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**ANGER RUMINATION, COGNITIVE INFLEXIBILITY AND THE
DEVELOPMENT OF RELATIONAL AND PHYSICAL AGGRESSION IN
ADOLESCENCE**

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D.Clin.Psy. Thesis (Volume 1), 2006.

University College London

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Overview

Volume 1 consists of three sections:

Part 1: A literature review which addresses how socio-cognitive theory may inform the understanding of childhood aggression. Though there are a range of approaches to the topic of aggression, the aim here is to focus on two specific cognitive theories: firstly, the hostile attributional bias (Dodge, 1980) which is an empirically robust theory of social cognition applied extensively to children; and, secondly, anger rumination (Sukhodolsky, Golub and Cromwell, 2001), a cognitive style associated with aggressive behaviour in adults. Distinctions between relational and physical aggression and the importance of gender and methodology are also discussed.

Part 2: A research project which investigates the role of cognition in the development of aggression in adolescents. More specifically, it sets out to determine whether anger rumination and cognitive inflexibility contribute to the development of relational and physical aggression. Firstly, gender differences are investigated in terms of the type of aggression displayed by girls and boys. Secondly, analyses are conducted to test whether anger rumination and cognitive inflexibility correlate with relational and physical aggression. The study not only highlights the importance of studying relational aggression as a distinct form of aggression but also that cognitive processes such as

anger rumination can predict the development of relational and physical aggression in adolescents.

Part 3: A critical appraisal of the research process provides a critical and personal review beginning with a reflection on why adolescent aggression initially caught my interest, and then focusing on methodological issues of design, recruitment, sampling and measurement. The construct of relational aggression is elaborated on in terms of development, gender and links to bullying and social maladjustment. The concept of anger rumination is also expanded upon in terms of broadening out the possible relationships between specific emotions and cognitive processing.

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Acknowledgements

I would like to acknowledge Dr. Stephen Butler and Dr. Pasco Fearon for their unlimited guidance and good humoured support; from the initial design of the study, to the analysis and interpretation of the results. I would like to thank my family, especially my parents, for being so thoroughly thoughtful, and my friends for their kindness and unfailing patience. I would also like to pay special gratitude to the teachers, parents and pupils for making the research possible, and for showing such enthusiasm and interest in the project.

PART 1: LITERATURE REVIEW

Does cognitive theory inform our understanding of childhood aggression-specifically the
Hostile Attributional Bias and Anger Rumination?

ABSTRACT

This literature review addresses how socio-cognitive theory may inform the understanding of childhood aggression. Though there are a range of approaches to the topic of aggression, the aim here is to focus on two specific cognitive theories: firstly, the hostile attributional bias (Dodge, 1980) which is an empirically robust theory of social cognition applied extensively to children; and, secondly, anger rumination (Sukhodolsky, Golub and Cromwell, 2001), a cognitive style associated with aggressive behaviour in adults. The potential to adapt theories of adult cognition to children and adolescence, distinctions between relational and physical aggression and the importance of gender and methodology will be discussed.

A. Introduction

The general aim of this literature review is to demonstrate that cognition research can be used to enhance understanding of why some children and adolescents are more aggressive than others. Though there are a range of approaches to the topic of aggression, the focus here is on two specific cognitive theories: hostile attributional bias (Dodge, 1980), an empirically robust and repeatedly validated theory of social cognition; and anger rumination. It is important to note at the outset that while hostile attributional bias has been used in the field of cognitive research for some time, anger rumination is of a more recent application. Because anger rumination research, in particular, has not been applied to children in the same depth as attributional bias, it is necessary to draw upon the insight and experience available in the literature on adults to specify the context for discussing its possibilities in the developmental arena. Despite its relative youth as a research technique, it is hypothesised that anger rumination theories could be applied successfully to children and adolescents. It is both theoretically important and therapeutically relevant given the current rise and interest in 'teenage aggression'. As will become evident, in applying these two theories, gender and methodological issues are important and will be addressed, as appropriate, to highlight their relevance to areas of future research.

Developmental context

Piaget (1954) studied cognitive development from infancy through to adolescence. As children head into adolescence, Piaget proposed that they move from the concrete-operational period (ages 6-11 years) characterized by the acquisition of operations and

the beginnings of being able to hold the viewpoint of another person in mind. He also suggested that at this stage children can sometimes misinterpret situations which leads to responses which have not been thought through. The formal operations period (ages 11 onwards) is the final stage of development proposed by Piaget. It is characterised by more abstract thought and metacognition. This allows adolescents to think through problems and situations carefully in order to reach a more logical result.

Selman (1977), another socio-cognitive theorist, similarly studied developmental stages of cognition but focused on the social perspectives approach. His stages are more fluid than Piaget's and overlap across age ranges; however he suggests that by adolescence, individuals are beginning to be able to see their social world from a more generalised third-party perspective. Previously, their understanding would have been characterised by one other person's point of view rather than a more sophisticated amalgam representing another world view. Selman (1977) suggested that by late adolescence (15-plus) the individual's "perspective taking" is more abstract which enables them to interact as an individual within the concept of a broader society. It is important to consider cognitive development as a child's cognitive development plays an important role in their ability to understand and think about social situations.

B. Attributional Bias.

1. Introduction to Social Information Processing

Human beings are social creatures who live, work and mature in social groups. Indeed, some evolutionists have argued that because of this, it has been necessary for humans to understand others' behaviours so that they can survive (Dawkins, 1976; Pinker, 2002;

Wolpert, 2006 (*passim.*)). Social cognitive research studies groups of individuals to determine how they comprehend their interactions with others, frequently beginning with their primary caregivers and then expanding to their peers and the world beyond them. Within this research tradition, it is a working hypothesis that children are able to process a vast amount of information about a social situation and use it to make decisions as to how they need to respond to optimise chances of achieving their desired goals. As they mature, children become more efficient and accurate at processing this information (Piaget, 1954; Selman, 1977, 1980; Crick and Dodge, 1994).

Scientists in this socio-cognitive tradition have developed various theories to describe the stages of thinking an individual goes through when placed in certain social situations. Dodge (1980) posits that these processing patterns emerge around middle childhood and are “routinised” during childhood and adolescence and become “personality-like traits” that influence how individuals interpret their experience (Dodge, 1980; Zelli and Dodge, 1999). Crick and Dodge (1994) show that deficits in cognitive processing predict the development of aggression in children. Dodge also hypothesises that these stable social information processing patterns mediate between the individual’s environment and development of aggression in childhood.

2. Stages of processing

According to the social information processing model a child’s response to a problematic situation can be described in several cognitive stages (Crick and Dodge, 1994). Initially, the child or adolescent selectively attends to the environmental and internal stimuli because there is not enough time to attend to all the stimuli at once, then encodes the social cues (environmental and internal) and, finally, interprets the cues

based on past experience. In this interpretation of events, the child formulates a goal which, in turn, leads to various possible cognitive, emotional and behavioural responses. More precisely, the individual chooses a response not only by distinguishing between interpersonal, intrapersonal and instrumental consequences but also by evaluating them separately. Possible responses (there may be more than one chosen) are either rejected or enacted. While this section of the paper is concerned primarily with the interpretation stage where attributional biases can be found, Dodge and Crick's (1990) earlier review observes that competency is needed at each stage of processing so that the formation of biases and deficiencies is inhibited. In this research, biases and deficiencies are associated with social and emotional adjustment difficulties and are manifested in, for example, aggression.

This earlier review (Dodge and Crick, 1990) shows that these cognitive-behavioural patterns have been successfully replicated many times thereby increasing the general validity of the theory. Crick and Dodge have since reiterated that children who misinterpret ambiguous or neutral social situations as threatening, and who attribute malicious intent to others are said to have developed a Hostile Attributional Bias and are more likely to act aggressively. Further, within that theory, three significant components have been distinguished (Dodge, 2003): firstly, the acquisition of knowledge and skill ability; secondly, prediction of aggressive behaviour development; and, thirdly, correlation of attributional bias with life experience.

The next section of the literature review aims to review Dodge's theory of the hostile attributional bias and the development of aggression in childhood and adolescence. It

will also raise issues around the measurement of cognitive processing, causality of the relationships between aggression and attributional biases, additional factors that might contribute to delinquent behaviour, and the implications of gender and aggression.

3. The approach propounded by Kenneth Dodge

As is evident in the article published in 1980 entitled “Social Cognition and Children’s Aggressive Behaviour”, Dodge was primarily interested in the different ways that aggressive and non-aggressive boys think in social situations. Dodge suggested that an aggressive boy is more likely to interpret others’ behaviour as hostile, in comparison to a non-aggressive boy. He postulated that when boys misinterpret situations as threatening they are more likely to respond in an aggressive way. Initially, Dodge studied male children aged between 6 and 12 years (n=90) and categorized them as aggressive and non-aggressive based on peer nominations and teacher questionnaire-based assessments. Peer nomination is a procedure in the application of which the children are asked to nominate peers whom they consider to be aggressive and non-aggressive and the children who have the most nominations are then categorized accordingly into aggressive and non-aggressive groups. Each boy was invited to try and win a prize by completing a puzzle. They were told that another boy was next door attempting the same thing. After the boy had completed some of the puzzle, the experimenter said she would show the other boy his puzzle and carried it through to the other room. The participant overheard one of the following three scenarios: hostile (boy purposefully destroying the puzzle), benign (“other boy” adds one bit to the puzzle to help out, in the process he drops the puzzle, it breaks, and he is heard apologising) and ambiguous (comments on how well he has done and then there is crashing heard as he drops the puzzle). The

experimenter (blind to experimental condition) returns with 2 puzzles, the original which is now all broken up and the “other boy’s” which was partially done. The experimenter then leaves the room and the participant’s response is video recorded.

This stage of the experiment raises ethical issues as the child participants were not informed that they were being video-recorded before the experiment as it was thought that it could have affected their response to the provocation. Nor was it shared with them after the experimental situation as it was felt that they would share the information with their peers. Informed consent was collected however from both the teacher and parent who were cognisant of the full procedure. The behavioural responses were coded by two independent raters on categories including disassembling the “other boy’s” puzzle, indirect and verbal hostility, and helping behaviours. Inter-rater reliability of 97% was achieved, and joint reviews were conducted in cases of disagreement.

The behavioural responses of the children did not differ significantly between the children categorised as either “aggressive” or “non-aggressive” when they faced hostile situations. The same was true when they faced benign situations. Most importantly, in ambiguous situations, those which are neither hostile nor benign, the “aggressive” children responded with significantly more verbal and non-direct hostility compared to the “non-aggressive” children. The results showed that being labelled aggressive predicted higher levels of verbal hostility, but this only accounted for 4% of the variance in behavioural response. The non-aggressive children, it appears, had treated their peers as if their behaviour had been accidental, whereas the aggressive boys interpreted the

situation as more threatening. In fact, there was no significant difference between the level of aggression expressed by the aggressive boys in the hostile and ambiguous situations. Attributions were not directly studied in the first part of the study, but Dodge suggested that it can be inferred from the behavioural responses that the aggressive boys think that other people are most likely to be behaving in a hostile manner towards them.

The second stage of Dodge's study published in 1980 was therefore more directly focused on investigating attributions. The participants were invited into a room and told four hypothetical stories about four peers categorised previously as "aggressive" or "non-aggressive" and themselves. Each story ended with something negative happening to the participant. They were then asked in a non-directive way by an interviewer about the intentionality of the peer and how they thought they would have responded. The results showed that aggressive boys attributed hostile intent 50% more often than non-aggressive boys. Although the evidence suggests that attributional bias is significant in the development of aggression, the significance of the prediction between attribution and aggression ($p < 0.09$) suggested that there are other factors that contribute to the development of aggression. These will be discussed later in the review.

Initially, Dodge argued that differences in aggression could be explained by a cue-utilisation deficiency or cue-distortion. The former suggests that the child does not process the social information quickly enough so the information itself does not affect their behaviour, suggesting that they merely act in a more impulsive way. The latter, by contrast, occurs when the child's interpretation of the situation is distorted. Dodge's

results support the cue-distortion hypothesis and have been interpreted as demonstrating that some male children can develop a “hostile attributional bias” which implies that they are more likely to infer hostile intent in ambiguous social situations. These *in vivo* experiments have good internal validity, the argument being that, because the children took part in the social situations, the results are indicative of actual behaviour and cognition rather than hypotheses about how the children thought they would act or think. According to a meta-analysis (Orobio de Castro, Veerman, Koops and Monshouwer, 2002) the majority of subsequent studies on attribution and aggression presented the social situations on video, in writing or orally, and therefore chose not to observe the children’s behaviour directly. Interestingly the meta-analysis highlighted that larger effect sizes were found in the studies where the children participated in the social situations.

There is much debate about whether it is possible to capture empirically the presence of a causal relationship between cognitive processes and behaviour. Dodge raises the difficulty in measuring processing patterns due to their internal nature. In the context of the hostile attributional bias, Dodge has argued that it is possible to infer from the research that cognitive processing patterns do cause the development of aggression in children. It is suggested that longitudinal data can help determine causality because, by looking at stability of social information cognitive processing and development of aggression over time, these data allow a stronger test of the hypothesis.

Weiss, Dodge, Bates and Pettit (1992) studied a random sample of 585 children aged four to six years old. They suggested that harsh discipline at an early age predicted the development of aggression and maladaptive social information processing. Indeed, the evidence indicated that after controlling for other predictors of aggression, namely socio-economic status, child temperament and marital violence, a consistent relationship between harsh discipline and aggressive behaviour was identifiable in two cohorts of children. Weiss and colleagues suggested that maladaptive social information processing patterns develop as a consequence of the harsh treatment and therefore mediate the relationship between the environment and behavioural response. However, the effect sizes linking attribution and various measure of aggression are small ranging from 0.02 to 0.14 in one cohort and 0.01 to 0.21 in the second cohort. The strongest of these correlations was found between attribution and observer and teacher ratings of the child's aggression in comparison to self and parent reports.

Another way to study the presence of causality is to measure attributions before and after an experimental intervention aimed at changing attributional biases. Hudley and Graham (1993) conducted an intervention-based study with African-American boys aged ten to twelve years. They recruited both aggressive and non-aggressive boys (via peer and teacher nominations) and placed them in treatment or control groups. The intervention was designed to change the attribution of intent held by aggressive boys in ambiguous situations. The evidence from their study suggests that in aggressive boys hostile attributional biases lessened, as did reports of aggressive behaviour in the ambiguous situation post-intervention. The authors suggest therefore that attributional

bias has a direct impact on aggressive behaviour suggesting a direction of effect from cognition to behaviour. The study is methodologically sound (multi-informants, explicit measures of aggressive behaviour, control group) and provides strong evidence for the causal relationship between cognition and behaviour. However, a limitation of the study is that, although it is likely that the attribution training contributed to the reduction in aggression, other therapeutic factors such as belonging to a group (Bloch and Crouch, 1985) and mixing with non-aggressive peers may have also contributed to the change were not discussed.

A meta-analysis was performed on hostile attributional bias and aggression in children and adolescents (Orobio de Castro et al., 2002). They reviewed forty one studies comprising general population samples, comparison studies of non-referred and referred aggressive children, and children ranging from non-aggressive to severely aggressive. Significant associations between hostile intent attributions and aggression in childhood were found, but with varying effect sizes. The weighted mean effect size of $r = 0.17$ should be interpreted with care as the effect sizes ranged from $r = -0.29$ to $r = 0.65$. The meta-analysis highlighted certain factors that moderated the effect sizes. Firstly, they found that severity of aggression was a moderator of effect size: that is stronger associations were found in the samples which displayed more serious/severe levels of aggression. Secondly, the way that the social situation was presented affected the magnitude of the effect size: video and picture based associated with the smallest effects ($r = .05$), audio presentation associated with moderate effects ($r = .29$ and $.24$) and actual staged social situations providing the largest effect sizes ($r = .55$). Thirdly the analysis

also looked at the style of questioning (multiple choice and open-ended questions) and found that significantly larger effect sizes were found with the more structured measures. Finally, they found that in the context of age, the largest effect sizes were found for children aged 8 to 10 years of age.

4. Relational versus Physical Aggression and the role of Gender

The initial stages of research using Dodge's model focused on physical aggression and was more tailored to aggressive behaviour in male children. Much of the subsequent research into the development of aggression in children continued to be conducted with males, thus adhering to the traditional belief that male children exhibit more aggression. To understand the subsequent evolution of the research agenda a distinction needs to be drawn between relational and physical expressions of aggression. Stated summarily, relational aggression refers to 'harm through damage of friendships or relationships', whereas physical is 'harm through physical damage' (Crick, Grotpeter and Bigbee, 2002).

In their 1995 publication, Crick & Grotpeter highlighted that previous research has not captured the true extent of female aggression. Their explanation for this oversight was that physical aggression was not considered to occur as frequently in females, in comparison, with males. Crick and Grotpeter investigated whether relational aggression was distinct from physical aggression and whether these types of aggression have any impact on social adjustment in children. This project studied 491 children aged 8 to 10 years old (approximately half boys, half girls). A peer assessment of relational

aggression and a self report measure of social adjustment provided information on the children's relational and physical aggression as well as pro-social behaviour and isolation. The participants were also asked to complete a peer-nomination instrument which categorized the children as relationally aggressive, physically aggressive or both. The results suggested that relational aggression was distinct from physical aggression suggesting that children's social difficulties cannot be accounted for by physical aggression alone. Relational aggression accounted for 13.5% of the variance whereas physical aggression accounted for 23.9 % of the aggression scores. The correlation between relational and physical aggression was moderate ($r = 0.55$) which would be expected when two variables are related but not the same.

Relational aggression was experienced significantly more by females compared to males and, as expected, boys were shown to express significantly more overt aggression than girls. The authors concluded that it was likely therefore that female aggression had been underestimated in previous studies because relational aggression had not been considered (Crick and Grotpeter, 1995). Theoretically, this observation prompted a differentiation of meaning within the concept of hostile attributional bias making it relevant to both relational and physical aggressive behaviour.

Crick (1995) compared how males and females experience social situations emotionally. It was found that males display more distress in situations where there are disagreements involving physical dominance and territorial issues. In comparison, females display higher levels of distress in situations involving interpersonal issues and relationship

concerns. It was also found that involvement in relational aggression predicts future social maladjustment for females that is not accounted for by physical aggression. More recently, Cummings & Leschied (2002) have corroborated some of these results in finding that Canadian adolescent females have more negative feelings as a result of verbal rather than physical fights.

Crick et al., (2002) studied a total of 680 third grade boys and girls (8-9 years old) to explore social cue interpretation processing. They considered relational as well as physical aggression. They were interested in intent attributions as well as the emotional distress elicited from relationally and physically aggressive situations across genders. The participants completed a peer-nomination instrument designed to categorise children into “aggressive” and “non-aggressive” groups (Crick, 1996) and were asked to rate on a Likert scale how “mad” and “upset” they would be if they were involved in these types of situations. The analysis found a significant main effect for physical aggression indicating that children categorised as physically aggressive had more hostile attributions when faced with instrumental provocation (for example, situations involving physical dominance and territorial issues). Subsequent analysis found a significant effect for relational aggression indicating that children categorised as relationally aggressive had more hostile attributions in situations involving interpersonal issues and relationship concerns and found the relational provocation more distressing. It was found that boys and girls did not differ in the amount of distress experienced when faced with physical aggression. This study not only draws attention to the fact that social information biases can be different for children in physically or relationally aggressive situations, but also suggests that there are implications across genders: that relationally aggressive situations

may elicit more social information processing deficits in girls. Essentially, this study illustrates that the social information processing model can be expanded to include relational aggression, and that processing patterns of aggressive children are specific to the type of aggression being experienced.

5. Another dimension – Proactive vs. Reactive Aggression

Crick and Dodge (1996) further developed the social information model by distinguishing between reactive and proactive aggression in children. They describe reactive aggression as a response to a hostile attack. Proactive aggression is characterised by children who strategise to behave aggressively because they believe that they will gain something from being aggressive and have some confidence in their own efficacy. Together, they describe two different social information processes to explain reactive and proactive aggression. On the one hand, they state that reactive aggression is characterised by the hostile attributional bias as it hinges on the child interpreting the other child's behaviour as threatening. On the other hand, they believe that proactive aggression is characterised by a positive evaluation of aggression in that one will gain something from it, and will have a good chance of achieving ones goal through the use of aggression. Male adolescents were found to have more confidence in the efficacy of their aggression in comparison to females (Coie and Dodge, 1998).

Crick and Dodge (1996) studied 624 children aged nine to twelve years of age and used teacher ratings to categorise the children into reactive-aggressive, proactive-aggressive, combined reactive and proactive aggressive and non-aggressive groups. Vignettes including hypothetical peer and conflict situations were presented to the children. Intent

attributions, outcome expectations, feeling of efficacy and social goals were assessed. They found that younger children attributed hostile intent to their peers more often than the older children. The older children who were described as reactive-aggressive made more hostile attributions than the other aggression groups. However, overall, the reactive group's aggression scores did not differ significantly from the other groups, suggesting that the processes of interpretation and evaluation may not be all that distinct and, indeed, may be part of the same process. Unfortunately the cell sizes were too small to measure any gender influence.

6. Developmental transitions

When working within a developmental perspective it is important to investigate how adult-based literature might inform the child and adolescent research. Burnstein and Worchel (1962) suggest that when adults perceive another adult to accidentally cause something negative, their "modal response" is to inhibit aggression. Mallick and McCandless (1966) suggested that this should be the same for children. However, subsequent research focused on cognitive development has highlighted individual differences in cognitive ability both across and within age groups. For example, children will differ in their ability to interpret others' intentions making it difficult to determine whether a child's aggressive response may be more based on cognitive development rather than environmental factors alone (Piaget 1965). Indeed, in their study of relational and physical aggression, Crick et al (2002) again found that third and fourth graders (aged 8-10 years) showed a higher level of hostile attributional bias compared to sixth graders (12 years old) when faced with instrumental provocation, suggesting that as they mature, children may become more able to interpret others' instrumental behaviour more

accurately rather than being able to do this from an early age as Mallick and McCandless had originally contended.

Children may become more able to inhibit immediate responses as they mature, as suggested by Burnstein and Worchel (1962) and more able to evaluate the possible consequences due to their increased ability to internalise social rules (Coleman and Hendry, 1999). They may also be more able to generate more alternatives the older they get (Selman, 1977). However, there were no significant differences between the eight and twelve year olds for experiencing and expression of relational aggression. This may be because the capacity to be relationally aggressive develops later due to the more sophisticated and complex processing involved (Selman, 1977) in comparison to being physically aggressive which develops much earlier (Bowlby, 1969, Winnicott, 1965). However, Ostrov, Woods, Jansen, Casas and Crick (2004) found gender differences in relation to aggression in children as young as 44 months with girls delivering and receiving more relational and boys more physical aggression. More specifically, Crick et al. (2002) suggest that the age difference arises partly because physical aggression declines as a child matures while, at the same time, the pressure of gradual socialisation also reduces or modifies it.

To make progress on this issue within a developmental perspective, Crick et al. (2002) suggest the need for longitudinal studies focused on aggression to track developments in social information processing as the child matures. This had already been investigated by Fontaine, Burks and Dodge (2002) in terms of physical aggression in boys, but it would be helpful to see if their findings can also be applied to relational aggression. Dodge, Pettit, Bates and Valente (1995) found, in their longitudinal study, processing

patterns predicted a growth in aggressive behaviour. However, the association is not as strong as might be expected and therefore to establish an unequivocal correlation between aggression and social cognition, it will probably be necessary to extend the time frame and develop more accurate measures of social information processing in order to examine patterns of physical and relational aggression from childhood through to adolescence whilst also considering gender difference. The complex nature of longitudinal studies, especially the difficult task of controlling the numerous variables (e.g. attachment patterns, family history of mental illness, criminality, socio-economic status, education, and ethnicity) often means that stronger correlations are difficult to identify.

Even if the time horizon of longitudinal studies were to be extended, there still arises the question of the direction of effect. That is, does the processing pattern cause aggressive behaviour or does the aggressive behaviour allow the processing patterns to develop? Dodge himself (1993) has observed that a child who is aggressive receives more negative peer attention and develops a “reputation” for being aggressive. He goes on to contend that if this goes unchecked it would be likely to increase the child’s hyper-vigilance for hostile cues from its peers which would, in turn, contribute to the development of a hostile attributional bias. Clinical interventions may have something to contribute to resolving this question because these indicate that cognitive behavioural interventions for both adults and children that focus on changing thoughts and beliefs do reduce aggressive behaviour (Novaco, 1975; Roth, Fonagy, Parry, Target and Woods, 2006; Roth, Fonagy, Target, Phillips and Kurtz, 2005).

The social information processing model only puts forward a cognitive understanding of how aggression develops in childhood. There are of course other factors that contribute to aggression, for example, parenting, intelligence, neurally mediated attention deficits, experience, emotion regulation, educational opportunity and gender. Waldman (1996) investigated the role of intelligence in social information processing and aggression, and found that although intelligence was able to predict aggression, cognitive processes contributed independently to the development of aggression in children. The same pattern was found with other psychological constructs like emotional development and knowledge (Dodge, Laird, Lochman, Zelli and Conduct Problems Prevention research group, 2002) and beliefs systems (Heussmann and Guerra, 1997).

Other factors have been researched in conjunction with social information processing and aggression in childhood. Dodge, Lansford, Burks, Bates, Pettit, Fontaine and Price (2003) found that early social rejection predicted aggression in children. Parker and Asher (1987) gave evidence to suggest that social rejection has consequences in later life for those children who are prone to chronic levels of aggression, emphasising the long term consequences of bullying and social rejection. Dodge suggests that processing patterns mediate between the experience of being rejected by peers and the aggressive behaviour reported in these children. However, because the mediation effect is only small, it only explains a small part of the variance in the development of aggression and the other cognitive factors warrant further investigation. Childhood maltreatment, as

discussed previously, has a similar relationship with aggression and social information processing patterns as social rejection.

This social-cognitive theory of aggression has informed clinical practice in highlighting the role of cognition in the control of problem behaviour in children. There is much evidence to support cognitive behavioural therapy in the treatment of aggression and anger including recognising and modifying negative automatic thoughts that support the underlying assumptions that others are behaving with hostility (Novaco, 1975; Roth et al., 2005). Further empirical investigation of the relationship between other cognitive factors and aggression could inform the evidence-base on which present assessment, formulation and treatment of aggression is formed.

In summary, the theory of hostile attributional bias is empirically sound and has been applied to the understanding of child and adolescent aggression using a variety of methodologies and populations. The evidence suggests that the way in which a child interprets others' behaviour can influence how they react to them and, more specifically that "aggressive" children are more likely to interpret others' behaviour as hostile, even when there has been no specific threat made, and this in turn increases the likelihood of them retaliating aggressively. The interpretation of hostility also plays an important role in the continuation of this behaviour because the child feels justified in its aggressive response. Dodge argues that there is a causal relationship between processing patterns and aggression. As stated above, there are other emotional, social and psychological factors that have been found to contribute to aggression. However, in the light of the

small to moderate effect sizes found in the attributional bias and aggression literature, further studies are required to look at what other cognitive factors might contribute to the development of aggression in children.

C. Anger Rumination

1. Introduction

Cognition has been shown, therefore, to have a fundamental role in the development and expression of anger and aggression. Another cognitive style that has been linked to aggression is rumination. Rumination is a cognitive strategy that has been described as “an obsessive or abnormal reflection upon an idea or deliberation over a choice” (Merriam-Webster Medical Dictionary, 2002). Rumination is empirically associated with depression, and has been strongly linked to inducing and prolonging negative mood, especially in females (Nolen-Hoeksema, 1987). More recently in the adult literature, rumination has been linked with other emotions including anger and behaviour such as aggression. More specifically, “anger rumination” is thought to increase levels of anger when the rumination involves thoughts about situations that made the individual feel angry. To date, there is little research involving anger rumination in children and adolescents. However, adolescence is considered to be characterised by self-preoccupation and the intense and challenging search for self-identity (Waddell, 2006). It could therefore be argued that adolescents may be prone to the self-referential and obsessive nature of ruminative thinking style. The theories of anger rumination involving adults will be outlined first, and then the relevant, relatively limited, developmental literature will be reviewed. This aim of this review will be to

create a thoughtful and evidence-based rationale for the theories of anger rumination to be tested and applied to adolescence.

Two cognitive models have been used to study anger rumination: a response-style theory (Nolen-Hoeksema, 1987) and a cognitive neo-associative model of aggression (Berkowitz, 1989). Bushman, Bonacci, Pedersen, Vasquez and Miller (2005) extended the latter with their study of triggered displaced aggression. Each will be considered in chronological order because this parallels the growth of interest in aggression in this field of cognitive psychology.

2. Characterising rumination: response style theory

Response-style theory attempts to explain an individual's ability to self-reflect (Nolen-Hoeksema, 1987) and has its foundations in the understanding of the relationship between rumination and depression (Nolen-Hoeksema, Larson and Grayson, 1999).

Nolen-Hoeksema's theory outlines three mechanisms by which rumination affects depressive symptoms. Firstly, individuals who ruminate when experiencing low mood, are more likely to have an interpretation bias that results in an overly negative interpretation of events which is fuelled by memories which, in turn, support the low mood. Secondly, individuals who adopt a ruminative response style are consumed by repetitive thoughts about their own moods. Thirdly, rumination prevents the individuals seeking and engaging in other activities that might alleviate their depressed mood because they have poorer cognitive skills and problem-solving ability. Nolen-Hoeksema and colleagues suggested that cognitive mechanisms could be applied to other negative

affects, including anger, especially in light of the evidence suggesting that aggression is linked to interpretation bias, such as the hostile attributional bias, discussed in the previous section of this review.

In these studies, Treynor, Gonzalez and Nolen-Hoeksema (2003) suggest that rumination is, “...*a method of coping with negative mood that involves self-focused attention...*”, and can be explained using a two-factor model separating ‘reflection’ and ‘brooding’ as different aspects of rumination. While ‘reflection’ allows the individual to problem-solve (Treynor et al., 2003), ‘brooding’ is associated with short-term and long-term depression suggesting that it is a maladaptive cognitive strategy. Along similar lines, Carver & Scheier (1981) argue that rumination can be maladaptive when the problem solving is not successful, leaving the individual with a feeling of frustration. More recently Kross, Ayduk and Mischel (2005) tried to explain how rumination and reflection differ in terms of content and direction of thought. This will be considered later.

The expansion of the theory to include a wider range of negative affect including anger was attempted by Rusting and Nolen-Hoeksema (1998). They studied a relatively small sample of 41 adults (20 men, 21 women) and considered how two different cognitive strategies, rumination and distraction, affected mood including anger. Unfortunately, the absence of a control group in this study places limits on the study’s reliability.

The method used progressed through four stages. Before the experimental situation was applied, the participants completed self-report measures of anger and hostility. They were then asked to imagine themselves in a situation where they were being treated unfairly. This approach had previously been demonstrated to induce an angry mood (Keltner, Ellsworth and Edwards, 1993). The sample was then split into two groups, one distraction group and one rumination group. The distraction group was asked to focus their attention away from themselves, whereas the rumination group was asked to concentrate on self-focused thoughts. The participants were then asked to complete a second round of mood questionnaires and do a story-completion task where their responses were analysed for levels of anger and positive-negative content. Rusting and Nolen-Hoeksema's (1998) study found that rumination increased the experience of anger whereas distraction decreased or had no effect upon the anger experienced.

The definition of anger rumination was refined somewhat by Sukhodolsky, Golub & Cromwell (2001) as an "*...unintentional recurring cognitive process related to anger experience and expression...*" To capture this formulation empirically a validated measure called the Anger Rumination Scale was developed to assess the cognitive processes that occur in adults (n=408) after the emotion of anger has been triggered. The definition was further expanded to include the propensity both to think almost obsessively over past experiences that have provoked anger and to interpret the current episodes of anger in context of their past experiences.

Subsequently, Sukhodolsky and colleagues predicted that anger generation and anger experience processes are intertwined with angry ruminative processes, which can be responsible for sustaining anger (Sukhodolsky, et al., 2001). They identified four significant factors that contributed to rumination: angry after-thoughts, angry memories, fantasies of revenge, and attribution of causes. Having to think through a recent angry episode with the intention of resolving it was thought to be the cause of the anger according to the individuals who took part in this study. They also found that the perceived function of revenge fantasies was to achieve closure of the angry episode, which contrasts with the empirical findings of Rusting and Nolen-Hoeksema, (1998) and Bushman (2002) who found that rumination increases the experience of anger.

Kross et al. (2005) studied rumination and reflection and how they relate to anger. The authors were interested in explaining why one cognitive pattern is associated with social maladjustment and the other is considered necessary for successful therapeutic treatment, when basically both require participants to think about themselves and what has happened to them. The study examined the types of self-perspective and emotional focus that individuals have when they self-reflect or ruminate, more specifically, whether the cognitive process was characterised by self-distanced or self-immersed thought and secondly whether the thought was focused on “what” emotions they felt or “why” they thought they were feeling those emotions.

Participants were asked to recall a social situation that had made them feel angry and hostile, and then to take a self-immersed or distanced approach (third party) to the

instance, and then to either concentrate on the specific feelings they were experiencing (what?) or the reasons underlying their emotions (why?). Anger was then measured implicitly with a word-completion task (Arndt, Greenberg, Solomon, Pyszczynski & Simon, 1997) and explicitly by a self-report tool (Watson, Clark & Tellegen, 1988). As predicted, those who were more able to take a more distanced perspective of the problem and were more interested in “why” the interaction had been anger-inducing, experienced the least anger. In contrast, those who became more self-immersed in the problem had a more intense experience of anger. Interestingly, there was no difference in level of anger arousal between the groups who concentrated on “why” or “what” they were feeling, suggesting that it is the type of perspective that is important and that focusing only on the reasons behind emotions is insufficient to reduce the level of negative affect. This suggests that rumination, as a self-focused cognition style, increases negative affective experience.

This finding is important as a possible focus of clinical intervention for individuals with anger problems. Kross et al (2005) suggest that thinking about why an altercation occurred as opposed to just focusing on what happened is not sufficient to change the affective experience of the memory. Nor is having a deeper and more sophisticated understanding of why something happened enough to effect change. Instead, they suggest that what is important is the type of perspective that one takes. For example, having an ability to stand back from the experience will reduce the negative affect associated with the memory.

3. The cognitive neo-association model: or more on how rumination works

Berkowitz and Heimer (1989) and Berkowitz's (1990; 1993) cognitive neo-association model of aggression posits that aggressive thoughts, emotions and behaviour are linked in an 'associative network'. They suggest that there are two groups of negative affect – fear and aggression. If the aggression network is activated, then all the associated emotional and behavioural tendencies are prompted concurrently and they all feed into the aggressive network.

This model throws light on the phenomenon of triggered aggression identified by Bushman (2002), referred to above, and supports the idea that ruminating about an event that generates feelings of anger would fuel rather than help reduce anger. Bushman was interested in why some individuals react more strongly to everyday situations which cause frustration or annoyance while others do not. He suggested that some individuals “carry around” anger which they have not been able to express and, consequently, find themselves becoming angry in situations that do not warrant that level of emotion. Thus, in terms of the neo-associationist model, an unexpectedly strong response arises because the whole network interacts positively to increase the level of arousal. Cognitive-behaviourally this model suggests that thinking about anger will increase the likelihood of children behaving with anger. Similarly, children who are aggressive have been shown to have significantly more immediate and long-term interpersonal, psychological and educational difficulties than non-aggressive peers (Berkowitz, 1993, Dodge and Coie, 1987).

In an attempt to establish support for the neo-association model, Bushman (2002) compared two cognitive strategies, rumination and distraction, in terms of whether they were successful at containing or diffusing anger in 600 undergraduates (gender-balanced). Based on the theory of catharsis, it would be predicted that rumination would be more successful than distraction at diffusing anger in adults because it would allow the person to vent their frustration and therefore prevent the build up of tension. In this study, all the participants were provoked by receiving negative evaluation of an essay they had been asked to write because, it was hypothesised, this would elicit feelings of anger (Bushman and Baumeister, 1998). The sample was split into three groups: rumination, distraction and control. The ruminators were asked to hit a punchbag and imagine it was the person who had commented on their work negatively. In comparison the distracted group were asked to imagine that they were trying to get fit when they were hitting the punch bag. The control group did not hit any punch bag. Self-report measures of anger were then taken after the experimental situation (rumination, distraction or control). Each was then given the opportunity to give loud blasts of noise to the people who had provoked them and these were taken as levels of anger expression. Overall, Bushman found that, in comparison to the distraction and control groups, the rumination group actually experienced more anger and expressed a higher level of aggression (as measured by the self-report questionnaires and level and frequency of noise given) suggesting that rumination fuelled the experience of anger.

However, it appears that aspects of this study are methodologically flawed. For example, there is no evidence given in the study to ascertain independently what effect the

provocation might have had on the participants and what negative emotions it elicited. Instead, it was based on previous research which used this technique to elicit anger, although it is only described as making individuals feel “quite angry” (Bushman and Baumeister, 1998). Negative evaluation of academic work may have increased the negative mood experienced, but it is also likely that some feelings of low mood or anxiety may have been elicited alongside or instead of anger. It may have been more appropriate, then, to measure their feelings of anger after the provocation and then after the experimental situation in order to measure the change in level of anger.

Of course, this would still leave aside the complex question of how to elicit feelings of anger in an ethical and accurate way. It remains a delicate ethical and methodological issue whether it is at all appropriate to induce anger in participants in a laboratory setting, when it is also possible to ask people to think about experiences of anger retrospectively. However, as mentioned previously, there is evidence to suggest that thinking about past episodes of anger can induce current angry feelings therefore making the study of anger ethically complex. Anger, however induced, would be expected to influence an individual’s clarity of thought and ability to recall what they were thinking or how they behaved when they were angry (Crick and Dodge, 1994). This would fundamentally affect any conclusions that might be drawn from the results.

More recently, the relationship between rumination and aggressive behaviour has been further investigated by Bushman et al., (2005) in a population of university undergraduates (n=385, gender balanced). The team were interested in studying displaced aggression which describes instances in which individuals experience difficult situations that make them angry, but they are not able to express their anger due to

moderating factors (e.g. boss being present). Instead they displace this expression of anger towards another, often undeserving, trigger some time later. The question being asked was whether rumination after a provocation-event would increase the likelihood of displaced aggressive behaviour after a 'minor annoyance' in comparison with groups where a positive mood was induced or a distraction introduced.

Across gender, no effects related to the interactions were found so the two groups were then combined to allow further analysis. As predicted, the findings demonstrated that negative affect experienced after the initial provocation was positively associated with displaced aggression in the rumination group but not in the positive mood or distraction groups. Rumination, therefore, was shown to increase and prolong the experience of negative affect suggesting that this thought pattern not only influences the emotion experienced, but also increases the likelihood that the individuals would behave with more displaced aggression when confronted with a trigger at a later time.

The length of time the individuals were left to ruminate between the initial provocation and trigger was also considered. Here, individuals were asked to ruminate for 25 minutes in the first study and up to 8 hours in the second. The effect of rumination on the anger elicited in both of these conditions supported the theory that rumination about a provocation increases the likelihood that a trigger event would increase displaced aggression. Again, no control group was established. All participants were placed in an experimental situation: rumination, distraction or positive mood, thus limiting the reliability of the results.

Gender

In the study reviewed earlier, Rusting and Nolen-Hoeksema (1998) found gender differences emerged in the second part of their study, and they were primarily interested in the difference in strategy chosen by males and females. The group was halved and anger was induced in one group and a neutral emotion in the other. Each participant was asked to choose either a distraction or rumination strategy. The females were found to be more likely to ruminate when in a 'neutral' mood but would employ distraction as a coping strategy when angry whereas males were as likely to employ rumination and distraction strategies, regardless of their mood. This gender difference is not replicated in studies of depression and rumination, where females have been found more likely to ruminate when in low mood in comparison to males. It is interesting to note the difference in response to anger and low mood in females. This suggests that females may be less comfortable feeling angry and, therefore, choose distraction rather than rumination to manage their anger. If this were indeed so, it would support those sociological studies (Barriga, 2001) which focus on anger and suggest that, compared to women and girls, it is more socially acceptable for men and boys to express their anger.

Developmental literature

As previously stated, theories of cognition have been applied successfully in many studies of rumination and depression in adults. Interestingly for this review, they have also been used to hypothesise about rumination and depression in children and adolescents (Ziegert & Kistner, 2002). This may suggest that as rumination, as a cognitive style, has been successfully applied to anger in the adult population, it may be

useful to study anger rumination in children. There are no studies to date that have focused solely on anger rumination in children or adolescents however, the coping strategies and emotion regulation literature often include rumination in the analysis. The results of these studies will therefore be noted but not reviewed in great detail.

Firstly, Bandura, Caprara, Barbaranelli, Pasotrelli and Regalia (2001) used a socio-cognitive structural model of self-regulation to study “transgressive” behaviour in early adolescence. This longitudinal study is of particular interest in the study of self-regulation and delinquent behaviour because it allows the authors to track 564 individuals over two years, from eleven to thirteen years old. Studying this age group could have highlighted any differences in emotion regulation and transgressive behaviour pre and post-puberty, however this was not discussed. Bandura et al. (2001) did suggest that children who display aggressive behaviour have some “problems of thought”, and that although anger does reduce over time, cognitive factors, like rumination, can increase the experience of anger. They argue that “hostile ruminative affectivity” not only increases the angry emotion, as in the adult literature, but places individuals at higher risk of acting aggressively, especially if they have an impulsive nature. To note, impulsivity is considered to be a characteristic of adolescence (Coleman and Hendry, 1999). Bandura et al. (2001) define ruminative affectivity as including two factors: rumination self-arousal and irascibility. The results from the self-report questionnaire data showed that male adolescents were quicker to increase their anger using hostile rumination than females, again corroborating the same gender trends found in the adult literature. Longitudinally, anger rumination was associated with

transgressive behaviour including displays of aggression. They state that ruminative hostility increases when adolescents are with like minded peers. This could suggest that the opportunity to develop this mode of thinking increases in adolescence because at this time of their lives children begin spending more time in groups, and, correspondingly, their behaviour is less directly influenced by the structure of both school and home.

Silk, Steinberg and Morris (2003) conducted a naturalistic study on emotion regulation and adjustment in adolescence (ages 12-17 years of age). Part of the study, more relevant to this review, focused on the cognitive strategies employed to regulate emotions, one of which was rumination, and whether emotion regulation strategies were related to problem behaviour. They measured adjustment and behaviour using a self-report questionnaire. The procedure for collecting information on the emotion regulation was complex and time consuming. Whenever the adolescents were sent a signal via a wrist watch (several times a day for a week) they completed questionnaires focused on current negative affect, and cognitive and behavioural regulation strategies. This was meant to ensure accurate recordings of current negative affect and regulation strategies and increased the ecological validity of the study by taking recordings across time and *in situ*.

In the analysis, in which rumination was only a part, the voluntary and involuntary disengagement strategy groups were combined. The following results should therefore be interpreted as offering little more than an indication of theoretical links between

rumination, emotion and adjustment. The findings demonstrated a correlation between disengagement strategies (avoidance, denial, rumination, involuntary action) and a limited ability to regulate emotion effectively. More specifically involuntary engagement (rumination) was significantly associated with more prolonged and intense experiences of anger and higher rates of problem behaviour (as measured by the Youth Self Report Form – part of Achenback Child Behaviour Checklist, 1991). As a study, one of its strengths was, being naturalistic in conception, it took measurements in context of how the individuals were feeling and behaving. However, this method of gathering data raises questions about the limitations of using only self-report questionnaires which may have simplified the emotion-regulation process by asking specific and tailored, rather than general and opened-ended questions.

In summary, there is evidence to suggest that rumination as a cognitive strategy increases the experience of anger and aggression in both males and females. As the rumination-depression literature was effectively applied to child and adolescent depression, it is suggested that the adult anger rumination literature could be applied successfully to the understanding of childhood and adolescent aggression. From the three adolescent-based studies outlined above, it appears thus far that similar theoretical links are evident between anger rumination, aggression and gender in adolescence compared to the adult sample. It could be suggested that if anger-rumination is a strategy that children with aggression difficulties actually employ, it may provide a new focus for clinical intervention in this area. The implications of this line of research for clinical intervention are expanded upon below.

D. Future research

In terms of how cognition and aggression theoretically interact, the empirical findings discussed suggest that hostile attributional bias and rumination may be two cognitive constructs that both promote and maintain aggressive behaviour. It may also be suggested that if these two cognitive constructs were to interact whether continuously or through a delay mechanism, they may increase and prolong a child's experience of anger and therefore increase the likelihood of aggressive behaviour. For instance, it may be that children who are prone to attribute hostile intent in others, are also more like to dwell or ruminate on their experiences of the perceived angry situations as it is these memories that are partly said to promote the aggressive behaviour. Alternatively, adolescents who are prone to ruminate more about angry or aggressive situations increase their level of anger which may lead them to interpret hostility where there is none. This would suggest that they are more likely to develop a hostile attributional bias. In this respect, high levels of affect can contribute to the misinterpretation of the social cues and could therefore be suggested to limit access to more effective emotional, cognitive and behavioural responses. On this premise, it could be fruitful to study the relationships between the hostile attributional bias, anger rumination and aggression to see if understanding of socio-cognitive mechanisms could be extended to include anger rumination as a significant maintaining factor.

One idea behind the review, as explained previously, has been to survey the adult literature on anger rumination with the view to extend this type of cognitive research into the developmental arena. Within the adult literature, the concept of anger

rumination has been measured in a variety of ways including retrospective self-report measures and *in vivo* situations where anger is induced and they are questioned about their thoughts. Rumination has also been compared with other coping mechanisms like distraction and has enabled questions about how rumination and reflection differ to be at least partially answered. There are further ethical considerations regarding the use of methods which induce anger in a laboratory setting or which allow participants to reflect on their anger-inducing experiences. This is because both of these methods involve thinking about past angry experiences and can possibly re-awaken difficult feelings, the consequential positive or negative effects of that are difficult to assess beforehand. This general ethical issue is, of course, particularly serious when investigating anger rumination in children because they may not be so efficient at managing difficult emotions as successfully as adults because of their relative emotional immaturity. This would suggest that more consideration would be necessary to ensure that the children's emotional state is carefully monitored and contained after the research has taken place.

In light of the difficulty in measuring anger rumination, it would also be important to consider the cognitive ability of the participants, not only what might be expected given their developmental stage but also any deficits present in functioning. For example, if they were answering retrospectively, developmentally, younger children may have difficulty in thinking about their thoughts whereas adolescents would be more able to think meta-cognitively (Piaget, 1954). It may therefore be difficult to assess younger children's rumination patterns as it may require the cognitive ability to introspect (Erikson, 1969).

The study of rumination poses still another problem in that by nature it is a cognitive process that must continue repeatedly over a period of time otherwise it would not be considered to be ruminative. Because of this, naturalistic and laboratory experiments face difficulties in measuring an individual's cognitive processing over protracted periods of time, thus increasing project management complexities and financial constraints as well as the range of ethical questions that need to be considered. This would suggest that, in order for these longitudinal studies to be robust enough to detect statistically significant associations, the sample size would need to be much larger than has been used heretofore.

There are opportunities for the questionnaire-based measures of anger rumination to be adapted for children and adolescents. However, as discussed above, the style of questioning would need to be appropriate to the cognitive developmental stage of the group being studied. It may be difficult to measure this ruminative style in younger children due to their difficulty in introspection so it may be more appropriate to adapt it for adolescents initially to see what questions and problems arise there first, before it is extended to younger children with less developed cognitive abilities.

However, for younger children a more qualitative approach conducted by trained mental health professionals may yield more information about how they think when they are angry and what they think about after the event. These studies could inform possible intervention plans for children and adolescents who have problem behaviour or adjustment difficulties. For example, presently, anger management interventions based

on the cognitive behavioural model are the “gold-standard treatment” for this population. Within this evidence-based clinical intervention the focus of treatment is how the cognitive, behavioural and emotional factors interact to promote and maintain aggressive behaviour.

The study of anger rumination in adolescents may help expand the focus of anger management for three reasons. Firstly, research already exists in the realm of cognitive behavioural therapy in the treatment of anger and aggression in various populations (young offenders, older adults, psychosis, developmental and intellectual disabilities; Novaco, 2000) but a more formal assessment of anger rumination may help to highlight those children who require a more specific form of intervention tailored to breaking the rumination cycle.

Secondly, if anger rumination is proved to be linked significantly to increased levels of anger and aggression in adolescents, the cognitive behavioural construct could be re-assessed and the individual treatment plan could reflect this as a problem area. In these cases a more psycho-educational approach may be more appropriate where teenagers could be taught new cognitive strategies to help them recognise and reduce anger rumination as well as new strategies to help them think about the angry situations more effectively. For example, one popular anger management strategy is to “stop and think”. However if a child is prone to anger rumination, this message could prove to be maladaptive as it could encourage self-immersed thinking which has been empirically linked to anger arousal and aggression. The message would need to be modified, or

made more specific to encourage distraction. For example “distract now, reflect later”. According to the research, distraction would lower the levels of anger experienced and therefore decrease the likelihood of the child behaving with aggression.

Thirdly, CBT usually looks in detail at the environmental, emotional and cognitive triggers that have led to the anger and aggressive display of behaviour, whereas anger rumination is a cognitive style that the individual employs after the event. So, if proneness to anger rumination was assessed, the focus of the cognitive behavioural approach could be expanded more formally to include how they think after the event as well as what triggers led to the event.

Anger and aggression are considered by some to be secondary emotions actually based on primary emotions, for example guilt, shame and humiliation. Therefore there may also be scope to expand the anger rumination literature to include a more detailed exploration of associated emotions. Gender differences in anger rumination are interesting as females have been found repeatedly to ruminate more about depressive thoughts and they are more likely to distract themselves rather than ruminate over their angry feelings than males. This suggests that the emotional context of the cognitive processing is paramount to studying anger and gender. Investigations into anger rumination across the sexes may raise some theoretical questions as to how girls differ from boys when they think about anger in social situations, which could introduce different approaches in the psychological treatment of anger and aggression in males and females.

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PART 2: THE EMPIRICAL PAPER

Anger rumination, cognitive inflexibility and the development of relational and physical aggression in adolescence.

ABSTRACT

This study aims to investigate the role of cognition in the development of aggression in adolescence; more specifically, to determine whether anger rumination and cognitive inflexibility are linked to the development of relational and physical aggression. One hundred and six adolescents (13-15 years of age) completed self-report measures of aggression and anger rumination, and an assessment of cognitive inflexibility. Teachers also completed questionnaires related to their experience of aggression in the pupil sample. As predicted, males were found to display more physical aggression compared to females, however there was no gender difference found in the reports of relational aggression. A large effect was found between relational aggression and anger rumination, and adolescents who were reported to be relationally aggressive were less perseverative compared to non-aggressive peers. The study not only highlights the importance of studying relational aggression as a distinct form of aggression but also that cognitive processes such as anger rumination can predict the development of relational and physical aggression in adolescence.

INTRODUCTION

Aggression in adolescence can be an area of profound concern for parents and constitutes a formidable challenge for psychiatrists, psychologists and social workers, whether theoretically or clinically inclined. Aggressive behaviour has become socially pervasive and is currently considered a common problem in clinical, community, forensic and school populations (Lahey, Moffitt and Caspi, 2003). Aggressive behaviour is complex and because of this it has been researched and analysed from a variety of theoretical perspectives by scientists employing a range of empirical techniques. However, cognitive processes and functioning have been at the forefront of many accounts of the development of aggression, most notably in Dodge's (1980) social information processing model, and Moffitt's neuropsychological research (1993), respectively. This study proposes to work within these two traditions. It will attempt to extend research that has been focused primarily on cognition and aggressive behaviour in adults to the cognitive factors, namely anger rumination and cognitive inflexibility, that may partly contribute to aggressive behaviour in early adolescence.

Dodge and Crick have published many papers on childhood aggression (Crick and Dodge, 1994, 1996) and their work has shown that the study of cognition is vital in understanding why some children are more aggressive than others. Crick and Dodge (1994) demonstrated how aggressive children interpret social situations differently from non-aggressive children, with aggressive children attributing more hostile intent to their peers in ambiguous situations compared to non-aggressive children. Dodge described this as the Hostile Attributional Bias (1980). Crick and Grotpeter (1995) highlighted the

importance of gender differences when studying aggression in adolescence. Firstly, they proved relational and physical aggression are distinct forms of aggression that contribute to social maladjustment independently. Secondly, they demonstrated that relational aggression is experienced significantly more by females in comparison to males, and that males express significantly more physical aggression in comparison to females.

Rumination is another important cognitive process or thinking style, that has been shown to contribute to anger and aggression in adults (Rusting and Nolen-Hoeksema, 1998; Sukhodolsky, Golub & Cromwell, 2001; Bushman 2000; Bushman, Bonacci, Pedersen, Vasquez and Miller, 2005). Rumination has been linked to increasing levels of depressive affect in adolescents (Park, Goodyer and Teasdale, 2004), and is a style of thinking that is consistent with adolescent self-preoccupation. Erikson (1969) highlights that adolescence is a time when self-referential ruminative thinking becomes more evident. This study proposes therefore to investigate the relative contributions of anger rumination to individual differences in aggression in early adolescence.

With regard to neuropsychological research, executive functioning has been linked to high levels of aggression and antisocial behaviour in children and adolescents (Moffitt and Henry, 1989; Nigg, Quamma, Greenberg and Kusche, 1999). More specifically, perseveration, an element of executive functioning characterised by inflexible thinking, has been associated with physical aggression in early adolescent boys (Seguin, Arseneault, Boulerice, Harden and Tremblay, 2002). It is also relevant to this study that rumination has been studied in the adult population and is reported to be related to a

cognitive style characterized by perseveration and inflexibility (Davis and Nolen-Hoeksema, 2000). This study therefore proposes to investigate the relative contribution of rumination and cognitive inflexibility to the development of aggression in adolescence.

Cognitive processing, aggression and development

According to the reformulated social information-processing model (Crick and Dodge, 1994), children process social information in stages. Importantly, Dodge proved that having difficulties with one or more of the stages can negatively influence a child's ability to cognitively process interpersonal information adaptively. This has implications clinically as these children are at an increased risk of interpersonal disputes which can lead to social maladjustment (Crick & Grotpeter, 1995). While in developmental terms, cognitive skills become more efficient with age, Crick and Dodge (1994) have argued that development can also lead to cognitive processes becoming more rigid and ingrained and that children who develop maladaptive cognitive skills are likely to continue to use the same processes even if the outcomes are not favourable (Davis & Noel-Hoeksema, 2000). If this is the case, it would be important to study the relevant cognitive processes early in development so as to appropriately target effective intervention in educational or clinical settings (Lahey et al., 2003).

Anger Rumination

Dodge and Crick have outlined the importance of cognitive interpretative processes in understanding social adjustment in children and adolescents. It could therefore be

suggested that other cognitive processes may also play a role in social adjustment.

According to Nolen-Hoeksema's (1987) response-style theory, rumination could be argued to interfere with all stages of social information processing. They explain that individuals who ruminate are more likely to have an interpretational bias, will be consumed by repetitive thoughts about their own mood, and therefore have poorer cognitive skills and problem-solving ability. A ruminative style of thinking, it seems, is a necessary accompaniment of adolescence because this unpredictable and turbulent period of life is characterised by self-exploration, self-doubt and discovery (Waddell, 2006) when the adolescent becomes preoccupied with the self and thought patterns become naturally more ego-centric and repetitive.

Rumination has been empirically linked to inducing and prolonging anger and aggression in adults (Sukhodolksy et al., 2001; Bushman, 2002; Bushman Bonacci, Pedersen, Vasquez and Miller, 2005). Kross, Ayduk and Mischel (2005) compared the effect of rumination and reflection on the experience of anger and found those individuals who ruminated became self-immersed in anger-inducing past events and experienced higher levels of anger. This self-immersion is often observed in adolescents as their view of the world is ego-centric.

However, Rusting and Nolen-Hoeksema (1998) raised the question of whether males and females differ in the type of cognitive strategy they choose when feeling angry. They reported that females were more likely to ruminate when in a 'neutral' mood but would employ distraction as a coping strategy when angry whereas males were as likely to employ rumination and distraction strategies regardless of their mood. This suggests,

at the very least, that the experience of anger rumination needs to be opened up to the possible salience of gender differences.

There are no studies to date that have focused solely on anger rumination in children or adolescents. However, the coping strategies and emotion regulation literature sometimes includes rumination in their analyses. Bandura, Caprara, Barbaranelli, Pasotrelli and Regalia (2001) showed that male adolescents (11-13 years old) were quicker than female peers to increase their anger using hostile rumination and that, longitudinally, rumination was associated with transgressive behaviour including displays of aggression. They conclude that ruminative hostility increases when adolescents are with like-minded peers, suggesting that the opportunity to develop this mode of thinking increases in adolescence because it is at this time of their lives that adolescents spend more time in groups, and when their behaviour is less directly influenced by the structure of both school and home.

Silk, Steinberg and Morris (2003) identified a correlation in adolescents (12-17 year olds) between disengagement strategies (avoidance, denial, rumination, involuntary action) and a limited ability to regulate emotion effectively. More specifically, involuntary engagement (rumination) was significantly associated with prolonged and intense experiences of anger and higher rates of problem behaviour (as measured by the Youth Self Report Form – part of Achenbach Child Behaviour Checklist, 1991).

There is thus some support for the position that anger-rumination is a cognitive construct that promotes and maintains aggressive behaviour not only in adults but in children and adolescents as well. Nevertheless a direct examination of this hypothesis has, so far, not

been undertaken. This is the first aim of this study, namely, to determine empirically whether anger rumination is related to aggressive behaviour during this developmental period.

Cognitive Inflexibility/ Perseveration

Much research has been conducted on cognitive deficits and antisocial behaviour in children and adolescents (Loeber, Farrington, Stouthamer-Loeber and van Kammen, 1998). One area of functioning that has repeatedly been associated with self- and teacher-reports of externalising behaviour is executive functioning (Moffit and Henry, 1989; Nigg et al., 1999; Seguin et al., 1995). Seguin et al. (2002) found that physical aggression predicted perseveration in adolescent boys, most strongly in boys who had histories of physical aggression. There are similar patterns being found in adolescent girls who have a diagnosis of conduct disorder (Giancola, Mezzich & Tarter, 1998).

Several cognitive mechanisms have been implicated in rumination (Nolen-Hoeksema et al., 1999). One is that ruminators tend to manifest weaker cognitive control skills that prevent them from changing their behaviour or seeking new coping strategies. Davis and Nolen-Hoeksema (2000) state that rumination is related to a cognitive style characterized by perseveration and inflexibility and can develop into an ingrained cognitive process. Their study found that male ruminators exhibited significantly higher levels of cognitive inflexibility than male non-ruminators, and in addition, cognitive inflexibility increased rumination. They also found that ruminators find it difficult to switch from maladaptive coping styles even when they have received negative feedback and that they more easily surrender adaptive techniques.

Significantly, Davis and Nolen-Hoeksema (2000) found that the level of cognitive inflexibility in the female group did not differ significantly between the ruminators and non-ruminators. They explain this gender difference rather simply by suggesting that male ruminators have more pervasive problems with cognitive inflexibility and cognitive resources, whereas females are generally more contemplative (Nolen-Hoeksema, Larson and Grayson, 1999).

Thus, in addition to the evidence supporting the view that the established link between anger rumination and aggression can be extended from adults to adolescents, evidence from adults further suggests that adolescents who may be more inflexible in their thinking may be more prone to ruminate and therefore have limited access to more adaptive cognitive and behavioural responses. This pattern would suggest that these children would display more aggression and have more social adjustment problems. Furthermore, according to the literature (Davis and Nolen-Hoeksema, 2000), it would be predicted that the correlation between anger rumination and cognitive inflexibility should be stronger in the male adolescents.

Relational and Physical Aggression, and Gender

Up to this point aggression has been considered in a relatively undifferentiated way. However there is increasing evidence that an important distinction needs to be made between two types of aggression, namely physical and relational aggression. Physical aggression, defined as 'harm through physical damage' is observed more in boys than girls (Crick, Grotpeter and Bigbee, 2002). The second, relational aggression, defined as "harm done through damage of friendships or relationships' is significantly associated

with females (Coie and Dodge, 1998). These gender differences are observed in children as young as three years of age (Ostrov, Woods, Jansen, Casas and Crick, 2004).

Crick and Grotpeter (1995) found that children who displayed relational aggression were more likely to attribute hostile intent to others' relational behaviour, whereas those who were more physically aggressive were more likely to attribute hostile intent to others' behaviour. This suggests that children who are more relationally aggressive may cognitively process social situations differently from those who are more physically aggressive. Crick and Grotpeter (1995) suggest that relational and physical aggression are associated with significant social-psychological adjustment problems and that involvement in relational aggression predicts future social maladjustment for females that is not accounted for by physical aggression. These problems with aggression can become manifest intra-personally (e.g. borderline personality features) or inter-personally (e.g. peer rejection).

Crick (1995) compared how boys and girls emotionally experience social situations in which peer aggression is present. It is suggested that males display relatively more distress than females in situations where there are disagreements involving physical dominance and territorial issues. This contrasts with females who display relatively high levels of distress in situations involving interpersonal issues and relationship concerns.

This raises the question of whether gender, anger rumination and cognitive inflexibility are related differently to relational, in comparison with, physical aggression.

Empirically, boys are more likely to ruminate over angry situations, more likely to be inflexible in their thinking, and more likely to behave with physical aggression in

comparison to their female peers. The evidence would also suggest that anger rumination and cognitive inflexibility would be more predictive of physical aggression in comparison to relational aggression.

Summary and Hypotheses

Cognitive processes have successfully been shown to play important roles in social behaviour, more specifically in explaining why some children are more aggressive than others in similar social situations (Dodge, 1980). Three strands of the research literature have been reviewed: physical and relational aggression, anger rumination and cognitive inflexibility.

Firstly the nature of aggression and gender differentiation reported in the sample will be investigated. On the basis of the current literature (Crick and Grotpeter, 1995) two hypotheses will be tested.

1. Physical aggression will be seen more in males compared to females.
2. Relational aggression will be more common in the female group compared to the males.

Secondly, rumination is a cognitive style that has been empirically shown to increase the experience of anger and expression of aggression in the adult population (Sukhodolsky et al. 2001). It is therefore hypothesised that:

3. Males will be more prone to ruminating about angry situations than females.

4. Adolescents who ruminate about angry situations are more likely to display aggressive behaviour;

Thirdly, deficits in executive functioning and more specifically perseveration have been implicated in the development of physically aggressive behaviour in children, adolescents and adults. This inflexibility of thinking has also been linked to rumination, particularly in men. It is therefore hypothesised that:

5. As in adults, it is expected that higher levels of cognitive inflexibility will be found in the male adolescent in comparison to the female.
6. Adolescents who report higher levels of aggression will be more inflexible cognitively.
7. The more inflexible an adolescent's thinking the more likely they are to ruminate.
8. It also suggested therefore that those children who are less flexible in their thinking and who ruminate about anger-inducing situations would display higher levels of aggression.

Due to the exploratory nature of the study the various reports of relational and physical aggression will be explored in relation to anger rumination and cognitive inflexibility.

In summary, it is the aim of this study to extend the current thinking on anger rumination, cognitive inflexibility and aggression in adults to an adolescent population.

It will build upon Crick and Dodge's injunction to study actual cognitive processes of "how" people think and not just "what" they think (1994). On the basis of the current

literature it is predicted that relational aggression will be more strongly associated with females and physical aggression with males, as predicted by Crick and Grotpeter (1995). Further, aggressive children who perseverate are more likely to ruminate about anger-inducing past experiences. This hypothesis is based on the literature and the theory that ruminative processes would raise the levels of anger experienced, therefore raising the risk that the adolescent would behave aggressively. This would provide the adolescent with more angry experiences to ruminate about, while their propensity to perseverate would prevent them from seeking alternative and more adaptive strategies. If this is the case, the results from this study could inform the formulation of individualised intervention programmes for adolescents with aggression-related problems. The results of the study may also draw attention to differences in thinking patterns between adults and adolescents, which may illuminate the importance of cognitive development in the understanding of cognitive processing, cognitive functioning and behaviour in adolescents.

METHOD

Ethics

Ethical approval was granted by University College London Committee on the Ethics of Non-NHS Human Research.

Participants

Participants were recruited from a secondary school in a suburban community near a large northern city in England. One hundred and thirty-five adolescents (48.2% male,

51.8% female), 13 to 15 years old, were approached in lessons at school. A total of 107 adolescents (46.2% male, 53.8% female) consented to participate in the study, a participation rate of 77%. Out of the thirty-two young people that did not take part, approximately half of them declined after the initial presentation and the other half did not return their consent forms. They explained that their parents did not wish them to participate. To note, the gender split is representative of the total sample. One participant withdrew their consent half way through the project, leaving the final total of participants at 106. The mean average age was 14.4 years (range 13.42 – 15.42 years). Optional demographic information was collected (90.5% return rate, n = 97) and illustrated that 85.4% of the participants (who returned the information) were of White British origin (See Table 1 for ethnicity data.) The remaining participants were split fairly evenly between White other, Black Caribbean, Black African, Asian and Chinese.

Table 1: Participant Ethnicity (percentage)

Ethnic Category	Valid Percentage	n
White British	85.4	83
White Irish	3.1	3
White Other	2.1	2
Black Caribbean	1.0	1
Black African	1.0	1
Indian	1.0	1
Pakistani	1.0	1

Asian Other	2.1	2
Chinese	2.1	2
Mixed Race	1	1

Eighty-one percent of the participants' parents were married (n =78), 11.5% were separated or divorced (n =12), 2.1 % were single parents (n = 2), 4.2 remarried (n = 4) and 1% widowed (n = 1).

Parents' occupations divided the following way: 61.8% (n= 61) described themselves as professionals, 18.2% white collar workers (n = 18), 7% manual workers (n = 7) and the remaining 10.6% (n = 10) were homemakers. Educationally 19.9% qualified from school (n = 19), 22.9 % (n = 22) did further training after school and 55.2% (n = 55) graduated from university. The remainder described themselves as having "no qualifications". Therefore the majority of the participants described themselves as being from a white middle class background.

Procedure

Ten schools were sent letters (appendix A) outlining the project. Only one Deputy Head replied and was interested in the school participating. With the help of the Head of Life Studies, six classes (Years 9 and 10) were approached during lessons by the main researcher who described the project and what they would be required to do if they consented to participate. Each individual was given an information pack containing consent and information sheets for both themselves and their parents (appendix B-E). A

sheet for collecting demographic information was also included (appendix F). The participants were given the opportunity to ask questions about the study and those interested in participating signed the consent forms at the end of the lesson and were asked to take the remainder of the information home to discuss with their parents. They were asked to return the parent consent form and optional demographic information the following week if their parents agreed to their participation. To note, the parents were given the opportunity to telephone the main researcher if they had any questions and both young person and parent consent was required for the young person to participate. The participants were entered into a raffle where they had a chance to win a £5 music voucher as gratitude for their participation.

The form teachers were also delivered details about the project (appendix G) and their potential involvement and were given frequent opportunities to ask questions about the project.

Measures

The following week, within the same lesson time, the adolescents who had given their consent, were asked to complete a battery of questionnaires:

1. The Children's' Social Behaviour Scale

The Children's Social Behaviour Scale self-report (CSBS-S, Crick, 1996; appendix H) was administered to measure two subscales: relational and physical aggression. There is normative data for adolescence. Some basic wording was adapted to make the

questionnaire more appropriate for adolescents. For example, "*Some young people try to keep certain people from being in their group when it is time to hang out or do an activity. How often do you do this?*" Was changed from "*Some kids try to keep certain people from being in their group when it is time to play or do an activity*" *How often do you do this?*

The pupils were asked to respond by rating how likely they were to think certain things when angry on a 4-point scale. Cronbach's alpha was computed and relational and physical aggression were both found to be highly reliable ($\alpha = 0.83, 0.94$ respectively). There is also evidence for favourable test-retest reliability (Crick, 1996).

2. The Anger Rumination Scale

This Anger Rumination Scale (ARS; Sukhodolsky, Golub & Cromwell, 2001. Appendix I) was chosen to measure the concept of anger rumination. The self-report questionnaire consists of 19 items which participants are asked to rate on a 4 point Likert-type scale ranging from 1 = 'almost never' to 4 = 'almost always' of how well the items correspond to their beliefs about themselves. The questionnaire measures four factors (Cronbach's alpha reported): angry after thoughts ($\alpha = 0.86$); thoughts of revenge ($\alpha = 0.72$); angry memories ($\alpha = 0.85$); and understanding of causes ($\alpha = 0.77$). Normative data is provided for a sample of 408 college-aged men and women (mean age = 20.32 years, S.D. 3.93). Cronbach's alpha was computed and showed that the ARS has high internal consistency ($\alpha = 0.93$). The test-retest reliability coefficient (0.77) shows good stability of anger rumination over one month. Convergent and discriminant validity of

the scale was demonstrated in the correlations between the ARS factors and measure of related measures, namely Spielberger's State-Trait Anger Expression Inventory (S.T.A.X.I., 1996). Some of the more complex wording of the ARS was changed for the adolescent sample. For example, "*I ruminate about past experiences of anger*" was changed to "*I think a lot about other times when I was angry*" [Item1].

3. The Wisconsin Card Sorting Test-64 card version

The participants also completed the Wisconsin Card Sort Test (W.C.S.T.-64; Kongs, Thompson, Iversen and Heaton, 2000) which is an assessment of cognitive flexibility. It was chosen as it is a widely accepted measure of perseveration and executive function with normative data for participants aged 6.5 to 89 years old (n = 899 normal children, adolescents and adults). It requires the ability to develop and maintain an appropriate problem-solving strategy across changing stimulus conditions in order to achieve a future goal. It provides objective scores not only of overall success, but also for specific sources of difficulty on the task (e.g., inefficient initial conceptualization, perseveration, failure to maintain a cognitive set, and inefficient learning across stages of the test). The W.C.S.T.-64 contains a set of stimulus and response cards in which the individual is required to sort the cards according to 3 different principles: colour, form and number. The test was individually administered during the designated lessons, before school and at lunchtime and all adolescents completed the test within ten minutes.

It would be considered normal for 32% of the adolescent sample to obtain one or more scores in the clinically impaired range. The W.C.S.T. scores that are considered in this study, are described as showing moderate to good reliability. Cronbach's alpha was

computed on multiple studies using the W.C.S.T.-64 and it was shown to be demonstrating a very good scale reliability ($\alpha = 0.74$). There are multiple validation studies outlined in the professional manual, and they all suggest that W.C.S.T. is a useful measure of executive functioning.

“Perseverative errors” and “Learning to learn” W.C.S.T. factors have been correlated with rumination in adults (Davis and Nolen-Hoeksema, 2000). Executive functioning deficits, more specifically, perseveration has been repeatedly associated with physical aggression in male children (Seguin et al., 2002). The following relevant W.C.S.T. factors will therefore be considered in the analysis:

Definitions:

“*Perseverative response*”. To persevere is to persist in responding to an incorrect principle of the key cards (e.g. following colour as the principle whilst being told you are wrong. A *Perseverative Response* is a response that matches the perseverated-to-principle.

A “*Perseverative Error*” refers to a response that matches the perseverated-to-principle and does not match the correct principle.

The “*Learning to Learn*” factor is a score that describes whether or not a respondent becomes increasingly proficient in moving from one category to the next as the test progresses.

4. Childrens' Social Behaviour Scale- Teacher report 2

Form Teachers were asked to complete the Children's Social Behaviour Scale (CSBS-teacher report part 2, Crick 1996. Appendix J) for all the participants in their class.

There are two subscales: relational and physical aggression. The teachers were asked to respond to the 23 items by rating how likely they thought the children were to behave in relationally and physically aggressive ways (4-point Likert scale). They were given two months to complete them. The questionnaire is internally consistent using Cronbach's alpha (relational aggression $\alpha = 0.94$; physical aggression $\alpha = 0.94$). The total correlation of relational and physical aggression was 0.77 ($p < 0.001$). It was also shown to be stable over time: boys physical aggression over time ($r = 0.78$), girls ($r = 0.68$); boys relational aggression over time ($r = 0.56$) and girls ($r = 0.68$).

5. Final Stage

When all the individual assessments had been completed the raffle was conducted in the designated lesson. There was also opportunity at this time for the children to ask questions about the study they had participated in. Those pupils who had not participated in the study were involved in the raffle by being asked to pick the names randomly.

RESULTS

Introduction

The study has eight hypotheses. Firstly, males would display more physical aggression than females. Secondly, females would display more relational aggression than males. Thirdly, males would have higher anger rumination scores compared to females. Fourthly, physical and relational aggression would be positively correlated with anger rumination scores. Fifth, males would be less flexible in their thinking. Sixth, adolescents who report higher levels of aggression would be more cognitively inflexible. Seventh, cognitive inflexibility would be positively correlated to anger rumination. Finally, adolescents who report higher levels of anger rumination and cognitive inflexibility would report higher levels of aggression.

Five sets of analyses were conducted: (a) descriptive statistics and basic correlations of aggression, anger rumination and cognitive inflexibility; (b) regression of aggression and anger rumination; (c) regression of aggression and cognitive inflexibility; (d) regression of cognitive inflexibility and anger rumination; and (e) interaction of anger rumination and cognitive inflexibility in prediction of self-reported aggression. There were 6 counts of missing data: mean averages were calculated and entered.

A. Descriptives and Correlations

Aggression (Hypotheses 1 and 2)

1. Children's Social Behaviour Scale

The self-report measure of aggression provided two total scores: relational and physical aggression. The mean score on the relational aggression score was 10.76 (s.d. 3/748). The mean score for physical aggression was 4.09 (s.d. 2.005). A correlation showed that the physical and relational aggression scores were correlated (0.308 sig. $p < 0.01$) but not strongly. The two scores were thus treated separately. The scores skewed to the left showing that most children were reporting lower reports of aggression.

A Mann Whitney test (2 independent samples) was performed on the self-report aggression scores to see if females and males reported different levels of relational and physical aggression. The results supported hypothesis 1 by illustrating that males and females reported significantly different levels of physical aggression ($z = -4.143$, sig. $p < 0.0001$), with males reporting higher levels than females. However, hypothesis 2 was not supported as the results showed that males and females reported similar levels of relational aggression ($z = -0.345$, $p < 0.730$).

No correlation was found between age or demographic information with self-reported relational or physical aggression.

2. Children's Social Behaviour Scale- Teacher Report

The teacher report form provides two total scores: relational and physical aggression. (90 % return rate; n=95). The relational total score is derived from nine questions and the mean score was 19.27 (s.d. 9.64). The physical aggression total is derived from seven questions and the mean score was 10.54 (s.d. 5.42). The correlation showed that they are significantly correlated ($r = 0.77$, $p < 0.001$) and so the two variables were combined to make one teacher-report measure of child aggression (Table 2). The distribution of the scores is skewed to the left, again suggesting that the teachers were rating most of the children as having lower levels of aggression.

The Mann Whitney test (2 independent samples) was performed on the teacher-report aggression scores and the results showed no differences between males and females for relational aggression ($z = -1.374$, $p < 0.173$), but significantly higher scores for males in relation to physical aggression ($z = -2.04$, $p < 0.04$). The teacher reported levels of aggression again supported hypothesis 1 but not hypothesis 2.

Interestingly, age was correlated positively with teacher-reported relational aggression ($r = 0.274$, $p < 0.007$) suggesting that as the adolescents mature, the more they are observed behaving in a relationally aggressive way. The teacher-report total aggression score was also positively related to age, ($r = 0.24$, $p < 0.02$).

There were no significant correlations between the demographic variables (ethnicity, parent marital status, education and occupation) and teacher-reported aggression.

Table 2: Means and standard deviations of self-report and teacher report aggression.

Measure	Gender	Mean	Standard Deviation
Self-report Relational Aggression	Female	10.86	4.09
	Male	10.73	3.35
Self-report Physical Aggression	Female	3.46	1.97
	Male	4.82	1.78
Teacher Report Aggression	Female	0.08	1.53
	Male	0.09	1.30

Correspondence between self-report and teacher-report aggression

Before the teacher aggression scores were collapsed, correlations were conducted on the relational and physical aggression. Self-reported physical aggression is correlated with teacher-reported physical aggression ($r = 0.320$, $p < 0.002$), but the two reports of relational aggression were not correlated ($r = 0.164$, $p < 0.104$).

3. Anger Rumination Scale (Hypothesis 3)

The anger rumination scale consisted of nineteen questions. The mean total score was divided by 19 as described in the validation article (Sukhodolsky et al., 2001) and the mean total anger rumination score is 2.2941 (s.d. = 0.584). The mean scores for the four factors were also analysed (Table 3) and are all slightly higher than the adult norms given in the validation paper. The scores were normally distributed. There were no significant gender differences ($f(104) = 1.173$, $p < 0.488$), disproving hypothesis 3 that males ruminate more about angry situations compared to females. Total sample means are provided.

Table 3: Adolescent sample means and standard deviations of the anger rumination scale factors and total score.

	<i>Mean</i>	<i>S.D.</i>
Angry Afterthoughts	2.19	0.70
Thoughts of Revenge	2.07	0.72
Angry Memories	2.24	0.71
Understanding of Causes	2.30	0.75
Anger Rumination Total	2.19	0.58

There were no significant correlations found between demographic information and age with anger rumination. However, the “understanding of causes” factor was positively correlated with age, suggesting that as the adolescents get older the more they attempt to understand why they feel angry ($r = 0.193, p < 0.049$). All four factors were correlated significantly with each other and the total rumination score. The analyses that follow thus only employed the total score.

4. Wisconsin Card Sort Test-64 (W.C.S.T.) (Hypothesis 5)

The mean perseverative responses standard score was 93.28 (s.d. 13.02). The scores ranged from 19 to 81. The scores were normally distributed on both measures of perseveration and the ‘learning to learn’ scores (Table 4).

Table 4 : Mean scores, standard deviations and ranges of 3 relevant W.C.S.T. variables.

	WCST total perseverative responses standard score	WCST total perseverative errors standard score	WCST learning to learn raw score
Mean	93.28	93.48	-8.38
Std. Deviation	21.17	19.15	14.06
Range	135.00	92.00	55.62
Minimum	11.00	54.00	-41.30
Maximum	146.00	146.00	14.32

Table 5: Gender means and standard deviations of two perseveration W.C.S.T. factors.

	Gender of child	N	Mean	Std. Deviation	Std. Error Mean
WCST total perseverative responses standard score	female	56	89.12	17.75	2.37
	male	48	98.12	23.85	3.44
WCST total perseverative errors standard score	female	56	88.35	16.94	2.26
	male	48	99.45	19.98	2.88
Learning to Learn Raw Score	female	36	-12.94	15.13	2.52
	male	37	-3.92	11.46	1.88

The independent samples t-test showed that males make significantly more perseverative responses compared to females ($t(85.712) = 2.153, p < 0.034$). Further, males make more perseverative errors than females ($t(92.682) = 3.027, p < 0.003$). These results support hypothesis 5 that cognitive inflexibility will be seen more in the male compared to the female sample. There was a small negative correlation between age and

perseverative errors ($r = -0.220, p < 0.025$) suggesting that as the adolescents mature they become less likely to persevere.

Further, females were found to be significantly more proficient at moving from one principle to the next (as measured by learning to learn) suggesting that males are less flexible in their thinking ($f(71) = -2.875, p < 0.005$) (Table 5). This also supports hypothesis 5.

There was no correlation found between demographic information and any measures of cognitive inflexibility.

B. Aggression and Anger Rumination (Hypothesis 4)

Three separate multiple regressions were conducted to investigate whether the three different reports of aggression could be predicted by the total anger rumination scores (hypothesis 4). Both gender and age were found to correlate with the three measures of aggression so were controlled for in all the regressions (Table 6).

Table 6: Correlation and regression statistics for anger rumination and aggression.

	Zero-Order Correlation		Regression Statistics			
	r	R ²	F	B	t	p
<i>Self-report relational aggression</i>						
Overall Model		0.220	9.485			
Anger Rumination	0.455**			2.891	5.107	<0.001**
Gender	-0.017			-0.031	-0.046	0.963
Age	-0.130			-0.765	-1.263	0.209
<i>Self-report physical aggression</i>						
Overall Model		0.196	8.230			
Anger Rumination	0.254**			0.952	3.122	0.002**
Gender	0.342**			1.474	4.042	<0.001**
Age	-0.055			0.102	0.311	0.756
<i>Teacher report aggression</i>						
Overall Model		0.071	3.458			
Anger Rumination	0.105			0.015	1.182	0.242
Gender	-0.064			-0.047	-0.161	0.873
Age	0.237*			0.609	2.420	0.021*

** significant at the 0.01 level.

* significant at the 0.05 level.

Anger rumination and self-reported relational aggression were positively correlated (see Table 6) thus supporting hypothesis 4 that adolescents who ruminate about angry situations are more likely to display aggression behaviour. The multiple regression suggested that self-report relational aggression, gender and age predict self-report relational aggression (moderate to large effect). The R-squared statistic suggested that 22% of variance in anger rumination may be attributable to self-report relational aggression.

Anger rumination and self-report physical aggression are positively correlated again supporting hypothesis 4 that adolescents who ruminate about angry situations are more

likely to display aggression behaviour. A multiple regression suggested that self-report physical aggression continued to be associated with anger rumination when gender was controlled for (identified earlier). The R-squared statistic suggested that 9% of the variance in anger rumination may be attributable to self-report physical aggression.

In the case of teacher reports of aggression, while a significant univariate correlation with rumination was present, it did not remain significant once age had been controlled for.

Gender Differences

Anger rumination was surprisingly not significantly correlated with self-reported physical aggression in males ($r = 0.207$, $p < 0.154$). However anger rumination scores were correlated with relational aggression in the male group ($r = 0.439$, $p < 0.002$). Anger rumination was correlated with relational aggression ($r = 0.466$, $p < 0.000$) and physical aggression in the female group ($r = 0.357$, $p < 0.006$). Thus, while the association between anger rumination and relational aggression was relatively consistent across males and females, the association between rumination and physical aggression appeared stronger in females than males.

C. Aggression and cognitive inflexibility (Hypothesis 6)

The adolescent literature suggested that aggressive children are more likely to be inflexible in their thinking and show higher levels of perseveration. Multiple regressions were therefore conducted to test whether measures of cognitive inflexibility (W.C.S.T.)

could predict aggression. These were conducted in two stages, firstly with measures of perseverance and secondly with perseverance and learning to learn measure. This was because learning to learn scores could only be calculated on 72 of the participants (69%)

The first set of regressions were conducted in order to test whether the three types of aggression could be predicted by the two perseverance variables (i.e. leaving learning to learn, which could otherwise reduce the n for analysis). A second set of regression were then conducted, based on the smaller sample for whom learning to learn data were available. The statistics are presented in Table 7 below.

Table 7: Correlation and regression statistics for aggression and indicators of cognitive inflexibility

	Zero-order correlation	Regression Statistics				
	r	R ²	F	B	t	p
<i>Self-report relational aggression n = 104</i>						
Overall Model		0.086	2.301			0.064
Perseverative Responses	-0.160			0.023-	0.688	0.506
Perseverative Errors	-0.219*			-0.070	-1.910	0.059
Age	-0.130			-1.223	-1.816	0.072
Gender	-0.017			0.340	0.441	0.660
<i>Self-report relational aggression n= 72</i>						
Overall Model		0.096	1.409			0.232
Learning to Learn	-0.077			0.025	0.714	0.478
Perseverative Responses	-0.178			0.023	0.697	0.488
Perseverative Errors	-0.271*			-0.087	-2.050	0.044*
Age	-0.041			-0.773	-0.955	0.343
Gender	-0.058			-0.184	-0.200	0.842
<i>Self-report physical aggression = 104</i>						
Overall Model		0.093	3.615			0.009**
Perseverative Responses	0.076			0.015-	0.812-	0.419
Perseverative Errors	0.060			0.019	0.898	0.372
Age	-0.055			0.033	0.095	0.924
Gender	0.342**			1.483	3.684	0.0001*
<i>Self-report physical aggression = 72</i>						
Overall Model		0.088	1.274			0.286
Learning to Learn	0.029			0.007	0.333	0.740
Perseverative Responses	-0.048			0.013	0.693	0.491
Perseverative Errors	-0.098			-0.030	-1.266	0.210
Age	0.057			0.405	0.891	0.376
Gender	0.079			1.116	2.162	0.034*
<i>Teacher report aggression = 104</i>						
Overall Model		0.074	1.727			0.151
Perseverative Responses	-0.162			-0.003	-0.228	0.821
Perseverative Errors	-0.172			-0.004	-0.289	0.773
Age	0.237*			0.494	1.991	0.050*
Gender	-0.064			-0.116	-0.400	0.690
<i>Teacher report aggression n=72</i>						
Overall Model		0.163	2.254			0.061
Learning to Learn	-0.284*			-0.019	-1.251	0.216
Perseverative Responses	-0.253*			-0.004	-0.283	0.778
Perseverative Errors	-0.282*			-0.004	-0.256	0.799
Age	0.309*			0.494	1.947	0.056
Gender	-0.196			-0.116	-0.163	0.871

Self-report relational aggression is negatively correlated to perseverative errors ($r = -0.219$, $p < 0.025$), suggesting that the more relational aggression adolescents report, the less perseverative errors they make. These results do not support hypothesis 6 that aggression is positively correlated to cognitive inflexibility. The multiple regression statistics (Table 7) show that self-reported relational aggression can be predicted by perseveration, age and gender ($f(98) = 2.301$, $p < 0.064$). The second stage regression also showed that age is also associated with self-report relational aggression, independently of perseveration, learning to learn and gender. The R-squared statistic suggests that perseveration, age and gender account for 8% of the variance in self-report relational aggression.

Self-report physical aggression can be predicted by perseveration, age and gender ($f(98) = 3.615$, $p < 0.009$), and they count for 9% of the variance in self-report physical aggression, thus supporting hypothesis 6 that aggression and cognitive inflexibility are positively correlated. However, it appeared that gender (being male) significantly predicted self-reported physical aggression independent of the W.C.S.T. factors and age, but that W.C.S.T. factors did not. Again, when 'learning to learn' factor was added, the three W.C.S.T. factors, age and gender did not predict levels of physical aggression ($f(66) = 1.274$, $p < 0.286$).

Teacher report aggression could not be predicted by perseveration, age and gender ($f(87) = 1.727$, $p < 0.151$), however when 'learning to learn' was added as a predictor, it was accountable for 16% of the variance in teacher reported aggression. The statistics

suggest that age is predicting teacher reported aggression independent from the other predictors ($t = 1.947, p < 0.056$).

D. Anger rumination and cognitive inflexibility (Hypothesis 7)

According to the adult literature, anger rumination and cognitive inflexibility should be positively correlated and that cognitive inflexibility should predict higher levels of rumination, especially in the male group (hypothesis 7).

Table 8: Correlation and regression statistics for anger rumination and cognitive inflexibility.

	Zero-order correlation		Regression Statistics			
	r	R ²	F	B	t	p
<i>Anger rumination n = 104</i>						
Overall Model		0.047	1.119			0.316
Perseverative Responses	-0.098			0.006	1.023	0.309
Perseverative Errors	-0.172			0.006	-1.758	0.082
Age	-0.038			-0.088	-0.822	0.413
Gender	-0.068			-0.033	-0.267	0.790
<i>Anger rumination n= 65</i>						
Overall Model		0.065	0.912			0.479
Learning to Learn	0.003			0.006	1.130	0.263
Perseverative Responses	-0.085			0.004	0.829	0.410
Perseverative Errors	-0.172			-0.011	-1.606	0.113
Age	0.084			0.015	0.118	0.906
Gender	-0.131			-0.124	-0.838	0.405

** significant at the 0.01 level.

* significant at the 0.05 level.

The multiple regression was conducted in two stages because only a proportion of 'learning to learn' scores could be calculated due to nature of the measure (69%). The results from the multiple regression showed that anger rumination could not be

predicted by perseveration, age and gender ($f(102) = 1.119, p < 0.316$) or when the 'learning to learn' factor was added ($f(71) = 0.912, p < 0.479$). (Table 8). Correlations of anger rumination and cognitive inflexibility were conducted to compare the female and male groups. Results suggested that the anger rumination and cognitive inflexibility scores were not correlated in either the female or the male group (Table 9), thus not supporting hypothesis 7.

Table 9: Correlation statistics anger rumination and cognitive inflexibility in the male and female groups.

Anger Rumination					
Females	r	p	Males	r	p
Perseverative Responses	-0.198	0.144	Perseverative Responses	0.021	0.889
Perseverative Errors	-0.242	0.072	Perseverative Errors	-0.068	0.646
Learning to Learn	0.066	0.703	Learning to Learn	0.018	0.916

** significant at the 0.01 level.

* significant at the 0.05 level.

Although the above correlations were not statistically significant perseverative errors were negatively correlated ($r = -0.242$) to anger rumination scores in the female group, suggesting a weak correlation. Looking at the previous analyses, this could be explained by the fact that anger rumination is strongly correlated with relational aggression which is reported significantly in the female group.

E. Aggression, anger rumination and cognitive inflexibility. (Hypothesis 8)

In previous regressions, both relational and physical self reported aggression can be predicted separately by anger rumination and measures of cognitive inflexibility.

Therefore, a multiple regression was conducted to see if self-report aggression could be predicted by anger rumination and cognitive inflexibility together or whether they were acting independently from each other (hypothesis 8).

Table 10: Correlation and regression statistics for self report aggression, anger rumination and cognitive inflexibility.

	Zero-order correlation	Regression Statistics				
	r	R ²	F	B	t	p
<i>Self-report relational aggression</i>						
Overall Model		0.256	6.673			0.001**
Anger Rumination	0.455**			2.699	4.709	0.001**
Perseverative Responses	-0.160			0.008	0.249	0.804
Perseverative Errors	-0.219*			-0.046	-1.251	0.214
Age	-0.130			-0.984	-1.606	0.111
Gender	-0.017			0.429	0.612	0.542
<i>Self-report physical aggression</i>						
Overall Model		0.202	6.906			0.002**
Anger Rumination	0.254**			0.947	2.992	0.004**
Perseverative Responses	0.076			0.009	0.533	0.595
Perseverative Errors	0.060			-0.008	-0.396	0.693
Age	-0.055			0.117	0.346	0.730
Gender	0.342**			1.514	3.910	0.001**

** significant at the 0.01 level.

* significant at the 0.05 level.

Anger rumination, perseveration, age and gender predict self-report relational aggression (f (102) = 6.673, p<0.0001). The statistics state that 1.8% of the variance is accountable by age and gender, 8.6 % by perseveration and the remaining 15.2% by anger

rumination. The results do not support hypothesis 8 as relational aggression is predicted by flexible rather than inflexible thinking. It is clear from the results of the regression that anger rumination predicts self-report relational aggression independently from the other predictors.

Anger rumination, perseveration, age and gender predict self-report physical aggression ($f(102) = 6.906, p < 0.002$). The statistics show that age and gender count for 12.1% of the variance, and the remaining 8.1% by perseveration and anger rumination. The regression shows that anger rumination and gender both predict self-report physical aggression independently from the other predictors.

DISCUSSION

The findings of this research project provide evidence for the view that studying cognition can provide a route to increase understanding of aggression in early adolescence. The study investigated a number of hypotheses attempting to related aggression anger rumination and cognitive inflexibility to aggression in a school-based population of adolescents. Broadly, the results indicate that both anger rumination and flexibility in thinking contribute independently to the development of aggression. The study tested eight hypotheses.

1. Physical aggression will be seen more in males compared to females.
2. Relational aggression will be more common in the female group compared to the males.

3. Males will be more prone to ruminating about angry situations than females.
4. Adolescents who ruminate about angry situations are more likely to display aggressive behaviour;
5. As in adults, it is expected that higher levels of cognitive inflexibility will be found in the male adolescent in comparison to the female.
6. Adolescents who report higher levels of aggression will be more inflexible cognitively.
7. The more inflexible an adolescent's thinking the more likely they are to ruminate.
8. It also suggested therefore that those children who are less flexible in their thinking and who ruminate about anger-inducing situations would display higher levels of aggression.

The first two hypotheses were partially confirmed as higher levels of physical aggression were reported in males, but no gender difference was found in the measure of relational aggression. The third hypothesis was not supported as there was no gender difference found within the anger rumination scores. In the case of the fourth hypothesis, self-report but not teacher-reported aggression was positively correlated with and predictive of anger rumination, especially in the case of relational aggression.

Hypothesis five was supported as males were more inflexible in their thinking compared to the females. The sixth hypothesis was not supported because when gender was

controlled for, perseveration was not predictive of physical aggression. More interestingly, self-report relational aggression was negatively correlated with perseveration, suggesting that relationally aggressive adolescents are more flexible in their thinking. The seventh hypothesis was not substantiated as anger rumination and cognitive inflexibility were not found to be related and therefore the final hypothesis was not supported. It should be noted that the sample, though homogeneous, consisted primarily of white, middle class adolescents. This limits the generalisability of the findings while, at the same time, reducing extraneous variability. Nonetheless, the findings, however, may have both theoretical and clinical implications, more particularly in the case of relational aggression.

Aggression

As hypothesised, the study revealed that males reported more physical aggression, and were described as displaying significantly more physical aggression by their teachers when compared to the female group (Dodge, 1994). However, at variance with numerous studies investigating relational aggression and gender (Crick and Grotpeter, 1995), in the present study boys and girls reported themselves and were described by teachers as displaying similar levels of relational aggression (instead of girls reporting more). This may be due to the specific culture of the school where acts of physical aggression can be grounds for expulsion and, perhaps for this reason, have not become part of everyday life at the school. In this sample, it could be hypothesised that the usual adolescent frustration and aggression could, therefore, be argued to be channelled and expressed more subtly through peer relationships by both the boys and the girls.

The results also suggested that the adolescents were self-reporting higher levels of both physical and relational aggression in comparison to the teacher-report. This may be because the teachers do not have the opportunities to observe their aggressive behaviour because it occurs when teachers are not present, for example at lunchtimes and after school. The results also showed that the teacher reports of relational and physical aggression were more highly correlated than self-reports, suggesting that teachers may find it harder to distinguish between the two types of behaviour in comparison to an individual's own rating of their behaviour. It may also reflect that the adolescents who are observed responding aggressively in either way are reported as having generally higher levels of aggression regardless of the type. Despite these limitations, teacher reports of aggression are still considered as a reliable report of behaviour. Indeed, other researchers have stressed the desirability of supplementing the self-report with other-report measures to increase internal reliability of the results (Barker, Pistrang and Elliott, 1994). Because they provide a more objective account of the child's aggression, teacher reports were used in this study. However, some teachers reported that they found completing the questionnaires challenging. Firstly, they questioned their ability to report with accuracy and, secondly, that it was more difficult to rate the relational aggression in comparison to the physical aggression questions because it was more difficult to observe.

Aggression and Anger Rumination

Based on Rusting and Nolen-Hoeksema's research with adults (1998), it was predicted that males would ruminate more about angry situations than females. However no

gender differences were found in the levels of anger rumination in the adolescent sample. This may be partly explained by looking more carefully at the relationship between self-reported levels of relational aggression and anger rumination. These two variables were found to be strongly correlated ($r = 0.455$, moderate-large effect size (Cohen's standard, 1992)), and anger rumination was a significant and independent predictor of self-report relational aggression. As has been learned, in this sample there was no gender difference found in self-reported relational aggression, suggesting that the lack of gender differentiation in reports of anger rumination may be a function of the level of relational aggression reported.

Anger rumination was also correlated, although not as strongly ($r = 0.253$, medium effect size), with physical aggression, and the analysis suggested ruminating about angry experiences predicted levels of physical aggression as reported by the adolescents. The stronger correlation between relational aggression and anger rumination, in comparison to physical aggression, could be explained by rumination being a process more associated with social interaction (Melling & Alden, 2000), in that when people ruminate about angry situations they may be more likely to include memories of others causing the feelings of unjust or anger, rather than themselves. This may be a process different from rumination which is more commonly associated with depression where the self is the focus for the negative thoughts and beliefs (Beck, 1976, Beck and Greenberg, 1974). There is also face validity in the hypothesis that adolescents would ruminate more about relational issues in context of friendships and group dynamics (school, teams, gangs) because adolescence is a time of development when peers can

become crucial to an individual's social status and sense of identity (Coleman and Hendry, 1999).

Interestingly, anger rumination was not correlated with teacher-reported levels of aggression, perhaps because of the less obvious nature of relational aggression, teachers may not be as sensitive at recognising relational aggression as the children themselves. Methodologically, another possibility is that the stronger correlations found in the self-report measure of aggression with self-report anger rumination are a function of reporter bias.

Aggression and cognitive inflexibility

It was predicted that physical aggression would be positively correlated with cognitive inflexibility (Seguin et al., 1995) and, indeed, this was found to be the case. However, on closer scrutiny it appears that the prediction is more of a function of being male. It could be suggested that a stronger correlation between cognitive inflexibility and physical aggression was not found due to the sample being school-based rather than clinic-based (Seguin et al., 2002, Moffitt and Henry, 1989; Nigg et al., 1999). That is, perseveration may be more strongly related to children who display chronic and more severe levels of physical aggression.

Interestingly, however, relational aggression was negatively correlated to perseveration suggesting that relationally aggressive children are significantly more flexible in their thinking and less perseverative. This may suggest that being relationally aggressive

requires individuals to be more flexible in their thinking. This finding has face validity in that relationally aggressive children may be considered more cunning and manipulative of social situations in comparison to their physically aggressive counterparts who may act more instinctively or impulsively (Lahey et al., 2003). Sutton, Smith and Swettenham (1999) have studied bullying and concluded that those bullies who employ more relational aggression are not lacking in social skills and understanding as initially understood, instead they use their ability to understand to manipulate and organise social situations to their advantage.

Teacher-reported levels of aggression were negatively correlated to the “learning to learn” factor from the Wisconsin Card Sort Test ($r = -0.284$, medium effect size). This factor measures whether a respondent becomes increasingly proficient in moving from one test rule to another. It is therefore empirically related to flexible thinking (W.C.S.T.-64; Haaland, Vranes, Goodwin and Garry, 1987). The findings of this study suggest that children whom the teachers were reporting to be more aggressive were those children who were more flexible in their thinking. This contradicts previous research which suggests that aggression is positively correlated with cognitive inflexibility (Nigg, 2000). It is important to note that the learning to learn factor could not be calculated on all the participants because, in order to measure increasing proficiency, they would have needed to complete three sections of the test. If this cannot be done, it is not possible to calculate the improvement. This means that the analysis at this stage was conducted on 68% ($n=72$) of the participants who all showed a certain level of proficiency in the test. Therefore this finding is only representative of a sub-sample of adolescents who were

more flexible in their thinking and quicker to understand the concept of the test (professional W.C.S.T. manual; Kongs, Thompson, Iversen and Heaton, 2000).

Anger rumination and cognitive inflexibility

It was hypothesised that anger rumination would be characterised by cognitive inflexibility in the male group, based on Davis and Nolen-Hoeksema's (2000) research with adult ruminators and depression. The findings of this study showed however that perseveration and cognitive inflexibility were not correlated with anger rumination scores in either male or female groups. This may be because anger rumination is distinct from depressive rumination; that perseveration is not a trait of anger ruminators in general, but only of depressive ruminators. These observations raise the possibility that different cognitive processes are involved when ruminating about angry situations in comparison to depressing ones, therefore suggesting that the emotional context of rumination is important and that perseveration is not a cognitive process that contributes to ruminating about anger.

Alternatively, it could be hypothesised that the difference between the adult and adolescent samples may be due to the participants being at a different stage of cognitive development. It could be suggested that during adolescence, cognitive processes are not yet ingrained and that rumination has not been adopted fully as a cognitive strategy used to manage angry feelings. A longitudinal study which tracks cognitive development alongside propensity to ruminate about angry situations would assist in exploring

whether ruminative thinking is part of normal adolescent development or whether it is a maladaptive cognitive strategy that leads to aggressive behaviour.

Anger rumination and cognitive inflexibility were found to be acting independently in the prediction of self-report aggression. This was expected as anger rumination was positively correlated to measures of aggression whilst cognitive inflexibility was negatively correlated.

Limitations and Future Research

Due to the homogeneous nature of the sample, the results from this study are not generalisable to a population in which there are probably higher levels of aggression and more variability in cognitive processing and functioning. Clearly, more robust external validity may have been attained, for example, if a sample of inner city schools had been involved where there is ethnic diversity, and more variation in socio-economic background as they have an impact on social adjustment in childhood (Lahey et al. 2003). In addition, future research in anger rumination points to clinically aggressive groups being studied in comparison to non-clinical groups to investigate whether proneness to rumination is implicated in whether a child experiences the expected difficulties with aggression or whether these problems become chronic and more serious with time. This is in line with much of the adolescent aggression research that focuses on individuals with conduct disorder (Lahey et al., 2003).

The findings of this study highlight that there was a discrepancy between teacher reports of aggression and adolescent self-reports. This difference may be partly due to methodological issues around content validity and reliability of the questionnaires used. However, it may also reflect that teachers find it difficult to observe relational aggression due to its more subtle nature. Therefore this study would have been improved by also asking parents to rate their child's aggressive behaviour as they may have been more aware of relational difficulties. The discrepancy also points to the need for teachers to be made more aware of the nature of relational aggression and how their pupils are experiencing higher levels of aggression than they may witness. Relational aggression is a characteristic of bullying (Besag, 1989) and it is good practice for all schools to have anti-bullying policies. With the increasing connections between psychology and education, psycho-educational programmes could be facilitated in schools to raise both student and teacher awareness of relational aggression.

The age group used in this study was relatively narrow, reducing the ability to measure developmental change in types of reported aggression, anger rumination levels and cognitive inflexibility in younger compared to older adolescents. Longitudinal studies are not without their limitations (controlling for multiple variables, attrition rates, etc.) however extending the time frame would provide a clearer understanding of how cognitive processes, such as anger rumination, contribute to aggression from pre-puberty to early adulthood.

The study of aggression in childhood is complicated and influenced by many factors, for example, parental histories of aggression (Moffitt and Henry, 1999), attachment (Bowlby, 1969; Rosenstein and Horowitz, 1996), personality (Marsee, Silverthorn and Frick, 2005) education, neuro-psychology, poverty, drug and alcohol abuse (see Huston & Ripke, 2006). Social adjustment problems have been linked to various emotional experiences, for example depression, anger and anxiety (Woodward and Fergusson, 1999). Emotions and the social information processing model have traditionally been studied separately despite the knowledge that cognition and emotion affect each other (Beck, 1976; Piaget, 1981). More recently however, in response to Crick and Dodge's review (1994), Lemerise and Arsenio (2000) attempted to integrate emotions into the different stages of cognitive processing. They describe the impact that negative emotions have on the encoding and interpreting of cues, clarification of goals, access to possible responses and decision-making stages of the social information processing model. The findings of the present study showed that the gender differences in levels of rumination are affected by emotional context: that females who are proved to be more prone to depressive rumination, shared the same relationship with anger rumination as males. It would be therefore be interesting to further develop ideas as to how gender and emotion influence socio-cognitive processing.

Certainly, the links found between relational and physical aggression with anger rumination highlight clinical opportunities to include a more formal assessment of anger rumination in psychological assessments of referrals of adolescent aggression. This would allow more comprehensive formulation of the presenting problem and therefore a more tailored clinical intervention to aid adolescents who are prone to ruminating about

angry situations. Cognitive-behavioural techniques could be taught to assist adolescents to recognise and modify their ruminative thinking style by replacing it with more adaptive strategies, like distraction which has been proved to reduce angry feelings (Bushman et al. 2005).

In summary, the study has raised some important questions about the actual links between aggression, anger rumination and cognitive inflexibility in an adolescent sample. More specifically a large – moderate effect size was found between anger rumination and relational aggression suggesting that this cognitive style contributes to the development of aggression, particularly relational aggression, in early adolescence. A moderate effect size was found between relational aggression and perseveration suggesting that relationally aggressive adolescents are less perseverative than their non-relationally aggressive peers. Both of these findings have theoretical and clinical implications in the understanding of relational aggression in adolescence, and support further investigation into the role of anger rumination in the development of aggression in childhood and adolescence.

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PART 3: CRITICAL APPRAISAL

Introduction

This study undertook to explore the relationships between aggression and cognition in adolescents. This is a critical and personal review of the research process beginning with a reflection on why adolescent aggression initially caught my interest, and then focusing on methodological issues of design, recruitment, sampling and measurement. The construct of relational aggression will then be elaborated in terms of development, gender and links to bullying and social maladjustment. The concept of anger rumination will then be expanded in terms of broadening out the possible relationships between specific emotions and cognitive processing. Aggressive behaviour problems are linked to social maladjustment and can place children at risk of developing mental health problems later in life (Silk, Steinberg and Morris, 2003). It is therefore necessary to understand more fully the reasons why some children become more aggressive than others, and how cognitive processes are involved in development of both physical and relational aggression in childhood and adolescence.

Idea generation

My research interest is in the development of aggression in adolescence, particularly in comparing reasons why males and females are considered to be so different in their propensity for aggression. This interest was borne out of clinical work I had previously undertaken with vulnerable male young offenders. After co-facilitating psychotherapy and psycho-educational groups addressing issues such as anger, bullying and offending, my attention was drawn to the way the boys described and evaluated their own aggressive experiences. Their reports appeared to be coloured by bias; that the world

was out to get them, and that there was a strong sense that they were defending themselves from harm. It was, of course, sometimes the case that they were acting in self-defence. However, more often than not, it appeared that aggressive responses to a situation were not socially justified.

The extensive literature on conduct disorder and anti-social behaviour in adolescence addresses some of the social, emotional, cognitive and psychological causes of aggressive behaviour (see Lahey, Moffitt and Caspi, (2003) for comprehensive review). While, the majority of the literature on cognition and aggression in young offenders is based on males (Crick and Dodge, 1994), there seemed to be little discussion around aggression in the female, young offender population or, indeed, any predictors relevant to the development of high levels of aggression for females in comparison to males. Within the literature on female aggression in the normal population there has been greater emphasis on relational aggression in comparison to physical aggression (Crick and Grotpeter, 1995). Given this, the present study focused on relational aggression and, in particular, whether cognitive factors might explain differences between females and males.

When conducting research in young offender institutions, one faces many challenges: recruitment of sufficient numbers of participants to ensure statistical power; gender bias of young offender population; varying cognitive ability; mental health issues; attitude of institution towards research and being “evaluated”; and complex legal issues. These were among the factors that led me to develop my ideas about cognition and aggression

in adolescence in a different direction when I realised that the same research questions concerning the relationships between anger rumination and cognitive inflexibility in the development of aggression could be investigated using a school sample of adolescents. That the anger rumination scale had not been used (in published articles) previously with an adolescent sample was also an important factor in deciding to pursue this idea with a non-offender, non-clinical sample. Further, if the present research yielded interesting results, it would still be possible to continue the research in offender samples when there was more time and fewer funding constraints. On the basis of these considerations, it was decided to conduct the study in a secondary school.

Methodological Issues

Recruitment and Sampling

Social conditions, economic status and ethnicity have been linked to anti-social behaviour but are described more as “catalytic” rather than directly liable for the development of aggression. Rutter (2002) argues that social situations and early rearing shape the way children learn to understand and interact with the world. Bugental and Goodnow (1998), contend that because parents on welfare face significantly more daily challenges, and have fewer resources, they are less able to provide environments that will optimise children’s development. These factors increase the risk that children will not be able to regulate their own behaviour as efficiently. This is important because poor emotion regulation is associated with high levels of aggression (Nigg, 2000).

It was for these reasons that inner-city London comprehensives were first approached as it was predicted the sample would be more ethnically diverse and from a range of socio-economic backgrounds. The challenge was, first, to find an appropriate school and, second, persuade staff, parents and students to participate in the study. Given the relevance of the study to bullying, it was anticipated that schools might show an interest in participating in the study. Ten schools in the London area were approached and sent information packs but none showed any interest in participating. Finally, a co-educational school in a suburb of a city in the north of England agreed to participate. As anticipated, the school was enthusiastic and interested in the research because it supported the teaching on bullying that had just been completed.

The demographic information gathered illustrated that the sample was characteristically white middle class. The majority of the parents described themselves as university-educated and currently in employment. The school and parents strongly supported the research project and, as a result, more children were recruited than had originally been expected. The response rate for parents was 95% and for teachers was 91%. There remains the unanswered questions whether this homogeneous sampling bias explains the lower levels of aggression reported and whether, if the sample had been taken as intended, from an inner-city comprehensive school, more varied and severe levels of aggression would have been found. In this study, the severity of aggression was important because meta-analysis of cognition and aggression (Orbó de Castro, Veerman, Koops, Bosch and Monshower, 2002) found that there was a stronger effect between cognitive processes and aggression in the clinical or offender samples, where

more severe levels of aggression were recorded. Clearly, given the importance of the severity of aggression, a significant addition to understanding might emerge if a study that aimed at determining the effects of larger effect sizes, and identifying gender and group differences was repeated using a young offender or referred sample of adolescents.

It is also necessary to raise the possibility of a sampling bias, arising from those who chose not to participate. It could be hypothesised that this sub-group of pupils comprised a more oppositional group that did not want to comply with school activities. This is a frequent occurrence when conducting research with adolescents, and should be considered, especially if they are being asked about personal experiences of when they feel angry and behave aggressively.

Measurement

a. Choice of aggression measures.

There are validated and reliable measures that rate childhood aggression but typically these have concentrated on physical aggression and been developed using boys. For example, the Achenbach Child Behaviour Checklist (C.B.C.L.; Achenbach and Edelbrock, 1983) is commonly used by clinical psychologists as part of a psychological assessment. However, as explained previously, this study was primarily interested in relational aggression and the measures had to reflect this. To meet this imperative, the Child Social Behaviour Scale, (C.S.B.S.; Crick, 1996) was chosen because it had been developed to measure relational and physical aggression, and could be used with both

females as well as males. This was important for the present study because the confirmation, or otherwise, of one hypothesis depended on the ability to detect differences in male and female aggression. Although the questionnaire-based measure was not as strongly validated as measures as the C.B.C.L., it had good internal validity and was chosen because it was more relevant to the aims of the study. As a result of choosing the C.S.B.S., physical aggression was not measured as precisely as is possible with other techniques and this may partly explain the stronger correlations found between relational aggression and rumination, in comparison to physical aggression.

b. Multi- Informants

The C.S.B.S. was also chosen because it contained a teacher-report version which would allow form teachers to rate the participants' behaviour. It was decided that both a self-report and an other-report of behaviour was advisable and necessary as the measures would provide both a subjective and more objective view a child's behaviour. The dual-report format provides information that contributes not only to the understanding of the experience of the child but also how the child is viewed by others. Some of the teachers commented that they found the questionnaires difficult to complete, particularly in regard to the questions on relational aggression. They found that the physically aggressive children were easier to rate because this type of behaviour was more apparent. In comparison, they found that relational aggression, being more subtle and displayed only in social interactions, more difficult to observe. This highlights possible issues concerning the accuracy and reliability of teacher-report data.

The more complex question of how to measure relational aggression in children and adolescents, more accurately is therefore raised. In the present study, it has been proved that although physical and relational aggression are correlated, they are also two distinct forms of behaviour. Relational aggression, therefore, demands further attention in that there is a need to develop additional measures that enable this more subtle and interactive behaviour to be measured more precisely. The present study suggests that teachers may not be best placed to observe this type of behaviour and that perhaps parents would be better in this capacity. However, it could be argued that relational aggression is mostly peer-based in adolescence due to the importance placed on friendships at this age, in which case parents may not be any more able than the teachers to rate relational aggression in their child. On the other hand, relationally aggressive behaviour patterns may be part of the family dynamic and more visible to parents.

It could therefore be suggested that peer-report or peer nomination may provide more objective and accurate reports of relational aggression. Peer nomination is a procedure in which the individuals are asked to nominate peers whom they consider to be relationally aggressive and non-aggressive and the children who have the most nominations are then categorized accordingly into aggressive and non-aggressive groups. This procedure was initially used in the study of physical aggression in boys (Dodge, 1980) but was adapted successfully for studying relational aggression in girls (Crick and Grotpeter, 1985). The literature reflects that this style of measure is more commonly used with pre-adolescent children, but could be useful for investigating relational aggression in an adolescent population. Peers may be the most aware of what really happens within their peer groups

and, therefore, may be most sensitive to the subtleties of this style of behaviour. The use of multiple perspective measures could help in trying to understand the intricacies of this style of behaviour so prevalent in children and adolescents.

c. Choice of cognitive inflexibility measure

The Wisconsin Card Sort Test-64 card (W.C.S.T.-64; names here) was chosen to measure cognitive inflexibility because it has strong internal and external validity and has norms for adolescents. It is a reliable measure of executive functioning and has separate sub-scores for perseveration which the adult literature has linked to rumination. Because the 64-card version is half the length of the original and continues to have strong reliability and internal validity, it was chosen to minimise the time the children needed to spend out of their lessons. It is important to note that the W.C.S.T., and much of the research on executive functioning, began with the study of individuals with brain injury. Neuropsychological studies began to link specific observable changes in behaviour, for example perseveration, to damage in different parts of the brain. The salient point is that the test was developed to measure perseveration in a clinical sample, not in a normal sample. Since then, the measure has been further validated and does provide norms for a non-clinical sample, but there are questions as to whether the type of perseveration that the W.C.S.T. measures is the same as the ruminatory style of perseveration observed in normal adolescents.

Relational Aggression

The present study was interested in cognition and aggression in adolescents. It was found that adolescents who were prone to anger rumination were the same ones that displayed relational aggression. The research did not propose to study causal relationships. However, in the literature Dodge (2003) states that the cognitive processes can cause the child to behave in certain ways. It could be hypothesised, in that case, that anger rumination causes adolescents to be more relationally aggressive for two reasons. Firstly, anger rumination is known to increase affect (Bushman, 2002) so would therefore be likely to increase the likelihood of the adolescent being aggressive. Secondly, that the content of rumination is often based on interactions with others, therefore fuelling the propensity to ruminate about angry situations. It is, therefore, logical to conclude that those who ruminate about anger inducing situations, would be likely to be more involved in relationally aggressive situations compared to those who do not ruminate about anger-inducing situations.

Severe levels of aggression in childhood are highly correlated with social maladjustment and therefore can be detrimental to mental health (Crick and Grotpeter, 1995; Weiss, Dodge, Bates and Pettit, 1992). Relational aggression is a distinct form of aggression and is usually more associated with girls. In particular, it predicts future social maladjustment in females, independently from the effects of physical aggression (Crick and Grotpeter, 1995). However in this normal sample, adolescent boys and girls are reporting similar levels of relational aggression. This may be developmentally appropriate in adolescence because both genders use relationally aggressive techniques

to improve their social status, so important to their self-identity and confidence at this stage of development. This does not mean to imply that adolescents stop using physical aggression at this age, just that the gender difference in the use of relational aggression is not so apparent at this age.

Relational aggression is a form of bullying. It encompasses aggression which is used to harm or influence friendships and relationships. This type of relational bullying is more associated with females (Sutton, Smith and Swettenham, 1999). The findings of the present study showed that those children, both girls and boys, who were more flexible in their thinking, were also more relationally aggressive. On the one hand, this finding could be described as a counter-factual because the view is often expressed that aggressive children lack social skills or have cognitive deficits which prevent them from having a clearer understanding of social interaction and relationships (Roland, 1989; Olweus, 1993). On the other hand, it is supported by the work of Sutton and colleagues who have tried to reframe some bullying behaviour as requiring a more sophisticated understanding of social interaction rather one that is based on a lack of understanding. They argue that a bully needs good socio-cognitive skills in order to manipulate others, and cause upset and damage to the victims, without being caught. This present study has brought to light that there are links to be made between cognitive processes and aggression in children and adolescents that have yet to be adequately researched. Further research is needed into the relationships between cognitive processing and relational aggression because of the known effects of bullying on children's mental health and socio-emotional adjustment. In summary, this study found that anger rumination

strongly predicted relational aggression in adolescent boys and girls and that these individuals were more flexible in their thinking.

Cognitive Processes and Emotion - Anger Rumination?

Critiques of the social information processing model highlight the lack of focus on emotion in the cognitive model. In response, Crick and Dodge (1994) contended that the cognitive model would benefit from integrating emotion into a more comprehensive model of cognition, affect and behaviour. Somewhat later, Lemerise and Arsenio (2000) did attempt to integrate emotions into the different stages of cognitive processing. Specifically, they described the impact that negative emotions have on encoding and interpreting of cues, clarifying goals, and accessing possible responses and decision making stages of the social information processing model. Subsequently, Orobio de Castro, Slot, Bosch, Koops and Veerman (2003) compared clinically aggressive, school-based non-aggressive boys and found that negative affect increased hostile attributional bias in the aggressive boys. More recently, Orobio de Castro, Merk, Koops, Veerman and Bosch (2005) found that aggressive boys (aged 7-13 years) had less adaptive emotion regulation strategies and tended to evaluate aggressive responses less negatively than the comparison group.

Within the social information processing literature, Crick & Dodge (1996) suggest that emotional distress influences the effectiveness of cognitive processing, and therefore has an effect on behavioural choices made by a child. For example, high levels of negative affect influences an individual's ability to problem solve, and therefore limits their access to alternative responses (Crick and Dodge, 1994). However, a limitation of the

social information processing research is that it leaves unspecified how particular emotions contribute to cognitive processing or, indeed, how specific emotions interact with specific cognitive processes (Crick and Dodge, 1994). There is, therefore, a growing interest in attempting to integrate emotion into the social information processing model without reducing the model's reliability.

The present research suggests that rumination, as a cognitive process, may only be associated with emotions that are valent to the individual. For example, individuals who may be prone to rumination, may be more sensitive to ruminating about particular emotions, or that specific emotions encourage a more ruminative style of thinking in individuals. This would suggest that rumination is not a style of thinking that is reverted to when feeling emotionally distressed, but specific to what is emotionally valent to the individual.

There are also important gender differences to be further examined: depressive rumination is a cognitive style that is reported significantly more in female compared to male adult samples (Nolen-Hoeksema, 1987; Nolen-Hoeksema, Larson and Grayson, 1999). However, anger rumination was predicted to be linked more strongly with males due to the context of anger (Rusting and Nolen-Hoeksema, 1998). Because of the sampling bias (discussed above), the present sample could have been expected to exhibit less aggression than in a normal adolescent sample. Indeed, this proved to be the case: no significant gender differences were found in propensity to ruminate about angry experiences. The current literature finds larger effects between cognitive processing deficits and aggression in clinical or offender samples (Orobio de Castro et al., 2002).

Based on this, it is predicted that that gender differences would be found if the same study was repeated with anti-social adolescents with clinical levels of aggression.

Conclusions

This present study has shown that relational aggression is a distinct form of aggression that is characteristic of adolescent males and females. It has also shown that there is scope to study how different cognitive processes are involved in the development of aggression and social maladjustment. This field of developmental psychological research has been dominated by Dodge and his social information processing model (see Dodge, 2003), and as such, many resources have been put into developing and validating the cognitive model of aggression. This study has suggested that looking at the literature on adult cognition, which may be further developed, there are cognitive theories that may be adaptable to children and adolescents. This has been the case with anger rumination which previously had only been researched in the adult population but has raised some interesting ideas about how this cognitive style relates to different types of aggression in adolescence. There may also be individual differences implicated in more specific links between particular emotions and the type of cognitive strategy employed.

Relational aggression is a pattern of behaviour that is fast becoming more important in the psychological understanding of social and group dynamics. It is a complex type of behaviour that in some cultures or situations would be evaluated positively. For example, in competitive, highly stressful work environments that emphasise performance it may be considered positive to behave with relational aggression towards

a rival. Children are faced with rivalry everyday: at school, with peers, and at home with siblings. A certain amount of relational confrontation and competition would be considered necessary for a child learn how to interact independently with the wider social circle. However, at what point does rivalry turn into aggression? When does the effects of these more challenging interpersonal relationships become distressing to a child, and harmful to their psychological wellbeing and socio-emotional adjustment? These are complex questions that require future study. The present study suggests that integration of cognitive, behavioural, emotional and social factors may contribute to a more comprehensive understanding of how some children are more socially maladjusted compared to others in similar environments.

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APPENDICES

APPENDIX A

Introductory letter to the school



05 October 2006

Dear

I am Doctoral student of Clinical Psychology at University College London. My supervisor and I are currently trying to recruit adolescents to partake in a study about teenage aggression. We are interested in how some children are more likely to react in aggressive ways to difficult situations and to think further about how their behaviour is linked to thinking styles and emotion. It is hoped the investigation into the potential links between emotions, thoughts and aggressive behaviour in children may inform bullying policies in schools. The results may be able to suggest new ways to address adolescents' aggressive and bullying behaviour by focusing on their thinking skills and self-esteem.

My thesis has been approved by the University College London Research Ethical Committee and I have received funding from the university. Ideally, I am hoping to recruit 85 students, both male and female aged between 13 and 15 years old.

Consent

The consent of both the student and their parent/carer will be sought initially. Information packs will be given and parents/carers will have an opportunity raise any issues of concern. In the past, it has been useful for me to present my ideas to the students collectively so that they might have an opportunity to ask questions as a member of a group. If the parents give their written consent for their child to participate, they are requested to complete a brief form which outlines basic demographic information. This is optional.

What the students will be asked to do

The students will be asked to complete 3 questionnaires; one based on their behaviour in social situations, one on their feelings of shame and one their thinking styles around anger. This process should take no more than 40 minutes. From experience this is most efficiently done in class as a group as it also ensures that they support is available if necessary.

Participants will also be asked individually to complete a brief test with myself to further assess their cognitive ability. This would be administered individually and normally takes about 20 minutes.

The students who participate will be entered into a raffle where they have good chance of winning a £5 voucher. At the end of the process, a raffle will be drawn from which £5 vouchers can be won by the students.

To maintain confidentiality and privacy at all times the information collected will be made anonymous. We do not anticipate that any of the adolescents would experience any distress from participating in the above study. However, if an individual is identified to be distressed as a result, they would be provided with appropriate support through consultation with appropriate school personnel and the clinical supervisor of the study (Consultant Clinical Child Psychologist).

What the teachers would be asked to do

It would be helpful for the study for teachers to rate the students' behaviour in school so that we can compare it to the students' perceptions of themselves. The teachers would be asked to rate the students on 20 aggression-related behaviours. As you will be fully aware, adolescents' views of themselves are not always the same as others' views. This discrepancy is important to the study in understanding the teenagers' self-perceptions.

Feedback

Once the results from the questionnaires and test have been interpreted you would receive a written report outlining the results of the study and some recommendations in how to address bullying and aggressive behaviour. I think it would also be important to present the findings to the students to show them what they helped to discover and to find their opinions on the findings. To note, all feedback to the school will be made wholly anonymous

I have included copies of the information packs for the parents, the students and the teachers. If you may be interested in your school being a part of this important study please do not hesitate to contact me.

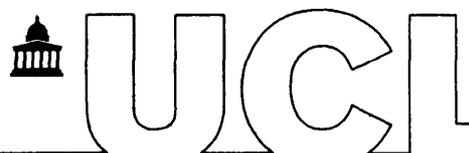
Yours sincerely,

Joanna Gibbons BSc, MSc.

Contact details:
(Telephone and email details omitted).
Sub-Department of Clinical Health Psychology
University College London
Gower Street
London WC1E 6BT

APPENDIX B

Information for young person.



University College London

A study of how you often feel, think and behave.

YOUNG PERSON INFO

Introduction

We are asking you to help us with a study that focuses on how teenagers, like you and your friends, often feel and think and how that can help shape how you behave. In particular we will be focusing on why some young people can become angry in situations with their parents, friends and other people.

What this information sheet tells you

This information sheet tells you about the study which is looking at how some teenagers become more angry than others in situations with their parents, friends and/or other people.

The information sheet explains why we would like your help to find out how angry behaviour develops in teenagers and what feelings and thinking may add to this. Most importantly, it will tell you what you will have to do if you decide to take part

I will be free to answer any questions you have about the project. You can leave a message with the college reception (details at the end) or ask me when I see you in class and I will do my best to answer your queries.

What happens if you agree to take part?

If you agree to take part you and your parent/carer will be asked to sign consent forms to say that you want to take part and that you fully understand what you will be asked to do.

Later on, you will be asked to fill in 3 questionnaires- this will only take about 40 minutes. They ask you how you sometimes feel, how you think after feeling angry and what you do in situations involving other people when you feel angry.

You will also be asked to do a short activity which is like a puzzle. You will do this alone with me. This will only take you 20 minutes.

If you have any difficulties reading or understanding any of the questions, I will be able to help you.

The information you give in the questionnaires and the activity is confidential which means that it is private. It is also made anonymous which means that your name is not used and that no one will know that you have taken part. The information gained will not be seen by anyone apart from me and the project manager.

We would like to reward you for helping us. If you choose to take part you will be entered into a raffle where you could win one of many £5 vouchers!

As part of the study we are also asking the teachers for some information about general behaviour. If it is ok with you, your teacher will be asked to answer 20 quick questions about your general behaviour in school. This information would not be seen by anybody else in the school, or passed on in any way.

Rules we must follow

There are a few things for you to know before you decide whether or not to take part in this study. When colleges like ours do projects, there are some important rules we have to follow to make sure that people who help us are treated well and not upset in any way. Here are those rules:

(1) Consent

First, you should know that you do not have to agree to take part if you do not want to. In other words, this is voluntary. If you decide you would like to take part in the study you have to sign a form to say you would like to take part. Also, your parent has to agree for you to take part too.

Also, if you DO agree to take part, you can change your mind at any point.

(2) Confidentiality (Being private)

Second, you should know that all the information we receive is confidential- which means very private. Records are stored in a secure area and will not be shared with anyone outside the project. Information you share will not be told to anyone outside the project, except in two circumstances:

We would have to inform the school if we were told that someone was planning to seriously harm another person.

We would also have to inform the school if we were to learn that a person was currently at risk of harm to themselves.

(3) Writing up the results!

The third thing you should know is that I have to write a report about the results of the project. No one's names will be in the report, and no one will have any way to identify you. In other words, the information about you will be anonymous because we talk about groups not individuals. We do this mainly by using percentages. For example, we might say that 90% of the people in the study held a certain opinion.

When I have added up all the results, I will also come back to see you all and explain what I found... again, no names will be used.

If you would like to talk to me after doing the forms and activity I will be free to give you guidance and support.

Summary

Importantly, what we learn in this study may be used to help young people who often feel angry or aggressive. The study may also help your school and other schools think about better ways to stop bullying.

Your questions and concerns

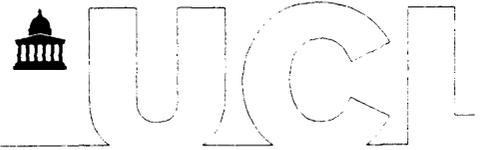
My name is Joanna Gibbons, I am a Trainee Clinical Psychologist and I am the main researcher for this project. I will be available if you have any questions or concerns. You can contact me at:

**Sub-Department of Clinical Health Psychology
University College London,
Gower Street,
London
WC1E 6BT**

Tel:

APPENDIX C

Information for Parents and Carers



UNIVERSITY COLLEGE LONDON

A study of adolescent emotion, thought and behaviour.

INFORMATION FOR PARENT OR CARER

Introduction

We are asking you to help us with a study that focuses upon how teenagers' feelings and thinking patterns can influence their behaviour. In particular we will be focusing on how young people can become angry in situations involving parents, friends and other people.

What this information sheet tells you

This information sheet tells you about a study which is looking at how some teenagers can become angrier than others in social situations.

The information sheet explains why we would like your help to find out how aggressive behaviour develops in teenagers and what emotions and thinking styles may contribute to this. It also tells you what will happen if you agree for your child to take part in our study.

There is some important information to help you make up your mind whether you would like your child to take part in the study. The researcher will answer any questions you have. You can leave a message with the college reception

(details at the end) and the researcher will return your call and answer any questions you have.

What happens if you agree to take part?

If you agree to take part, you and your child will be asked to sign consent forms to allow your child to participate in the study. You will also be asked to volunteer information about you and your family, for example how many people live in your house, what you do for a living and your ethnic background. All the information you share with me will be recorded in such a way that it will not be possible to identify you or your family. However, you do not have to disclose this information if you do not want to.

Your teenager will be then invited to complete 3 questionnaires that will take approximately 40 minutes to fill out. They cover how your child often feels, how they think after feeling angry and how they behave in difficult social situations. There is also a short activity for the young person, like a puzzle, which they will then complete with the researcher which will take approximately 20 minutes. This looks at your child's style of thinking.

If you or your child have any difficulties reading or understanding any of the questions, we will be pleased to help you. The information you and your child give in the questionnaires and the activity is confidential which means that it is private. Again, it is also made anonymous which means that no names are used and that you and your child's input will not be identifiable. The information gained will not be seen by anyone apart from the researcher and project manager.

We would like to show your child our appreciation for agreeing to participate in the study by entering your child into a raffle where they have good chance of winning a £5 voucher.

As part of the study we would also like your permission and your child's permission to approach the young person's school for information. This will involve your child's teacher completing a short questionnaire (20 questions) describing how your child behaves in social situations whilst in school. Again, all the information given will be confidential and anonymous. You are free to see the questionnaire if you so wish.

Rules we must follow

There are a few things for you to know before you decide whether or not to take part in this study. When organisations like ours do studies, there are some important rules we have to follow to make sure that people who help us are treated well and not harmed in any way. Here are those rules.

1. Consent

First, you should know that you do not have to agree to take part if you do not want to. In other words, this is voluntary. If you decide you would like to take part in the study both you and your child have to agree. If you and your child DO agree to take part, you can change your mind and withdraw your consent at any time and there will be no consequences to this decision.

2. Confidentiality

Second, you should know that all the information we receive is confidential. Records are stored in a secure area and will not be shared with anyone outside the study. Information shared by your child and his teacher will not be told to anyone outside the study, except in two circumstances:

- We would have to inform the school if we were told that someone was sincerely planning to seriously harm another person.
- We would also have to inform the school if we were to learn that a person under the age of 16 was currently at risk of harm to themselves.

3. Reporting the findings of the study

The third thing you should know is that a report will be written about the results of the study. In that report, the results will be presented in such a way that no one can identify the young person or you or know that you took part. In other words, we can guarantee that information about you will be anonymous because we talk about groups not individuals. We do this mainly by using percentages. For example, we might say that 90% of the people in the study held a certain opinion.

Conclusion

Finally there are no physical or psychological risks associated with taking part in the study. However, if your child would like to talk through the process of completing the questionnaires and doing the activity, the researcher will be free to give guidance and support. Importantly, what we learn in this study may be used to help other young people who often feel angry or aggressive. The study may also help schools think about more effective ways to manage bullying.

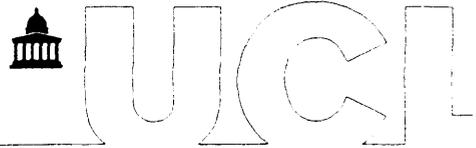
Your questions and concerns

My name is Joanna Gibbons and I am a Trainee Clinical Psychologist. I am the main researcher for this project and will be available if you have any questions or concerns. You can contact me at:

Sub-Department of Clinical Health Psychology
University College London,
Gower Street,
London
WC1E 6BT

APPENDIX D

Young Person Consent Form



UNIVERSITY COLLEGE LONDON

A study of adolescent emotion, thought and behaviour.

CONSENT FORM – Young Person

PROJECT MANAGER: Dr. Stephen Butler (Consultant Child and Adolescent Clinical Psychologist)

MAIN RESEARCHER: Joanna Gibbons (Trainee Clinical Psychologist)

Please complete the following:

Circle as necessary

1. I have read the information that describes this study. Yes/No
2. I have had an opportunity to ask questions and discuss this study. Yes/No
3. I have received satisfactory answers to all my questions. Yes/No
4. I have received sufficient information about this study. Yes/No
5. I understand that I do not have to take part in this study. Yes/No
6. Do you agree to take part in this study? Yes/No
7. I understand that I can choose not to participate in this study at any time. Yes/No

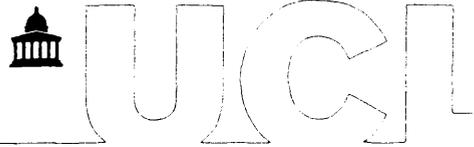
Signed: Date:
.....

Name in Block Letters:

Signature Project Manager/Researcher:.....

APPENDIX E

Parent/ Carer Consent Form



UNIVERSITY COLLEGE LONDON

A study of adolescent emotion, thought and behaviour.

CONSENT FORM – PARENT OR CARER

PROJECT MANAGER: Dr. Stephen Butler (Consultant Child and Adolescent Clinical Psychologist)

MAIN RESEARCHER: Joanna Gibbons (Trainee Clinical Psychologist)

Please complete the following:

necessary

Circle as

- | | | |
|----|---|--------|
| 1. | I have read the information that describes this study.
Yes/No | |
| 2. | I have had an opportunity to ask questions and discuss this study. | Yes/No |
| 3. | I have received satisfactory answers to all my questions. | Yes/No |
| 4. | I have received sufficient information about this study. | Yes/No |
| 5. | I understand that my child does not have to take part in this study. | Yes/No |
| 6. | I agree that my child can take part in this study? | Yes/No |
| 7. | I understand that my child can choose not to participate at any time. | Yes/No |

Signed: Date:

Name in Block Letters:

Child's

Name.....

Signature of Project Manager/Researcher:.....

APPENDIX F

Demographic Information Sheet



FAMILY, EDUCATION, OCCUPATION & ETHNICITY

We would be grateful if you would answer the following questions about your family, education, occupation and ethnic background. For questions where you have to think about a child, we would like you to think about your child who will be taking part in this study.

Your answers are completely confidential and will not be shared with anyone.

Your name

Date of Birth

Your child's name

Date of Birth

Today's date

1. Please indicate who lives in your household:

Number of adults (please state their relationship to you. E.g. partner, husband, mother-in-law).....
.....
.....

Number of children (please state their relationship to you. E.g. son, niece)
.....
.....

2. Please indicate your marital status (Please circle the one that applies to you).

Single Married Separated Divorced Remarried Widowed

3. What is your ethnic group? (Please choose one from a to f and then tick the appropriate box).

- a. **White** - British
 Irish
 Other White background (please describe).....

- b. **Black or Black British** - Caribbean
 Africa
 Other Black background (please describe).....

- c. **Asian or Asian British** - Indian
 Pakistani
 Bangladeshi
 Other Asian background (please describe).....

- d. **Chinese** - Chinese

- e. **Mixed** - (please describe)

- f. **Other** - (please describe).....

4. Which of these qualifications do you have (please tick all the boxes that apply to you – if not specified, give the nearest equivalent).

- 1 + O levels/CSEs/GCSEs (any grades) NVQ Level 1, Foundation GNVQ
- 5 + O levels/ 5= CSEs (grade1) NVQ Level 2, Intermediate GNVQ
- 5 + GCSEs (grades A-C), School certificate NVQ Level 3, Advanced GNVQ
- 1 + A levels, 1 AS Levels NVQ Level 4-5, HNC, HND
- 2 + A level, 4 + AS Levels, Higher School Other Qualifications (e.g. City
 and Guilds, Certificate RSA/OCR,
 EC/Edexcel
- First Degree (e.g. BA, BSc) No Qualifications? In which year
 did you
- Higher Degree (e.g. MA, PhD, PGCE, leave secondary
 education?.....
- Post graduate certificate/diploma)

5a. Please tick the box that most clearly describes your occupation?

- Professional post (e.g. teacher, doctor, accountant, solicitor)
- White collar worker (e.g. police constable, bank clerk, admin, computer programmer)

- Skilled manual worker (e.g. plumber, electrician, HGV/train driver)
- Manual worker (e.g. porter, van driver, packer)
- Homemaker
- Without income - Unemployed – how long have you been unemployed?

.....

- State Benefits- For how long?

.....

- Other (please describe).....

5b. If employed, please write full title of job.....

.....

...

5c. How many hours do you usually work in a week?

6. If you have a partner who lives with you which of these qualifications do they have? (please tick all the boxes that apply – if not specified, give the nearest equivalent).

- 1 + O levels/CSEs/GCSEs (any grades) NVQ Level 1, Foundation GNVQ
- 5 + O levels/ 5= CSEs (grade1) NVQ Level 2, Intermediate GNVQ
- 5 + GCSEs (grades A-C), School certificate NVQ Level 3, Advanced GNVQ
- 1 + A levels, 1 AS Levels NVQ Level 4-5, HNC, HND
- 2 + A level, 4 + AS Levels, Higher School Other Qualifications (e.g. City
and Guilds, Certificate RSA/OCR,
EC/Edexcel
- First Degree (e.g. BA, BSc) No Qualifications? In which year
did you
- Higher Degree (e.g. MA, PhD, PGCE, leave secondary
education?.....
- Post graduate certificate/diploma)

7a. Please tick the box that most closely describes their occupation.

- Professional post (e.g. teacher, doctor, accountant, solicitor)
- White collar worker (e.g. police constable, bank clerk, admin, computer programmer)
- Skilled manual worker (e.g. plumber, electrician, HGV/train driver)
- Manual worker (e.g. porter, van driver, packer)
- Homemaker
- Without income Unemployed – how long have you been unemployed?

.....

State Benefits- For how long?

.....

Other (please

describe).....

7b. If they are employed, please write full title of job.....

.....

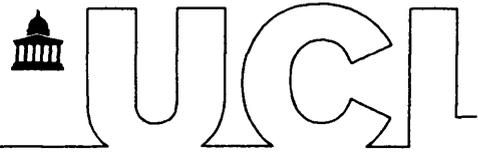
7c. How many hours do they usually work in a week?

That is the end. Please place this form together with the signed yellow informed consent form in the envelope provided. Please give to your child to return to school.

thank you for you time.

APPENDIX G

Information Sheet for Teachers.



University College London

A study of adolescent emotion, thought and behaviour.

INFORMATION FOR TEACHERS

Introduction

We are asking you to help with a study that focuses upon how teenagers' feelings and thinking patterns can influence their behaviour. In particular we will be focusing on how young people can become angry in different situations involving parents and other teenagers.

What this information sheet tells you

This information sheet tells you about a study which is looking at how some teenagers become more aggressive than others in social situations.

The information sheet explains why we would like your students' help to find out how aggressive behaviour develops in teenagers and what emotions and thinking styles may contribute to this. It also informs you what you would need to do.

The students will be invited to complete 3 questionnaires that will take approximately 40 minutes to fill out. They cover how they often feel, how they think after feeling angry and how they behave in difficult social situations. There is also a short activity for the student, like a puzzle, which they will complete with myself which will take approximately 20 minutes. This looks at their style of thinking.

What is your role in the study?

It would be helpful for the study for you as the students' teacher to rate the students' behaviour in school so we can compare it to the student's perceptions of themselves. As you will be fully aware, adolescents' views of themselves are not always the same as others' views. This discrepancy is important to the study in understanding the teenager's self-perception. You would be asked to rate the students on 20 aggression-related behaviours. Each questionnaire should take no more than a couple of minutes to complete and was selected because of this as we appreciate how busy you are.

The information you give in the questionnaires is confidential and wholly anonymous. The information gained will not be seen by anyone apart from the researcher and project manager.

The students will be entered into a raffle where they have good chance of winning a £5 voucher.

Rules we must follow

For your information: When organisations like ours do studies, there are some important rules we have to follow to make sure that people who help us are treated well and not harmed in any way. Here are those rules.

(1) Consent

First, you should know that the students do not have to agree to take part if they do not want to. In other words, this is voluntary. If they decide to take part in the study their parents and the student need to give written and informed consent which they can withdraw at any time.

(2) Confidentiality

Second, you should know that all the information we receive is confidential. Records are stored in a secure area and will not be shared with anyone outside the study. Information collected will not be told to anyone outside the study, except in two circumstances:

- We would have to inform the school if we were told that someone was sincerely planning to seriously harm another person.
- We would also have to inform the school if we were to learn that a person under the age of 16 was currently at risk of harm to themselves.

(3) Reporting the findings of the study

The third thing you should know is that a report will be written about the results of the study. In that report, the results will be presented in such a way that no one can identify the young person or you or know that you took part. In other words, we can guarantee that information about the students will be anonymous because we talk about groups not individuals. We do this mainly by using percentages. For example, we might say that 90% of the people in the study held a certain opinion.

Conclusion

Finally there are no physical or psychological risks associated with taking part in the study. However, if the student would like to talk through the process of completing the questionnaires and doing the activity, the researcher will be free to give guidance and support. Importantly, what we learn in this study may be

used to help other young people who often feel angry or aggressive. The study may also help schools think about more effective ways to manage bullying.

Your questions and concerns

Joanna Gibbons, main researcher for this project, will be available if you have any questions or concerns. You can contact her at:

Sub-Department of Clinical Health Psychology
University College London,
Gower Street,
London
WC1E 6BT