
| 63 | | | |

| | | | |
|-------|-------------------------|--|--|
| 82 | | | |
| 90 | | | |
| 96 | | | |
| 98 | | | |
| 99 | | | |
| 101 | | | |
| 105 | | | |
| Total | | | |
| | | | |
| | Aggressive behaviour | | |
| 3 | | | |
| 6 | | | |
| 16 | | | |
| 19 | | | |
| 20 | | | |
| 21 | | | |
| 23 | | | |
| 37 | | | |
| 57 | | | |
| 68 | | | |
| 76 | | | |
| 77 | | | |
| 86 | | | |
| 87 | | | |
| 88 | | | |
| 89 | | | |
| 94 | | | |
| 95 | | | |
| 97 | | | |
| 104 | | | |
| Total | | | |
| | | | |

B4: The State Trait Anxiety Inventory for Children: State/Trait Form

B5: The Profile of Mood States: State Form

Below is a list of words that describe feelings people have. Please read each word carefully. Circle one of the numbers beside each word to indicate HOW YOU FEEL RIGHT NOW.

| | 0 | 1 | 2 | 3 | 4 |
|------------------------|-------------------|---|---|---|---------------------|
| | Not at all | | | | Very much so |
| interested | 0 | 1 | 2 | 3 | 4 |
| full of pep | 0 | 1 | 2 | 3 | 4 |
| nervous | 0 | 1 | 2 | 3 | 4 |
| lonely | 0 | 1 | 2 | 3 | 4 |
| active | 0 | 1 | 2 | 3 | 4 |
| distressed | 0 | 1 | 2 | 3 | 4 |
| confused | 0 | 1 | 2 | 3 | 4 |
| angry | 0 | 1 | 2 | 3 | 4 |
| excited | 0 | 1 | 2 | 3 | 4 |
| unable to concentrate | 0 | 1 | 2 | 3 | 4 |
| peevish | 0 | 1 | 2 | 3 | 4 |
| worthless | 0 | 1 | 2 | 3 | 4 |
| upset | 0 | 1 | 2 | 3 | 4 |
| energetic | 0 | 1 | 2 | 3 | 4 |
| tense | 0 | 1 | 2 | 3 | 4 |
| strong | 0 | 1 | 2 | 3 | 4 |
| vigorous | 0 | 1 | 2 | 3 | 4 |
| muddled | 0 | 1 | 2 | 3 | 4 |
| hopeless | 0 | 1 | 2 | 3 | 4 |
| guilty | 0 | 1 | 2 | 3 | 4 |
| on edge | 0 | 1 | 2 | 3 | 4 |
| spiteful | 0 | 1 | 2 | 3 | 4 |
| bewildered | 0 | 1 | 2 | 3 | 4 |
| scared | 0 | 1 | 2 | 3 | 4 |
| anxious | 0 | 1 | 2 | 3 | 4 |
| hostile | 0 | 1 | 2 | 3 | 4 |
| discouraged | 0 | 1 | 2 | 3 | 4 |
| enthusiastic | 0 | 1 | 2 | 3 | 4 |
| cheerful | 0 | 1 | 2 | 3 | 4 |
| uneasy | 0 | 1 | 2 | 3 | 4 |
| efficient | 0 | 1 | 2 | 3 | 4 |
| annoyed | 0 | 1 | 2 | 3 | 4 |
| proud | 0 | 1 | 2 | 3 | 4 |
| irritable | 0 | 1 | 2 | 3 | 4 |
| miserable | 0 | 1 | 2 | 3 | 4 |
| resentful | 0 | 1 | 2 | 3 | 4 |
| alert | 0 | 1 | 2 | 3 | 4 |
| ashamed | 0 | 1 | 2 | 3 | 4 |
| lively | 0 | 1 | 2 | 3 | 4 |
| forgetful | 0 | 1 | 2 | 3 | 4 |
| sad | 0 | 1 | 2 | 3 | 4 |
| inspired | 0 | 1 | 2 | 3 | 4 |
| restless | 0 | 1 | 2 | 3 | 4 |
| furious | 0 | 1 | 2 | 3 | 4 |
| attentive | 0 | 1 | 2 | 3 | 4 |
| uncertain about things | 0 | 1 | 2 | 3 | 4 |
| jittery | 0 | 1 | 2 | 3 | 4 |
| active | 0 | 1 | 2 | 3 | 4 |
| afraid | 0 | 1 | 2 | 3 | 4 |
| determined | 0 | 1 | 2 | 3 | 4 |

B6: The Profile of Mood States: Trait Form

Below is a list of words that describe feelings people have. Please read each word carefully. Circle one of the numbers beside each word to indicate HOW YOU GENERALLY FEEL.

| | | | | | |
|------------------------|---|---|---|---|---|
| interested | 0 | 1 | 2 | 3 | 4 |
| full of pep | 0 | 1 | 2 | 3 | 4 |
| nervous | 0 | 1 | 2 | 3 | 4 |
| lonely | 0 | 1 | 2 | 3 | 4 |
| active | 0 | 1 | 2 | 3 | 4 |
| distressed | 0 | 1 | 2 | 3 | 4 |
| confused | 0 | 1 | 2 | 3 | 4 |
| angry | 0 | 1 | 2 | 3 | 4 |
| excited | 0 | 1 | 2 | 3 | 4 |
| unable to concentrate | 0 | 1 | 2 | 3 | 4 |
| peevish | 0 | 1 | 2 | 3 | 4 |
| worthless | 0 | 1 | 2 | 3 | 4 |
| upset | 0 | 1 | 2 | 3 | 4 |
| energetic | 0 | 1 | 2 | 3 | 4 |
| tense | 0 | 1 | 2 | 3 | 4 |
| strong | 0 | 1 | 2 | 3 | 4 |
| vigorous | 0 | 1 | 2 | 3 | 4 |
| muddled | 0 | 1 | 2 | 3 | 4 |
| hopeless | 0 | 1 | 2 | 3 | 4 |
| guilty | 0 | 1 | 2 | 3 | 4 |
| on edge | 0 | 1 | 2 | 3 | 4 |
| spiteful | 0 | 1 | 2 | 3 | 4 |
| bewildered | 0 | 1 | 2 | 3 | 4 |
| scared | 0 | 1 | 2 | 3 | 4 |
| anxious | 0 | 1 | 2 | 3 | 4 |
| hostile | 0 | 1 | 2 | 3 | 4 |
| discouraged | 0 | 1 | 2 | 3 | 4 |
| enthusiastic | 0 | 1 | 2 | 3 | 4 |
| cheerful | 0 | 1 | 2 | 3 | 4 |
| uneasy | 0 | 1 | 2 | 3 | 4 |
| efficient | 0 | 1 | 2 | 3 | 4 |
| annoyed | 0 | 1 | 2 | 3 | 4 |
| proud | 0 | 1 | 2 | 3 | 4 |
| irritable | 0 | 1 | 2 | 3 | 4 |
| miserable | 0 | 1 | 2 | 3 | 4 |
| resentful | 0 | 1 | 2 | 3 | 4 |
| alert | 0 | 1 | 2 | 3 | 4 |
| ashamed | 0 | 1 | 2 | 3 | 4 |
| lively | 0 | 1 | 2 | 3 | 4 |
| forgetful | 0 | 1 | 2 | 3 | 4 |
| sad | 0 | 1 | 2 | 3 | 4 |
| inspired | 0 | 1 | 2 | 3 | 4 |
| restless | 0 | 1 | 2 | 3 | 4 |
| furious | 0 | 1 | 2 | 3 | 4 |
| attentive | 0 | 1 | 2 | 3 | 4 |
| uncertain about things | 0 | 1 | 2 | 3 | 4 |
| jittery | 0 | 1 | 2 | 3 | 4 |
| active | 0 | 1 | 2 | 3 | 4 |
| afraid | 0 | 1 | 2 | 3 | 4 |
| determined | 0 | 1 | 2 | 3 | 4 |

APPENDIX C: Letters and consent forms

C1: Parental information letter and opt-in consent form

UNIVERSITY OF
Southampton
School of Psychology

Dear Parent,

My name is Philip Horton and I am a student from the University of Southampton. I am doing a research study looking at how males your son's age respond to pictures of facial expressions on a computer screen. I am contacting you to ask for your permission to invite your son to take part in the study.

Taking part will involve him completing two tasks on a computer. It will take 30 minutes to finish. The tasks involve looking at single faces or pairs of faces with different emotions on the computer screen and trying to identify what the emotions are.

The study will be confidential and any personal information will not be released or viewed by anyone other than researchers involved in the project. The results will not include your son's name or any other information that could identify him. His participation is voluntary and he may withdraw from the study at any time.

If you are happy for your son to take part please complete the consent slip at the bottom of the page and post it to *name of school* in the stamped addressed envelope.

A summary of this research project will be supplied to you upon request. To request a project summary or if you have any questions please contact me, Philip Horton, at the Educational Psychology Department, University of Southampton telephone number: 023 8059 5320/2609 or via email at: pamh@soton.ac.uk.

Regards,

Phil Horton

**Please complete the consent page and post it to
name of school in the stamped addressed envelope**

Name of pupil:

I give consent for the my son to take part in the research study

Please tick

Name of Parent:

Signed:

Dear

My name is Philip Horton and I am a Trainee Educational Psychologist from the University of Southampton currently working in your school. I am undertaking a research study investigating how Year 10 males respond to images of facial expressions on a computer screen.

I am contacting you to ask for your help in completing a short questionnaire asking for your views on the behaviour of a number of Year 10 boys in school. Each questionnaire will only take a few minutes to complete and involves circling scores for each item to indicate how frequently certain behaviours are demonstrated by the young person. I would be grateful if you could complete the questionnaire and return it to *name*, SENCo, in the envelope provided.

Personal information will not be released to or viewed by anyone other than researchers involved in this project. The results of this study will not include your or the young person's name or any other identifying characteristics. A summary of this research project will be supplied to the school upon completion. If you have any questions please contact me, Philip Horton, at the Educational Psychology Department, University of Southampton telephone number: 023 8059 5320/2609 or via email at: pamh@soton.ac.uk.

Many thanks for your help.

Regards,

Philip Horton
Trainee Educational Psychologist

Dear

My name is Philip Horton and I am a Trainee Educational Psychologist from the University of Southampton. I am undertaking a research study investigating how Year 10 males respond to images of facial expressions on a computer screen.

I am contacting you to ask for your help in completing a short questionnaire asking for your views on
behaviour in school. The questionnaire will only take 5 minutes to complete and involves circling scores for each item to indicate how frequently certain behaviours are demonstrated by the young person.

I would be grateful if you could complete the questionnaire and return it to *name* in the envelope provided.

Personal information will not be released to or viewed by anyone other than researchers involved in this project. The results of this study will not include your or the young person's name or any other identifying characteristics. A summary of this research project will be supplied to the school upon completion. If you have any questions please contact me, Philip Horton, at the Educational Psychology Department, University of Southampton telephone number: 023 8059 5320/2609 or via email at: pamh@soton.ac.uk.

Many thanks for your help.

Regards,

Philip Horton

Trainee Educational Psychologist

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