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Aggression and Social Information Processing in Typical Children and Children with Developmental Delays

by

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Abstract

The purpose of this study was to examine whether aggressive children with developmental delays show biases in their social information processing (i.e. interpretation and response decision). More specifically, social information processing was examined in relation to developmental status (typical children versus children with developmental delays) and aggressive status (aggressive versus nonaggressive children).

This study included 78 boys and girls in Grades 4 through 6 attending public schools in the Calgary area. Of these children, 52 were typical children attending regular classrooms and 26 were developmentally delayed children attending special education classrooms. The participants ranged in age from 9.0 to 12.9 years old.

Teachers completed rating scales assessing reactive and proactive aggression in their students. The results were used to classify children as aggressive or nonaggressive. Children participated in individual interviews depicting hypothetical scenarios which assessed their social information processing.

The research questions were assessed with quantitative analyses. One of the most significant findings of this study was that aggressive children did not demonstrate biases in their social information processing in comparison to nonaggressive children. Children with developmental delays gave more aggressive responses than typical children, but were no more likely than typical children to attribute a hostile intent to a peer. Hostile attributions of intent were not associated with more aggressive response decisions for typical children or developmentally delayed children. The findings from the current study are inconsistent with

much research demonstrating that aggressive children show biases in their social information processing. However, the results are consistent with research showing that children with developmental delays process social information somewhat differently than typical children. The current study also supports the notion that how developmentally delayed children respond in some social situations may be independent of how they interpret a peer's intention.

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CHAPTER I: INTRODUCTION

Aggressive and disruptive behaviour are the most common referrals for mental health services among youth (Achenbach & Howell, 1993). Aggression in children and adolescents is associated with peer rejection (Coie, Dodge, & Kupersmidt, 1990) and long-term negative outcomes (Kupersmidt & Coie, 1990; Kupersmidt & Patterson, 1991). Hence, strategies to reduce aggression in children would be beneficial in order to improve aggressive children's quality of life. Understanding of the mechanisms underlying aggression could help in the design of useful strategies to reduce aggression.

Much research (Crick & Dodge, 1994) has examined the role of social problem solving in aggression. Dodge (1986) proposed that children progress through certain social cognitive processes before responding to social situations. These processes include encoding, interpretation, clarification of goals, response access, response decision, and behavioural enactment (Crick & Dodge, 1994; Dodge, 1986). Many studies (Dodge, 1986; Dodge & Price, 1994; Dodge, Price, Bachorowski, & Newman, 1990) have found that aggressive children have biases in these processes. For example, aggressive children often display hostile attribution biases (Crick & Dodge 1996). That is, they tend to attribute negative intentions to others behaviour. Dodge & Coie (1987) differentiated reactive and proactive types of aggression, and each of these two types of aggression appear to be related to biases in social information processing (SIP) (Crick & Dodge, 1996; Dodge & Coie, 1987).

Children with developmental delays often have aggressive behaviour problems (Benson & Reiss, 1984; Reiss, 1990). However, little research has examined the underlying factors of aggression, such as SIP, in children with developmental delays. This kind of information might

provide a better foundation for the design of treatment strategies. More research is needed in order to better establish and validate the nature and scope of SIP in children with developmental delays (Benson, 1994).

The current study investigated SIP in relation to aggression and developmental status in order to determine if aggressive children with developmental delays show biases in their social information processing. In the next chapter, the relevant literature regarding these issues is reviewed.

CHAPTER II: REVIEW OF THE RELEVANT LITERATURE

Introduction

Increasing numbers of youth are involved in aggressive acts such as assault and murder (Richters, 1993), and many aggressive children will have adjustment problems when they reach adolescence (Coie, Lochman, Terry, & Hyman, 1992) and adulthood (Farrington, 1992). Aggression appears to be especially salient in some groups of children, such as those with developmental delays (Cullinan, Epstein, Matson, & Rosemier, 1984; Reiss, 1990). Although much research has examined aggression in typical children, must less is known about aggression in particular groups such as children with developmental delays. It is important to understand aggression in these children so that the most appropriate and beneficial treatment strategies for reducing aggression can be developed. Hence, the purpose of this study is to determine the underlying social cognitive factors of aggression in children with developmental delays.

This literature review will provide the foundations of aggression and social information processing. This review will begin with a conceptual overview of aggression, and discuss issues relative to the definition, nature, and identification of aggression as well as the subtypes, prevalence, and associated disorders of aggression. Following this discussion, several major theories will be presented, including biological perspectives, psychoanalytic theory, the frustration-aggression model, and social learning theory, in order to explicate the foundations and explanations for aggressive behaviour. Within this section, the social information processing theory will be reviewed, followed by a review of the empirical evidence regarding social information processing in children. In addition, methodological issues regarding this research will be examined. This will be followed by a review of current issues including the role of family

patterns and media violence in aggressive behaviour, and peer rejection of children who are aggressive. Lastly, the focus of this study will be outlined and compared to other studies.

Overview of Aggression

Definition of Aggression

Several researchers have attempted to conceptualize aggression (for example, Bandura, 1973; Berkowitz, 1969; Dollard, Doob, Miller, Mowrer, & Sears, 1939; Freud, 1923). Below are examples of some definitions used by researchers in past 60 years:

- "behavior that results in personal injury and in destruction of property" (Bandura, 1973, p. 5)
- "a response that delivers noxious stimuli to another organism" (Buss, 1961, p. 1)
- "any sequence of behavior, the goal-response to which is the injury of the person toward whom it is directed" (Dollard, Doob, Miller, Mowrer, & Sears, 1939, p. 11)

Although the definition of aggression varies somewhat among researchers, the following definition of aggression appears to be generally accepted: "any form of behavior directed toward the goal of harming or injuring another living being..." (Baron & Richardson, 1994, p. 7). This definition has several important features: (a) aggression is depicted as a behaviour, (b) aggression is thought to be intentional, (c) the goal of the aggressor is to injure or cause harm to another living being, and (d) physical harm is not required to be considered an act of aggression. This definition appears to be sufficiently robust because it incorporates the main characteristics of other definitions of aggression which have been posited by researchers. For example, nearly all definitions of aggression found in the literature depict aggression as a type of behaviour, act, or response (ex. Dollard et al., 1939; Bandura, 1973; Buss, 1961). Concomitantly, the role of intentionality has been given increased focus by researchers (ex. Weiner, 1995). As noted by

Weiner (1995), intentionality of the act is an important factor when individuals make judgements of other's responsibility. Another characteristic seen in many definitions of aggression is with respect to injury or harm (for example, behaviour that may result in personal injury [Bandura, 1973; Dollard et al., 1939] or destruction of property [Bandura, 1973]). Lastly, some definitions (Buss, 1961; Crick, Casas, & Mosher, 1997) of aggression posit that aggression can be indirect with the use of third parties (ex. spreading rumors).

Nature of Aggression

Aggression may range from minor behaviours such as pinching, to more severe behaviours such as murder. Problematic behaviour is relative to its intensity, frequency, and situational context. There are a number of situational characteristics which can predict the likelihood of humans aggressing. In a study by Törestad (1990), children and adolescents were asked to described situations which made them angry. A factor analysis of 60 of these situations extracted ten kinds of situations which made these youth angry: (1) self-opinionated people, (2) blaming and bullying, (3) insulting and depreciating, (4) foolish and thoughtless behavior, (5) teasing, (6) frustration, (7) nagging or quarreling, (8) physical harassment and assault, (9) general or environmental frustration, and (10) people's belongings (however, it should be noted that this study examined feelings of anger and not aggression per se). Unfortunately, Törestad (1990) did not examine how angry each of these types of situations made the children and adolescents. Therefore, it is unknown whether some of these situations are more aggression provoking than others.

Generally, children are more likely to aggress against a peer than an authority figure (Karniol & Heiman, 1986; Underwood, Coie, & Herbsman, 1992). For instance, in a study by

Karniol and Heiman (1986), sixth graders were asked how they would respond in several hypothetical provoking situations involving peers or authority figures. Children's responses indicated that they were more likely to use aggressive responses, such as physical aggression, retaliation (i.e. "getting back"), or yelling, with peers rather than authority figures. With adults, children reported they would more often respond by being internally bitter/angry, verbally persuading the provoker (ie. explaining), and complying.

Typically, aggression has been found to be quite stable throughout development (Olweus, 1979). That is, aggression in childhood is positively correlated with aggression during adulthood (r = .63, Olweus, 1979). However, there are some differences in the level and pattern of aggression across development. During toddlerhood, children more often engage in instrumental types of aggression (ex. disputes over objects) than interpersonal aggression (Loeber & Hay, 1997). During the early school years, children engage in physical or indirect forms of aggression. (Loeber & Hay, 1997). Some researchers have noted that aggression changes notably during adolescence. During this developmental period, research has shown that aggression develops curvilinearily. That is, it appears the rate of aggression increases around mid-adolescence, and then reduces again around late adolescence (Lindeman, Harakka, & Keltikangas-Järvinen, 1997). Loeber and Hay (1997) posit that some reasons aggression may increase during this time period include increased physical strength, the use of weapons, more collective forms of violence (ex. ganging up on a child), and more organized gangs. Also, younger children may have not yet developed certain aggressive strategies (Björkqvist et al., 1997). Although aggression generally increases during adolescence, this does not mean that all adolescents are aggressive. In fact, it has been reported that about 18% of adolescent boys are physically aggressive (Loeber & Smith,

1996), which indicates that most boys in this age group are not. Moreover, during later adolescence, physical aggression tends to decrease (Loeber & Hay, 1997).

Identification of Aggression

Practitioners, such as clinical and school psychologists, often use behaviour rating scales such the Child Behavior Check List (CBCL, Achenbach & Edelbrock, 1986) or the Conner's Rating Scale (CRS, Conners, 1985) in order to assess behavioural problems such as aggression. These types of rating scales generally include parent and teacher versions, and sometimes a self-report form. The CBCL (Achenbach & Edelbrock, 1986) includes a series of statements to which the parent or teacher rate the item on a three point scale regarding how true the statement is for the child. There are several behavioural scales on the CBCL, including one scale assessing aggression. Scores are compared to standardized norms in order to ascertain whether the given child displays signficantly more aggression than their peers. However, some teacher ratings scales have been found to be poor predictors of the severity of physical aggression (Kruesi et al., 1994). Hence, Kruesi et al. (1994) suggest that the measurement of physical aggression should include information across multiple sources.

Clinicians may also identify aggression through observational and interview methods. Observational methods may include classroom or home observation by the practitioner. Observation may be formal (ex. interval recording, event recording) or less formal (ex. narrative recording) (Sattler, 1992). Sometimes clinicians may have parents and teachers conduct observations as well. For example, the CBCL also includes a Direct Observation Form, which teachers use to record 10 minute samples of behaviour. Interview methods for assessing aggressive behaviour may be conducted with the parent, teacher, and/or the child.

The approaches researchers use to investigate the nature and scope of aggression have been much more varied than those of clinicians because researchers tend to use more specific and operationalized definitions of aggression (ex. Bushman, 1995; Coie, Lochman, Terry, & Hyman, 1992; Dodge & Coie, 1987). There are many aggression scales which have been used in research (ex. Dodge & Coie, 1987) to assess salient features of aggression. Researchers examining the prevalence of aggression in youth have used self-report research questionnaires (ex. Bentley & Li, 1995; Krahé, 1998), data from national surveys (ex. Kingery, Coggeshall, & Alford, 1998), and crime rate statistics (ex. Richters, 1993). Self-report questionnaires used to study the prevalence of aggression often include items regarding the experience of victimization, as well the experience of executing aggressive acts such as bullying (Olweus, 1989). Although each of these methods for examining prevalence are useful, the variability in procedures and instruments makes cross-study comparison difficult.

Researchers examining other aspects of aggression (ex. correlates, predictors, long-term outcomes) have used even more techniques for identifying aggression, including teacher ratings (ex. Dodge & Coie, 1987), and peer nomination techniques (ex. Björkqvist, Lagerspetz, & Österman, 1992; Crick & Grotpeter, 1995). Researchers using rating scales to identify aggression sometimes use clinical ones such as the CBCL (ex. Henington, Hughes, Cavell, & Thompson, 1998), but more often use scales they designed themselves (ex. Björkqvist et al., 1992; Crick, Casas, & Mosher, 1997; Dodge & Coie, 1987). This is generally due to the generic nature of clinical scales, and the tendency for researchers to examine more particular forms and aspects of aggression. Researchers tend to use self-report methods less often due to their questionable reliability and validility (Huesmann, Eron, Lefkowitz, & Walder, 1984).

Subtypes and Patterns of Aggression

Aggression has historically been divided into distinguishable subtypes or patterns of behaviour. At the most basic level, aggression may be verbal or physical (Buss, 1961). Verbal aggression includes behaviours such as name calling or threatening. Physical aggression includes behaviours such as punching and slapping.

Another classification is instrumental versus hostile aggression (Feschbach, 1970). Instrumental aggression is a goal-directed behaviour, which may include using aggression to obtain objects. Hostile aggression is more interpersonal, and may involve the infliction of pain to another. As these labels suggest, hostile aggression appears to be emotionally driven, whereas instrumental aggression appears to be object driven.

Aggression may also be direct or indirect (Buss, 1961). In direct acts of aggression (ex. name calling, hitting) the victim can identify (i.e. witness) the perpetrator's act, whereas in indirect acts of aggression (ex. spreading rumors) the perpetrator is less identifiable by the victim (Bushman & Anderson, 1998). Direct aggression is characterized by verbal and physical acts directed towards the victim. Indirect aggression is characterized by using third parties to retaliate. That is, perpetrators manipulate the social or peer network in order to harm or injure the victim. Relational aggression is also a term used to describe a form indirect aggression (Crick et at., 1997; Crick & Grotpeter, 1995). Relational aggression "harms others through damage to their peer relationships (e.g. using social exclusion or rumor spreading as a form of retaliation)", (p. 579, Crick et al., 1997). However, researchers examining indirect (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Lagerspetz, Björkqvist, & Peltonen, 1988) and relational (Crick et al., 1997; Crick & Grotpeter, 1995; Crick & Werner, 1998) aggression have not made clear the relationship

between the two, if any. For example, Björkqvist et al. (1992) provide examples of indirect aggression that include "backbiting and manipulation of the social structure of the class" (p. 118), which are quite congruent with Crick and collegue's conceptualization of relational aggression that includes acts such as social exclusion or rumor spreading (Crick et al., 1997). Therefore, it appears that indirect and relational aggression are quite similar.

Dodge and his colleagues have distinguished two subtypes of aggressive behaviour in children called reactive and proactive aggression. Reactive aggression is defined as "an angry, defensive response to frustration or provocation" (p. 67, Crick & Dodge, 1996). Proactive aggression "is a deliberate behaviour that is controlled by external reinforcement" (p. 67). In comparison to reactive aggression, proactive aggression does not occur necessarily in reaction to any external stimulus and is driven by an external goal or outcome. Dodge and his colleagues have demonstrated (Crick & Dodge, 1996; Dodge & Coie, 1987; Dodge, Lochman, Harnish, Bates, & Pettit, 1997) that reactive and proactive aggressive are distinct subtypes of aggression. For example, reactive aggressive children demonstrate more hostile intent attributions (Crick & Dodge, 1996) whereas proactive aggressive children evaluate aggressive behaviour more positively (Dodge et al., 1997).

Prevalence of Aggression

There is no precise estimate on the general prevalence of aggression in children and adolescents. The prevalence of aggression is dependent on many factors including what type of aggression is being examined, how aggression is being identified (ex. self-report, police records), and what population is being studied.

Increasing numbers of aggressive youth are involved in aggressive acts such as assault

and murder (Richters, 1993). Homicide rates for adolescent and young adult black males in the United States is 85/100, 000, which is the highest rate among industrialized nations (Richters, 1993). In Canada, the rate for all males within this same age range is 2.9/100,000 (Richters, 1993).

Other forms of aggression occur in high frequency among youth. Bently and Li (1995) examined the rates of bullying and victimization in public school children living in Calgary, Canada. Using self-report measures, these authors found that about 21% of 8 to 12 year old students had been bullied "sometimes" or more during that school term. About 8% were bullied several times a week. The bullying often included being called names, being physically hurt, having rumors spread, and being threatened. Hence, bullying included both direct and indirect forms of aggressive behaviour.

Other school related violence has been studied through national surveys (Kingery, Coggeshall, & Alford, 1998). Kingery et al. (1998) examined the results of several violence surveys of youth in the United States in grades 7 through 12. Between 1.6% and 7% of the students (depending on grade and sex) reported being physically attacked at school in the last six months. Between 9% and 12% of boys in Grades 9 through 12 were threatened or injured with a weapon at school in the past year. Furthermore, 4.4% to 11.8% of students in the surveys reported that they fear being harmed at school.

The prevalence of aggression within intimate relationships among youth is also high. In a German sample, about 11% of women (with an average age of 17) indicated that someone had attempted intercourse with them through the use of force (Krahé, 1998). In a Canadian sample,

about 46% of undergraduate students reported experiencing some form of physical violence in their most recent dating relationship (Pederson & Thomas, 1992). Interestingly, more men (46%) than women (25%) in this sample reported having been the target a partner's physical aggression. More women (40.5%) than men (22%) reported using physical aggression against a dating partner. Furthermore, women who reported experiencing dating violence used both minor (ex. pushing, slapping) and severe (ex. biting, hitting with a fist) tactics. These studies show that aggression is not only prevalent in school-age children, but also in older adolescents and young adults.

Associated Disorders

Common disruptive behaviour disorders include Conduct Disorder (CD), Oppositional Defiant Disorder (ODD), and Attention Deficit Hyperactivity Disorder (ADHD). CD occurs in approximately 5.5% of children and adolescents (Offord, Alder, & Boyle, 1986) and is characterized by a "repetitive and persistent pattern of behavior in which the basic rights of others or age-appropriate societal norms or rules are violated" (APA, 1994, p. 90). Aggressive behaviours comprise seven of the fifteen behavioural criteria used for diagnosis of CD (DSM-IV, APA, 1994). For example "often bullies, threatens, or intimidates others". The aggressive criteria include a mixture of overt and covert acts. In the DSM-III (APA, 1980), there were four subcategories listed for CD, corresponding to the presence of aggression (aggressive versus nonaggressive dimension) and type of antisocial behavior (socialized versus undersocialized). In DSM-III-R (APA, 1987), the subtyping system was changed to three categories including a) socialized type, b) solitary aggressive type, and c) and undifferentiated type. However, the

subtypes of CD in DSM-IV (APA, 1994) relate to the age of onset and severity.

ODD is a less severe behavioural disorder but is also associated with aggression. ODD is characterized by "a pattern of negativistic, hostile, and defiant behavior" (p. 93, APA, 1994). Several of the eight behavioural criteria listed in the DSM-IV reflect aggression. For example, "often loses temper" and "is often angry or resentful". However, it is not necessary for aggression to be present in order to meet these diagnostic criteria. Of note, research has shown that early aggression, particulary proactive aggression, is predictive of ODD and CD in mid-adolescence (Vitaro, Gendrau, Tremblay, & Oligny, 1998).

ADHD is a behaviour disorder characterized by inattention, hyperactivity, and impulsivity (APA, 1994). Children with ADHD may have difficulty sustaining attention for long periods of time, fidget or talk excessively, or have difficulty awaiting turns (APA, 1994). Some researchers (Barkley, 1997) have contended that behavioural disinhibition is a core feature of ADHD. Those diagnosed with ADHD are classified as either "Predominantly Inattentive", "Predominantly Hyperactive", or "Combined Type". Contrary to CD and ODD, the diagnostic criteria for ADHD do not include aggressive indicators. However, children with ADHD are often more aggressive than their peers (Barkley, 1990). Furthermore, many children with ADHD, approximately 30-50%, eventually meet the criteria for a diagnosis of ODD and/or CD (Barkley, 1996). It appears that children with ODD or CD, who also have comorbid ADHD, have higher levels of reactive or hostile types of aggression than those without ADHD (Atkins & Stoff, 1993) which might be due to poor impulse control. Interestingly, reactive aggressive children have also been found to be more inattentive (Dodge et al., 1997). Research has also indicated that medication such as

methylphenidate (Ritalin), used to control the primary symptoms of ADHD, also decrease aggressive behaviour in these children (Hinshaw, 1991; Murphy, Pelham, & Lang, 1992).

Gender Issues and Sex Differences

Males have historically been considered to be more aggressive than females (ex. Buss, 1961). Hence, much of the earlier research on aggression included mostly male samples (Frodi, Macaulay, & Thome, 1977). More recently, the view that males are more aggressive has been challenged (ex. Björkqvist, 1994). The main problem in most early studies of aggression was that only direct physical or verbal acts were investigated. For example, in an early review by Maccoby & Jacklin (1974), it was concluded that males were more aggressive than females based on several observational studies in school settings. However, some forms of aggression are less overt, or observable. As it turns out, girls do display similar amounts of aggression as boys, although they generally do this in a different way (i.e. relational aggression; Björkqvist, 1994).

Recently, there has been much more literature regarding gender differences in aggression. It appears that girls are more relationally/indirectly aggressive and boys are more directly aggressive (Björkqvist et al., 1992; Crick et al., 1997; Crick & Grotpeter, 1995; Lagerspetz et al., 1988). As described earlier, indirect aggression (similarly termed relational aggression) involves covert behaviors such as spreading rumors or social exclusion. Björkqvist et al. (1992) used the term social manipulation to describe this type of aggression. These studies have found that girls are more likely to do things like becoming friendly with someone else as revenge or telling lies behind someone's back, whereas boys are more likely to do things like kicking or tripping (Lagerspetz et al., 1988). Boys also evaluate direct aggression more favourably than girls (Crick & Werner, 1998). The reason that girls and boys do not equally display the same forms of

aggression is probably due to socialization factors. For example, direct aggression is more likely to result in peer rejection for girls than it is for boys (Henington et al., 1998).

Some recent studies investigating gender differences have found that boys have higher levels of both direct and indirect/relational aggression (Henington et al., 1998; Lindeman et al., 1997; Tomada & Schneider, 1997), although the gap is smaller for levels of relational aggression (Tomada & Schneider, 1997). One explanation for this is that girls' indirect/relational aggression tends to be very context-specific (Archer, Pearson, & Westeman, 1988), and therefore may not come across in some studies.

Theories of Aggression

Several theorists and researchers (ex. Bandura, 1973; Berkowitz, 1969; Dollard et al., 1939; Freud, 1923) have attempted to explain aggression. In the following sections, some of the broad theoretical perspectives of aggression will be reviewed. These include medical/biological explanations, Freudian psychoanalytic theory, the frustration-aggression hypothesis, and social learning theory. A more recent model of aggression (i.e. the social information processing theory) will be reviewed in more depth.

Biological Theories

Evidence has shown that aggression, at least in part, is associated with genetic (Carey & Goldman; 1997), neurophysiological (Krawkowski, 1997), neurochemical (Berman, Kavoussi, & Coccaro, 1997), and hormonal (Brain & Susman, 1997) factors. What is less known however is the precise mechanism by which these factors influence behaviour. Evidence linking genetic factors to aggression have typically come from twin and adoption studies (for review see Carey, 1996) and more recently from molecular genetic methods (Carey & Goldman, 1997). One major

assumption is that if aggressive behaviour is related to genetic factors, then monozygotic (identical) twins should exhibit more similar patterns of aggressive behaviour than dizygotic twins. Some evidence has suggested that monozygotic twins are more similar in their antisocial behaviour than dizygotic twins (Carey, 1992; Grove et al., 1990). Furthermore, adoption studies (Cadoret & Stewart, 1991) have posited a genetic association with antisocial behaviour. For example, Cadoret and Stewart (1991) found that having a biological parent who is delinquent or has an adult criminal conviction was predictive of a diagnosis of antisocial personality disorder in male adoptees.

Aggression has also been considered to be part of a complex interplay among environmental and neurological factors. Brain areas implicated in violence and aggression include the hypothalamus, amygdala, and frontal lobes (for a review see Krakowski, 1997). Head trauma and diffuse brain dysfunction have also been associated with aggression (Krakowski, 1997). Furthermore, different forms of aggression and violence are associated with the unique areas of dysfunction. Researchers have described two principal neural systems for aggression (Renfrew, 1997): the Onset Aggression System which produces aggressive behaviour during aversive states, and the Offset Aggression System which produces aggression following the termination of pleasurable states. The former neural system is hypothesized to function after the onset of aversive stimulation, such as pain. The latter neural system is hypothesized to function when reinforcing stimuli are blocked. This implicates two environmental factors which activate aggression - aversive or painful stimuli, and barriers to pleasurable stimuli.

Researchers have also studied the relationship between neurotransmitters and aggression (for a review see Berman et al., 1997). This has been studied by examining 1) typical

neurotransmitter function, 2) excesses and deficits of neurotransmitters, and 3) the effects of drugs on aggression. Neurotransmitters (i.e. acetylcholine, norepinephrine, serotonin, and dopamine) have been associated with aggression (Berman et al., 1997; Renfrew, 1997). For example, it appears that there is relationship between the level of serotonin activity in the brain and aggressive behaviour (Berman et al., 1997). In addition, several drugs seem to impact aggression. For example, tranquilizers, psychostimulants, and lithium have been shown to decrease aggression, whereas cocaine and anabolic steroids have been linked to increases in aggression (Renfrew, 1997).

Hormones also seem to impact aggression (for a review see Brain & Susman, 1997). Testosterone and other androgens, which have higher concentrations in males, have been associated with increased aggression in animals and humans. The female hormone progesterone, important during preganancy, has been shown to decrease aggression (Renfrew, 1997). However, the role of hormones in human behaviour is complex and dynamic. Brain and Susman (1997) point out that various hormones may act on humans prenatally, in fact organizing brain circuitry, at puberty, and in adulthood. Furthermore, hormonal levels may be consequences as well as causes of aggressive behaviour. However, as Brain and Susman (1997) note, this consideration is generally not examined in hormone-aggression research.

In summary, evidence from the biological research indicates that aggression is associated with genetic, neurological, neurochemical, and hormonal factors. However, this approach is not sufficient for a comprehensive understanding of aggression. For example, monozygotic twins do not always share comparable levels of antisocial behaviour (ex. Dalgard & Kringlen, 1976), which suggests that other factors may play an important role. Hence, other factors need to be

considered in order to more fully explain aggressive behaviour.

Psychoanalytic Theory

Psychoanalytic theory has bridged the two worlds of biology and mental functioning. According to the psychoanalytic theorizing of Freud (1914), the basic mechanisms of mental functioning are pleasure seeking and pain avoidance. Human behaviour was depicted as being driven by underlying biologically programmed instincts which were mediated by the Ego and Superego. The primary instinct which Freud originally focused on was Eros, the life instinct, whose energy was labelled as the libido.

In Freud's later work (1923), he began to focus more attention on the aggressive aspects of human behaviour. Freud posited that there were two major instincts driving human behaviour - Eros, the life instinct, and Thanatos, the death and destructive instinct. The energy of the Eros is directed toward preserving and enhancing life. The energy of the Thanatos however is directed toward the destruction of life; and ultimately "to lead organic life back into the inanimate state" (p. 40, 1923).

According to Freud (1959), changes in the proportion of one instinct over another led to noticeable behavioural results. That is, when the death instinct becomes stronger, it will result in aggressive instincts toward the self. However, Freud postulated that the self-directed destructive instinct can be diverted toward the external world, thereby displacing the instincts through changing their aim. This displacement of instinctual destructive energy to the external world would neutralize the destructive instinct toward the self. Freud claimed that this displacement is "essential for the preservation of the individual" (p. 7, 1959). Thus, outward aggression was understood as an inevitable function of human behaviour, and indeed adaptive for the individual.

In fact, to withhold aggressive instincts, thereby directing them towards oneself, "is in general unhealthy and leads to illness" (p. 7, 1959). Therefore, not only did Freud see the aggressive instinct as being inevitable, but perceived outward aggression to be the best way to maintain the integrity of the individual.

Little empirical work has substantiated the notion of the destructive instinct or its advantageous displacement to the outside world. Therefore, Freudian psychoanalytic theory relative to aggression lacks scientific support, even though several pscyhoanalytic thinkers have offered reconceptualizations of aggression since Freud's work (ex. Harris, 1998; Stone, 1991).

Frustration-Aggression Hypothesis

The basic tenets of the frustration-aggression hypothesis were conveyed simply and sweepingly by Dollard, Doob, Miller, Mowrer, and Sears (1939); "...the occurence of aggressive behavior always presupposes the existence of frustration and, contrariwise, that the existence of frustration always leads to some form of aggression" (p. 1, 1939). Frustration was defined by the authors as "that condition which exists when a goal-response suffers interference" (p. 11). In other words, frustration exists when the behaviour or response one wishes to make is somehow blocked. Hence, frustration encourages aggressive behaviour.

According to Dollard et al. (1939), the critical features of the frustration-aggression relationship are a) the strength of the instigation to aggress, b) the inhibition of aggression, c) the displacement of aggression, and d) aggression as a form of catharsis (1939). Dollard et al. (1939) suggested that three factors are important with respect to the strength of the instigation to aggress. These include a) the strength of instigation to the response that has been blocked, b) the amount of interference with the goal-response, and c) the number of frustration responses

experienced. Inhibition of aggression is deemed primarily a function of the anticipated punishment for the aggressive act. However, although the threat of punishment may inhibit the aggressive response, it does not reduce the instigation to act aggressively. In fact, if an individual's initial aggressive response to the agent of frustration is inhibited, then his/her instigation to aggress may facilitate aggression against other persons with whom there is less threat of punishment. This phenomenon was termed displacement of aggression, a term originally used by Freud. However, the difference in their conceptualization is that Freud considered any aggressive act on the external world to be displaced from destructive acts toward the self, whereas Dollard et al. considered displacement to occur only when the aggressive act was not against the specific agent of frustration. Although the inhibition of aggression does not reduce the actual instigation to aggress, the authors posited that the instigation to aggression is reduced through the process of catharsis. That is, any act of aggression, direct or indirect, serves as a defense mechanism, thereby reducing the aggessive drive.

The initial publication by Dollard and his colleagues (1939) led to much research examining the tenets of the frustration-aggression hypothesis. For example, in an investigation by Geen (1968), males who were in a frustrating condition of either working on insolvable puzzles or being interefered with while completing a solvable puzzle, subsequently directed stronger shocks to the confederate of the study, therefore supporting the contention that frustration in some circumstances does increase aggression. However, many of the earlier studies which claimed to support the frustration-aggression theory were flawed in that they did not consider confounding factors which may also influence aggression. For example, in one study (Mallick & McCandless, 1966) children who were in the "frustration" condition (which involved being

prevented from completing tasks by a confederate) were also exposed to irritating and sarcastic comments by the same confederate. This irritation could have contributed to their subsequent aggression. Moreover, much research has shown that frustration does not always lead to aggression and that aggression is not always preceded by frustration (ex. Gustafson, 1986; Melburg & Tedeshi, 1989). For example, Melburg and Tedeschi (1989) found that the use of increased shocks by participants was related to the superior performance of a confederate during a task and not related to annoyance by a confederate during the same task (frustration condition), which suggests that another factor (i.e. performing less well than someone else on a task) besides frustration was important in influencing subsequent aggression.

Generally, empirical studies suggest that frustration may sometimes lead to aggression, and aggression is sometimes preceded by frustration. However, other factors do play an important role. Baron and Richardson (1994) suggested that four factors including a) the magnitude of frustration, b) the presence of aggressive cues, c) the arbitrariness of the frustration, and d) emotional and cognitive processes, determine whether frustration will lead to aggression.

The frustration-aggression hypothesis has been modified by some authors. For example, in his earlier work, Berkowitz (1969) posited that frustration is only one type of aversive stimuli which may create a readiness for aggression (as opposed to directly producing an aggressive drive). Furthermore, he hypothesized that the probability of overt aggression will increase in the presence of aggression eliciting stimuli, termed aggressive cues, which may or may not be present in an aversive situation. These aggressive cues become associated with aggression in a classical conditioning process.

Although this theoretical deviation has received some empirical support (ex. Gustafson,

1986), it cannot explain aggressive acts which are not preceded by aversive stimuli. For example, an air force pilot who drops a bomb, a bully who steals lunch money, or a husband who kills his wife for her insurance policy. In these kinds of examples, there is no apparent aversive stimuli instigating the reaction. Rather, it seems the aggressive behaviour may be related to the outcome of their act. In summary, although the frustration-aggression hypothesis is useful for understanding some incidences of aggression, it is not helpful for understanding all forms of aggressive behaviour.

Social-Learning Theory

Bandura (1973) proposed that aggressive behaviour is learned like many other behaviours, and is maintained by reinforcement contingencies. Bandura defined aggression as "behaviour that results in personal injury and in destruction of property. The injury may be psychological ... as well as physical." (p. 5, 1973). According to Bandura, aggressive behaviour is acquired or learned through either direct experience or through indirect experience like observation. For example, a child who enjoys the sweet taste of a chocolate bar after grabbing it out of his sister's hand, may learn the benefits of aggressively taking objects from his sister. As with other behaviour, when aggression is rewarded there is an increased probability that the act will be repeated. Aggressive behaviour is also acquired through observation of others. For example, a child who witnesses their father receiving a free meal after aggressively yelling at a waitress may learn that yelling at servers in restaurants will get you free meals. The probability of the child eliciting this act is now more likely than if he had not observed his father being rewarded. Bandura (1973) also posited that aggressive behaviour is maintained in much the same way as it is acquired. External sources of rewards, vicarious experiences, and self-administered

rewards, all increase the likelihood of the aggressive act being repeated. For example, a child who receives social praise (external reward) after bullying a younger child is more likely to bully again than if he/she received no such reward. Punishment decreases the likelihood of the aggressive act being repeated. For example, if the same child is given detention for bullying the younger child, theoretically he/she is less likely to bully again. According to the social learning approach, alterations of environmental cues and contingencies should alter aggressive behaviour. In fact, there is some evidence that this approach is useful in the reduction of aggression. For example, Petermann (1987) found that a behaviour modification procedure based on Bandura's social learning theory was effective in reducing disruptive and aggressive behaviour in eight to twelve year-old children.

Overall, the social learning approach to aggression has received some empirical support (ex. Eron, Huesmann, Dubow, Romanoff, &Yarmel, 1987; Harris, 1996). For example, Eron et al. (1987), in their longitudinal study, found that children's aggression increased when exposed to aggressive role models. However, Eron and his colleagues also found that children who were punished for their aggressive acts were in fact more aggressive at school, suggesting that punishment for aggressive behaviour does not necessarily decrease the probability of the behaviour. Hence, other factors seem to mediate aggressive behaviour. Over the last two decades, several researchers (ex. Dodge, 1986; Huesmann, 1988; Huesmann & Eron, 1984) have promoted the investigation of cognitive factors in the occurrence of aggressive behaviour.

Social Information Processing Theory

The social information processing (SIP) model (Crick & Dodge, 1994; Dodge, 1986) attempts to explain how social cognitions are related to social adjustment and aggression in

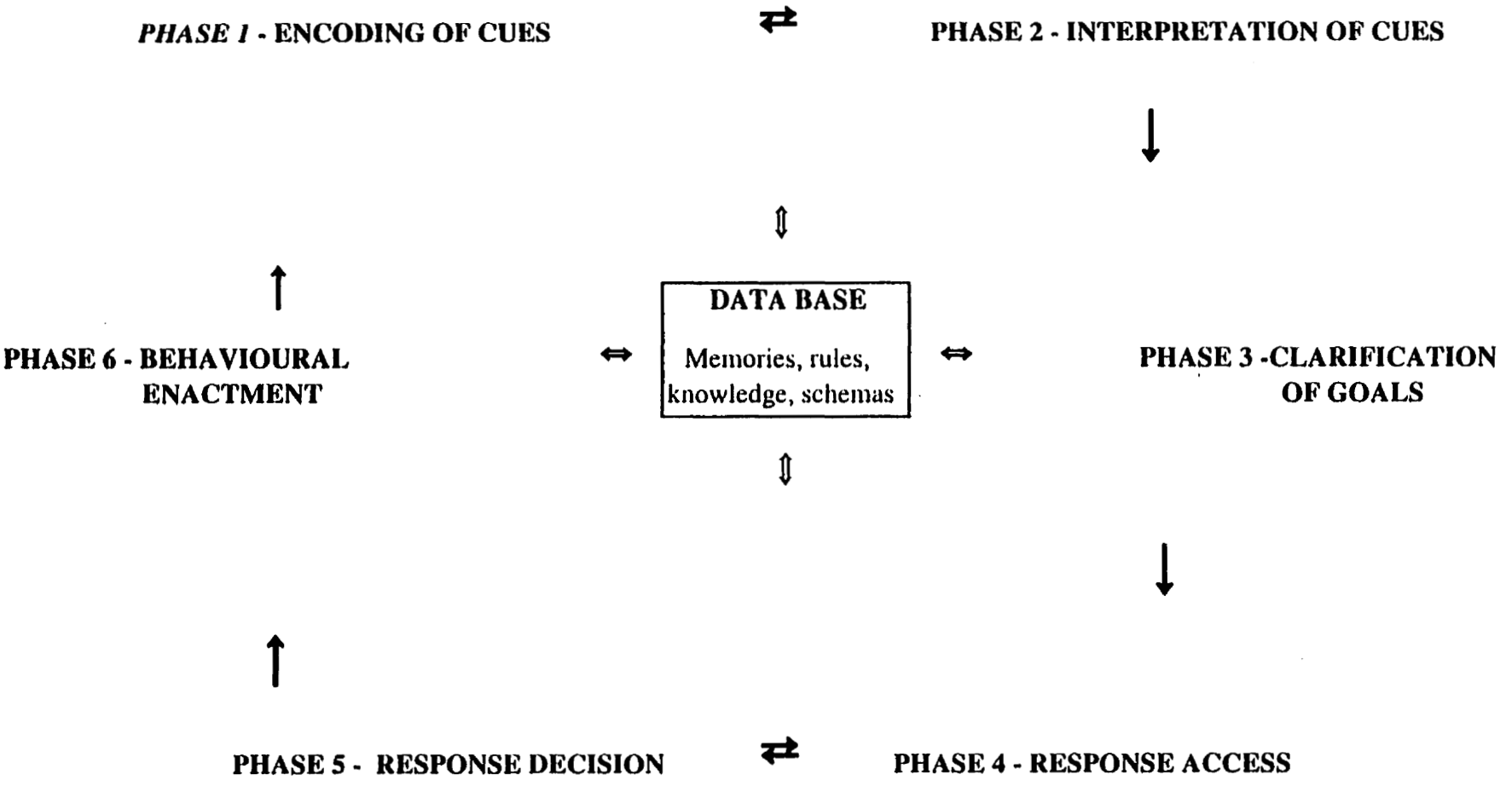
children. The social information processing model was developed by Dodge (1986) and later reformulated by Crick & Dodge (1994). It depicts children's responses to social cues as a function of a series of mediating cognitive processes. Deficits or biases in one or more of these processes are associated with aggressive behaviour.

The SIP model. The SIP model was designed to depict the social cognitive processes underlying children's behaviour in social situations. The underlying assumption of the model is that all individuals generally progress through the same social cognitive processes, however the content and style of these processes are specific to individuals based on their own biological make-up, experiences, and knowledge.

In the SIP model, behavioural responses to social cues are a function of six social cognitive processes. A diagrammatic representation of this model (Crick & Dodge, 1994) is presented in Figure 1 (see Figure 1). Each of these processes interact with one's personal data base which includes memories, knowledge, rules, and schemas. The six processes are (Crick & Dodge, 1994; Dodge, 1986):

1) Encoding - This process involves attending to and perceiving social cues. Focusing on cues (for example, what you see or hear) in social situations leads individuals to develop a mental representation of the situation they are faced with. For example, a boy who has just been knocked over onto the ground may attend to cues such as physical pain, the presence of a peer

Figure 1. The SIP model (adapted from Crick & Dodge, 1994)



standing over him, and laughter.

2) Interpretation - This process involves a child's intepretation of the social situation as he/she has encoded it (attended and perceived). Children integrate the situational cues with their own knowledge, experiences, and memories in order to develop an understanding of the situation they are facing. This interpretational process may also include making causal inferences and attributions of intent (Crick & Dodge, 1994). This step is important in determining responses because the perceived intentionality of a provocateur has an impact on whether anger, and subsequently aggression, is experienced (Olthof et al., 1989; Weiner, 1995). Dodge (1986) indicated that this process is often integrated with encoding. For example, how a child inteprets a situation may affect what social cues he/she attends to. For example, the boy who was knocked over may interpret that the peer standing over him knocked him over on purpose and was trying to be mean.

3) Clarification of goals- It is hypothesized that children have a tendency to produce a certain outcome or goal. Crick and Dodge defined goals as "focused arousal states that function as orientations toward producing (or wanting to produce) particular outcomes" (p. 87). Children bring goals into social situations but also develop and revise new goals in the face of social cues. Examples of goals in social situations include being happy, reducing anger, or making a friend. The boy in the example may decide that he wants get even with the boy that he believes knocked him over.

4) Response access - This process involves generating possible responses to social cues or goals. Children rely on response rules in order to determine what responses are appropriate. For example, children may decide that if a peer acted with hostility it is alright to react with

aggression. However, if the provacateur was an authority figure they might behave differently (Karniol & Heiman, 1986; Underwood, Coie, & Herbsman, 1992). The rule in this example might be that it is alright to act with aggression towards a peer but not to an authority figure. The boy in the example may access several possible responses such as telling the teacher, physically attacking the other boy (ex. pushing, hitting), or verbally insulting him.

5) Response decision - This process includes an evaluation of each generated response in terms of (1) the content of the response, (2) outcome expectancies (i.e. consequences), and (3) the self-efficacy of performing that response (Crick & Dodge, 1994). The boy in the example may decide that he is not capable of physically hurting the other boy, and is fearful of retaliation if he verbally insults him. Therefore, he decides that telling the teacher would be the best option because he believes it is acceptable (content), the other boy will get in trouble (consequences), and is confident he is able to perform the act of telling the teacher (self-efficacy).

6) Behavioral enactment - This process involves acting out the chosen response. This requires specific skills (ex. verbal skills, motoric skills) which have been acquired throughout development. In the example, this would consist of the boy actually going to his teacher and telling her that the other boy assaulted him.

These six processes are generally automatic and unconscious. In addition, these processes are continually interacting with an individual's personal data base (i.e. memories, knowledge of rules, social knowledge and schemas; Crick & Dodge, 1994).

Peer reactions to a child's behavioural response represent additional social cues, and these social cues will lead to another cycle of SIP. For example, when the boy tells his teacher about the playground assault, the other boy may respond with an apology, ridicule, or even more

physical aggression towards the boy. This response will stimulate another cycle of SIP in the boy.

Reformulated model. Crick and Dodge (1994) made several modifications to the SIP model in the reformulated version. The most important modification in the model is the depiction of social cognitive processes as nonlinear (i.e. parallel and simultaneous). That is, the new model proposes that individuals may be engaged in more than one processing step at once. This is depicted by the feedback loops between Steps 1 and 2 and Steps 4 and 5 as reproduced in Figure 1. Moreover, processing is cyclical. Hence, individuals are in a continuous state of processing.

Another change is the addition of the goal clarification process to the model. This process was described in the previous section and depicted in Figure 1. However, in Dodge's original model (1986) only the five other processes were depicted.

Empirical studies of SIP

Research has found that aggressive children differ from typical children in their SIP. Most of the research has focused on deficits and biases in encoding, interpretation, response access and response decision, and somewhat less on goal clarification and behavioural enactment. These studies typically use hypothetical situations, delivered orally or via videorecordings, in order to assess SIP variables. After being exposed to the scenarios, participants are typically asked questions which assess the specific processes being examined. Table 1 represents highlights of SIP research examining aggression since the original publication of the SIP theory in 1986 (see Table 1).

Deficits in encoding. Dodge (1986) hypothesized that because of the large amount of information present in any social situation, children must encode information in social situations efficiently (ex. attend to appropriate cues) and without biases (i.e. not attend more to certain

kinds of cues than others) in order to behave in adaptive ways. For example, some children may focus their attention on negative cues in social situations, such as being hurt and embarassed after falling. They may focus less on positive cues, such as others helping them up after they fall.

Several studies (ex. Dodge et al., 1997; Dodge & Newman, 1981; Dodge & Price, 1994; Lochman & Dodge, 1994) have found that aggressive children encode information inadequately in social situations prior to making a response decision. For example, Lochman and Dodge (1994) found that violently aggressive boys recalled more irrelevant cues than nonaggressive boys, after watching videotaped vignettes portraying conflict situations. Furthermore, Dodge and Newman (1981) found that aggressive boys requested less information than nonaggressive boys about hypothetical social situations before making a decision. These studies indicate that aggressive children make their behaviour decisions based on less relevant, and smaller amounts of information, than nonaggressive children. Interestingly, it seems that inadequate encoding may be problematic in reactive aggressive but not proactive aggressive youth. For example, Dodge et al. (1997) found that reactive aggressive youth gave more irrelevant information than proactive aggressive youth when asked to recall what happened in a videotaped story they just viewed, suggesting that they were not attending to relevant social cues. This deficit in reactive but not proactive aggressive youth is consistent with the conceptualization of reactive aggression being driven by situational antecedents and not response outcomes.

Table 1
Summary of Social Information Processing Research Examining Aggression in Children and Adolescents

Authors and Year	Social Information Process(es) Examined	SIP Instruments	Sample Characteristics			Findings		
			Age	Sex	Groups	Sig. Corr. between SIP and RD/Behavior?	Grp. Differences Agg/Non	Grp. Differences Agg Types
Dodge et al. (1997)								
Study 1	E, I, RA, RD	-videotaped, oral, & cartoon vig.	Gr. K-3 (Long.)	M/F	Rv, Pv, RPv, Non	n/a	Yes	Yes
Study 2	E, I, RD	-videotaped vig. - questionnaire	M=12.7 yrs.	M	Clinical - Rv and Pv	n/a	n/a	Yes
Crick & Dodge (1996)	I, CG, RD	- oral vignettes	Gr. 3-6	M/F	Rv,Pv,RPv,Non	n/a	Yes	Yes
Dodge & Price (1994)	E, I, RA, RD, BE	- videotaped vig.	Gr. 1-3	M/F	n/a	Yes	n/a	n/a
Lochman & Dodge (1994)	E, I, RA,RD	- videotaped & oral vig., questionnaire, self-report scale	Gr. 4, 7	M	Agg, Violent (Clinical), Non Pre-adolescent, adolescent	n/a	Yes	Yes
Quiggle et al. (1992)	I, RA, RD, BE	- oral vig.	Gr. 3-6	M/F	Agg, Depressed, Agg/Depressed, Neither	n/a	Yes	Yes
Dodge et al. (1990)	I	- videotaped vig.	M=16 yrs.	M	Clinical - rated on Rv, Pv, and socialized and undersocialized CD	Yes	n/a	No
Dodge & Coie (1987)								
Study 3	I, RD	-videotaped vig.	Gr. 1, 3	M	Rv,Pv, Rpv NonAgg/Rejected, Avg.	n/a	Yes	Yes
Study 4	I, BE	-videotaped vig.	Gr. 1, 3	M	Ratings for Rv and Pv	Yes	n/a	Yes

Note. E= encoding, I= interpretation, RA= response access, RD=response decision, BE=behavioral enactment, vig.=vignettes, Gr. = grade, M=male, F=female, Rv= Reactive Aggressive, Pv= Proactive Aggressive, Non=nonaggressive, RPv= reactive and proactive aggressive.

Table 1 Continued
Summary of Social Information Processing Research Examining Social Adjustment in Children and Adolescents

Authors and Year	Social Information Process(es) Examined	SIP Instruments	Sample Characteristics			Findings		
			Age	Sex	Groups	Sig Corr. between SIP and RD/Behavior?	Grp. Differences Agg/Non	Agg Types
Dodge & Somberg (1987)	I, RD	-videotaped vig.	Gr. 3-5	M	Rej-Agg, Adj-NonAgg	Yes	Yes	n/a
Dodge (1986)								
Study 1	E, I, RA, RD, BE	-videotaped vig. -group entry task	Gr. K-2	M/F	n/a	Yes	n/a	n/a
Study 2	E, I, RA, RD, BE	-videotaped vig. -group entry task	Gr. 2-4	M/F	Clinical & control	Yes	Yes	n/a

Note. E= encoding, I= interpretation, RA= response access, RD=response decision, BE=behavioral enactment, vig.=vignettes, Gr. = grade, M=male, F=female, Rv= Reactive Aggressive, Pv= Proactive Aggressive, Non=nonaggressive, RPv= reactive and proactive aggressive.

Hostile attribution bias. Dodge (1986) hypothesized that deficits (for example, inaccurately interpreting cues) and negative biases (for example, making more hostile interpretations) in the second processing stage of intepretation may also lead to maladaptive behaviour in social situations. Many studies have indicated that aggressive children exhibit a hostile attribution bias, that is, they tend to over attribute negative or hostile intentions to others behaviour (Crick & Dodge, 1996; Dodge, 1980; Dodge, Price, Bachorowski, & Newman, 1990; Dodge & Somberg, 1987) when a negative event occurs in which the intent of the provocateur is ambiguous. For example, Dodge, Price, et al. (1990) found that youth with undersocialized conduct disorder gave more hostile attributions of intent during observation of videotaped scenarios than those without conduct disorder. With regards to the two different forms of aggression, Dodge and Coie (1987) found that only boys with reactive type aggression displayed hostile attribution biases. Furthermore, those with higher levels of hostile attributions had higher rates of reactive aggression. Crick & Dodge (1996) found similar results in their study with 9-12 year olds. Schwartz et al. (1998) also found that reactive aggression was associated with hostile attributional tendencies, as well as frequent victimization by peers. This is again consistent with the notion that reactive aggression occurs in response to situational antecedents, whereas proactive aggression does not.

Clarification of goals. It is hypothesized that the social goals children choose influence their subsequent behavioural responses. It is thought that typical children respond in ways that will help them achieve their goal and children who have socially inappropriate goals (ex. getting even) are hypothesized to develop maladaptive or aggressive ways of responding.

Relatively less SIP research has focused on this process. However, some research

conducted thus far has indicated a link between goals and SIP (Crick & Dodge, 1992, 1996; Renshaw & Asher, 1983; Slaby & Guerra, 1988). Generally, aggressive children tend to generate and pursue goals that are inappropriate, relationship damaging, and involve wanting to be liked. In addition, Crick and Dodge (1996) found that proactive aggessive youth reported more instrumental goals than reactive or non-aggressive children, indicating that proactively aggression in children is in part, driven by anticipated positive attainments.

Response access, evaluation, and decisions. Some research has investigated response access and response evaluation in aggressive children (Crick & Dodge, 1996; Dodge & Price, 1994; Lochman & Dodge, 1994; Richard & Dodge, 1982). Dodge (1986) hypothesized that maladaptive behavioural responses to social cues is related to deficits or biases in response search skills, or due to biased processing previous to response access. In addition, it has been hypothesized that socially maladjusted children select more maladaptive response decisions. It has been shown that aggressive children generate fewer and more aggressive responses, and evaluate aggressive responses more favorably (Dodge, 1986; Gouze, 1987; Richard & Dodge, 1982; Schwartz et al., 1998). Moreover, this pattern appears more characteristic of proactive than reactive aggressive children (Crick and Dodge, 1996; Dodge et al., 1997; Schwartz et al., 1998).

Methodological procedures. Most studies examining SIP and aggressive behaviour have used hypothetical situation scenarios, in which the participant is exposed to a conflict situation via stories, pictures, videotape, or a combination of these. Subjects are generally asked to imagine themselves as the protagonist in the situation. After listening to or viewing these scenarios, they are asked a series of questions, depending on the social information process being evaluated. For example, when assessing the subject's interpretation, they are generally asked why

the provocateur in the scenario behaved a certain way, and/or was it on purpose? Of course, it is impossible to observe how children process social information so researchers generally rely on self-reports. This procedure seems to be a close proximity to understanding how children process social information in real-life circumstances.

Often, the groups in the studies (i.e. aggressive/nonaggressive, reactive/proactive) are distinguished based on teacher or observational ratings of children. Dodge and Coie (1987) developed a teacher rating system for identifying reactive and proactive aggressive children. This instrument requires teachers to rate the frequency children's behaviour regarding a series of statements on a 1 to 5 point scale ranging from never to almost always. This measure showed good internal consistency, and concurrent and discrimimant validity (1987). Generally, self-report measures of aggression are not used as their validity is questionable (Huesmann et al., 1984). However, if ratings from others are being used, it may be prudent to use ratings from several sources including teachers, parents, and peers, in order to obtain a more stringent evaluation of aggression. Some studies have done this (Quiggle, Garber, Panak, and Dodge, 1992), although several have used ratings from only one source.

Most of these studies have used between group analyses (i.e. ANOVAs), which compare SIP in different groups children (i.e. aggressive versus nonaggressive, reactive versus proactive aggressive). Some studies, although fewer, have used correlational or regression designs which examine the association between behaviour, or response decisions, with SIP variables. Several studies that have examined the predictability of behaviour from SIP have found that processing patterns in the earlier stages such as encoding and interpretation are predictive of processing patterns in the later stages such as response access and response decisions (Dodge, 1986; Dodge

& Price, 1994; Dodge et al., 1990).

Populations under study. The majority of research on SIP and aggression has been conducted with male samples. One reason for this tendency is that more boys than girls are identified having aggression difficulties. Girls demonstrate more indirect/relational forms of aggression than overt physical or verbal aggressive acts (Björkqvist et al., 1992; Crick et al., 1997). It is important for more SIP research to include girls in order to understand girl's SIP patterns, and any differences in SIP between aggressive boys and girls. To date, little research has directly compared male and female processing patterns.

SIP research has been conducted with typical school-age populations (ex. Crick & Dodge; 1996; Dodge & Coie, 1987; Quiggle, Garber, Panak, & Dodge, 1992) and in settings with more severely behaviour disordered juveniles (Dodge et al., 1997; Dodge, Price et al., 1990). In typical populations, aggression is often identified through teacher ratings of aggression or observation of aggression in the classroom. Groups of aggressive and nonaggressive children are established based on these measures. Studies in clinical populations, with more severely aggressive youth, often evaluate subject aggression using existing reports (ex. cumulative files). Some of these studies take place in special settings for aggressive offenders. For example, Dodge, Price, et al. (1990) conducted a study of hostile attribution biases with adolescent boys from a maximum security prison for juvenile offenders, most of whom were conduct disordered. It is important that SIP research include typical and clinical populations in order that the relationship between SIP and aggression can be best understood for all children.

Although much SIP research has been conducted with typical children and in clinical populations with more severe aggressive behaviour (ex. juvenile offenders), little SIP research

has been conducted in other populations. For example, very little research has focused on special populations which exhibit aggressive behaviour, such as children with developmental delays. This would be beneficial in order to determine (a) the nature and scope of SIP in developmentally delayed children, and (b) whether similar or unique deficits and biases in SIP exist within specialized populations. In one study, (Dodge et al., 1997), aggressive children with ADHD were shown to be more likely to be reactive aggressive as opposed to proactive aggressive. Because reactive and proactive aggressive children are known to differ in their SIP patterns, this study suggests that ADHD may contribute to specific forms of SIP deficits and biases. Research with other special populations, such as those with developmental delays, will help determine whether their aggression is associated with problematic processing styles.

Summary. In summary, the SIP model posits that children's responses to social cues are a function of a series of mediating cognitive processes. These include encoding, interpretation, goal alignment, response access, response decision, and finally behavioural enactment. These processes occur dynamically in relation to one another, and the whole process continues with each social interaction. The SIP model has been successful in distinguishing aggressive children from their nonaggressive peers. Generally, aggressive children encode less situational information, exhibit a hostile attribution bias, choose maladaptive goals, generate fewer possible responses, and evaluate aggressive behaviour more favorably. Furthermore, the SIP model has distinguished reactive and proactive aggressive types based on their SIP patterns. In general, reactive aggressive children show more deficits and biases in the earlier stages of processing, whereas proactive aggressive children show biases in the later phases.

The benefit of examining the relation between SIP and aggression is that it can help in the

development of effective intervention strategies for aggressive children. Knowledge of specific biases or deficits in processing help pinpoint areas needing remediation. For example, specific remediation plans can be differentially designed for reactive and proactive aggressive children, based on their unique deficits or biases in SIP. Anger or aggression management training could then focus on skill training in particular processing steps.

Due to the lack of research examing SIP with special populations, little is known about SIP processing and its relationship, if any, to aggression in these groups. Future research should include other populations exhibiting aggressive behaviour as well, in order that the robustness of SIP theory can be tested. To date, there has been little research of SIP in aggressive children with psychological impairments other than conduct disorder. Research examining SIP in aggressive developmentally delayed children would help delineate whether SIP processes are important in influencing aggressive behaviour in this population, and also to determine whether these children exhibit unique deficits and biases in their SIP.

Issues Related to Aggression

Aggression has been given much attention in the literature for many years. Some issues which have been salient in the aggression literature in recent years include media violence and family patterns, peer rejection, and the future outlook for aggressive children.

Media Violence

With the introduction of television, video cassette recorders, and videogames, has come a great deal of attention in the literature to the negative effects of media violence on aggressive behaviour in children (Heath, Bresolin, & Rinaldi, 1989; Smith & Donnerstein, 1998). Although most scholars believe there is some relationship between media violence and aggression, there is

less consensus on the degree of this relationship (Heath et al., 1989). Perhaps the most classic example of how exposure to violence can have behavioural effects is the famous "Bobo doll" experiment (Bandura, Ross, & Ross, 1961). In this experiment, children who witnessed a film with an adult behaving aggressively toward an inflated doll subsequently played more aggressively than children who had not seen the adult model. Several other experiments such as this have shown that children behave more aggressively immediately after viewing television violence than those who do not view the same violence (Wood, Wong, & Chachere, 1991). In their meta-analytic review, Wood et al. (1991) found that overall, exposure to media violence signficantly increased viewers subsequent aggressive behaviour. It appears that television violence does influence aggression in both boys and girls, and young children and adolescents (Smith & Donnerstein, 1998). Furthermore, media violence seems to increase tolerance for aggressive behaviour. For example, Molitor and Hirsch (1994) used video material to determine whether children's toleration for real life aggression was affected by exposure to media violence. These authors had children in the experimental group watch a movie with violence. Immediately afterward, the children were left alone and were asked to briefly watch over two younger children in another room via a video camera, as a favor to the experimenter. The children were told to come and get the experimenter if the younger children got into any trouble. The video they were watching was actually taped earlier and included two young children in an aggressive conflict situation. Children in the experimental group, who had just watched the movie with violence, took a significantly longer period of time to seek adult help than children who did not watch the violent movie.

Not all children are adversely affected by media violence, and not all media violence

results in aggression. The effects of media violence are pronounced when the aggression viewed is rewarded, when the child can identify with the media character, and when the program is more realistic (Heath et al., 1989). For example, Berkowitz and Geen (1966) found that college students who watched a violent segment of a film subsequently administered more severe shocks to other students than students who had not watched the violent film. However, these students showed even more aggression when the target of their aggression shared some salient characteristic (for example, a name) with a victim in the violent film they just viewed, which suggests that they identified with the character in the film.

Several cognitive factors also mediate the role between media violence and aggression (Rule & Ferguson, 1986). Those who already have favourable attitudes toward aggression and increased tolerance for aggression are more affected by media violence (Rule & Ferguson, 1986). It is not surprising then, than those who experience violence in their home are more susceptible to media violence (Heath et al., 1989). For example, Bushman (1995) found that young adults who scored high on a rating scale measuring aggression were more likely to feel angry after viewing violent videos than those who were not aggressive. In addition, after watching the violent video, young adults who were aggressive were more likely than non aggressives to aggress during a game with an opponent by giving them loud blasts of noise. This suggests that those who are already aggressive are more affected by media violence. Furthermore, Bushman's (1995) study demonstrated that individuals who scored higher on the aggression rating scale were more likely to choose a violent film to watch than those scoring lower on aggression. This suggests that aggressive individuals are drawn towards media violence, and not just affected by it.

Several theories have been posited to explain the relationship between media violence and subsequent aggressive behaviour such as social learning theory (Bandura, 1973) and cognitive neoassociation (Berkowitz & Rogers, 1986). Social learning theory, described earlier, posits that children can learn behaviours vicariously through modeling and observation, and this is more likely to happen when what they observe is reinforced (Bandura, 1973). Therefore, this theory would suggest that children are modelling the violence they see in the media, and are more likely to do so when the violence they see is reinforced (for example, the aggressive character receives praise). Empirical evidence for this position was found in the Bobo doll study described earlier. When applied to media violence and aggression, Berkowitz's cognitive neoassociation theory (Berkowitz & Rogers, 1986) suggests that media violence stimulates the recall of other aggressive thoughts and ideas. This process is also known as priming. Support for this theory was found in a study by Langley, O'Neal, Craig, and Yost (1992) in which young adult males who were given lists of aggressive words to read subsequently wrote stories with more aggression, violence, and fear, than those who were given lists of neutral or positive words. Also, these young men subsequently expressed more interest in violent films than the other subjects. Evidence for a social information processing explanation for media effects on aggression has also been found (Kirsh, 1998). Kirsch (1998) had third and fourth grade children play violent or nonviolent videogames for several minutes. Afterwards, the children were read hypothetical situations with a negative outcome, in which a peer's intent was ambiguous. Those who played the violent videogame were more likely to attribute hostile intent to the peers in the scenario than children who played the non-violent video game. This study suggests that media violence may lead to a biased social information processing pattern, characterized by hostile interpretations of

peers' intentions.

Family Patterns

Much research (Dodge, Pettit, Bates, & Valente, 1995; Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995) has examined the role of family environment and parenting in the development of childhood aggression. The results of several empirical studies have suggested that family factors such as parental abuse (Dodge et al., 1995) and poor parenting practices (Pettit, Dodge, & Brown, 1988) are associated with aggression in children and even toddlers (Keenan & Shaw, 1994). Dodge et al. (1995) investigated the relationship between maternal reports of abuse and later child conduct problems in a longitudinal study. Kindergarten children of mothers who reported more physical abusive behaviour (for example, their child had been hit severely enough by an adult to require medical attention) were more likely to have teachers in grades three and four who perceived them to have more externalizing problems such as aggression, than children whose mothers did not report abuse. Parenting practices also influence child aggression. Factors such as restrictive discipline (ex. a high degree of concern and constraint exhibited by parents) are positively associated with aggression (Pettit et al., 1988).

Other research has examined the characteristics of the parent's relationship and its effect on child aggression (Dadds & Powell, 1991; Skinner, Elder, & Conger, 1992). For example, Dadds & Powell (1991) found that interparental conflict, characterized by the degree of parent's cooperation and agreement in performing parenting functions in the family, was associated with aggression in boys and girls between three and eight years of age. That is, parents who reported more interpersonal conflict with each other also reported more aggression in their children. This was an especially strong association for children in clinic populations (i.e. those seeking help for

child behaviour problems at guidance clinics).

Several researchers (Kupersmidt et al., 1995; Skinner et al., 1992) have found that socioeconomic status is an important factor in childhood aggression. For example, Kupersmidt et al. (1995) compared the association between income level, socioeconomic status of the neighborhood, ethnicity, and family characteristics (i.e. single versus two parent families) with aggression in children in the second through fifth grade. The children who were most aggressive were black children in single parent families with low incomes, who were living in low socioeconomic status neighborhoods. However, children in this same group but who lived in middle socioeconomic status neighborhoods were not more aggressive than other children. The authors suggest that middle socioeconomic status neighborhoods operate as a protective factor against aggression for children who are already at risk (Kupersmidt et al., 1995). Skinner et al. (1992) conducted an empirical investigation of how socioeconomic status may influence aggression. In their investigation with adolescents from two parent families, Skinner et al. (1992) found that the association between economic hardship and aggression was mediated by family factors. That is, economic hardship characterized by economic pressure, financial loss, and unstable work, was predictive of negativity in fathers (for example, complaining remarks about life). This paternal negativity was associated with negative marital interactions and irritable parenting which, consistent with the research discussed above, was associated with higher levels of adolescent aggression. Therefore, it appears that socioeconomic status influences aggression indirectly, by affecting parenting practices and interparental conflict.

Although it is apparent that family factors are associated with aggression, the mechanisms by which this occurs is less clear. However, there is some indication that this relationship may be

mediated by social information processing factors (Dodge et al., 1995). In the study by Dodge et al. (1995) in which parental abuse predicted higher levels of aggression, it was also found that this relationship was mediated by biased social information processing patterns in children. Specifically, maternal reports of abusive behaviour toward children were associated with children having encoding errors, hostile attribution biases, more accessing of aggressive responses, and positive evaluations of aggressive behaviour. These SIP patterns were associated with later externalizing problems, such as aggression. Therefore, this study substantiates the large amount of literature which shows that SIP is related to aggression, but also exhibits how SIP can be affected by family patterns.

Peer Rejection

Peer rejection is a form of negative social status characterized by being overtly disliked by peers (Asher, 1990). Aggression is the primary correlate of negative social status at all ages (Coie, Dodge, & Kupersmidt, 1990). That is, children generally do not like other children who are aggressive. Approximately half of rejected children are also viewed as aggressive by their peers (Coie & Koepple, 1990).

Studies in this area typically involve peer nomination procedures, teacher ratings, or direct observation to assess social status and behavioural correlates. Generally, peer nomination procedures have children indicate whom they like most and like least in their class (ex. Coie, Dodge, Terry, & Wright, 1991) relative to a particular context (ex. who would you like to work with on a class project). Being nominated as liked least is used an indication of peer rejection. Teacher perceptions of status or behaviour are often assessed through behaviour checklists (ex. Crick et al., 1997). Several studies have found that aggressive children are more likely to be

rejected by their peers than nonaggressive children (Crick, 1996; Dodge, Coie, Pettit, & Price, 1990; Lancellotta & Vaugh, 1989; Pope, Bierman, & Mumma, 1991). For example, Pope et al. (1991) studied peer status and aggressive behaviour in third through sixth grade boys by using peer nomination procedures. Children were given ratings based on positive peer nominations (liked by peers), negative nominations (disliked by peers), withdrawal (avoids social interactions), and likability (especially nice). Peer perceptions of aggressive behaviour were also assessed. Peer rated aggression was a significant predictor of negative nominations by peers (peer rejection). That is, children who were perceived as more aggressive by their peers, were also more disliked.

Although aggression is clearly associated with peer rejection, not all aggressive children are peer rejected. This observation has led some researchers to examine what factors are important in determining whether an aggressive child is also peer rejected. For example, Coie and his colleagues (Coie et al., 1991; Dodge, Coie et al., 1990), have examined the association between different kinds of aggressive behaviour with peer status, to determine what qualitative aspects of aggressive behaviour specify the relation between aggression and peer rejection. This subtyping of aggression is characteristic of much recent aggression research (ex. Dodge & Coie, 1987; Crick et al., 1997). In one study, Coie et al. (1991) collected peer sociometric ratings for black males in the first and third grades. Children nominated three peers whom they liked most and liked least (popular and rejected), and rated peers on aggressive behaviour as well. These boys then participated in contrived play groups with other boys whom they had never met. Each group included average, rejected, popular, and neglected boys. All aggressive behaviour was observed and categorized as reactive, instrumental (for example, grabbing a toy from another

boy), or bullying. Among third grade boys, each type of aggressive behaviour occurred more often in rejected than nonrejected boys. Among the first grade boys, only instrumental types of aggression were more prevalent in the rejected boys. Furthermore, children who had been rated by their classroom peers as aggressive and rejected were more likely to intiate instrumental aggression than those who were only aggressive, only rejected, or neither. These aggressive-rejected children also escalated conflicts more often than other children when they were the target of instrumental aggression, as opposed to submitting or defending themselves. This study indicates that the type of aggression displayed by a child is important in determining peer status, but this is dependent on the age of the child as well. That is, reactive aggression and bullying were associated with more negative status for older children than for younger children. In fact, Dodge, Coie, et al. (1990) found that bullying was even associated with popularity in first grade children. Coie et al. (1991) posited that perhaps bullying in younger boys is related to establishing dominance in the peer group, whereas bullying in older grades relates more to humiliation and abuse, which would be less acceptable. In addition, Coie et al. (1991) suggested that younger children are more tolerant of reactive aggression in others because they do not make any distinction between justified and unjustified reactive aggression, as older boys do. Rather, younger boys may see reactive aggression simply as a way of standing up for oneself. Older boys therefore, are conceptualized as being more dicriminatory in their judgments of reactive aggression, and subsequently reject more reactive aggressive peers. Therefore, the research indicates that both aggression type and child's age are important determinants in the relationship between aggression and peer rejection.

In general, it has been found that aggression is less central to peer status among girls than

boys (Coie et al., 1990). However, this may be due to the type of aggression being studied. As discussed earlier, girls often display more relational types of aggression than boys (Björkqvist et al., 1992; Crick et al., 1997). The role of relational and direct aggression in predicting peer rejection have been given increased attention in recent years (Crick, 1996; Crick et al., 1997; Crick & Grotpeter, 1995). In a study by Crick et al. (1997), both relational and overt aggression were related to peer rated rejection for both boys and girls in preschool. That is, girls and boys who were perceived by peers as either relationally or overtly aggressive were also more disliked by their peers. Crick (1996) had similar results in a sample of 9-12 year olds. Furthermore, Lancelotta and Vaughn (1989) found that several types of aggressive behaviour including provoked physical, unprovoked physical, outburst, verbal, and indirect, all had a significant negative correlation with social status for girls. In fact, the strongest correlation was for indirect forms of aggression, such as tattling. Therefore, it appears that both relational and direct forms of aggression are related to peer rejection. Furthermore, this holds true for both boys and girls.

Overall, it appears that many aggressive children are disliked by their peers. However, whether an aggressive child is rejected depends on the type of aggression displayed and the age of the child. It appears that both aggressive boys and girls are disliked. Unfortunately, peer rejection faced by aggressive children increases the likelihood of children having difficulties later in life (Coie, Lochman, Terry, & Hyman, 1992). This issue will be discussed in the next section.

Future Outlook for Aggressive Children

Recent research has focused more attention on the long-term outcomes for aggressive children. These studies typically examine the predictability of adult or adolescent maladjustment from childhood ratings of aggression, and sometimes employ longitudinal designs. For example,

Coie et al. (1992) followed two cohorts of Black children from the third grade into adolescence. Peer nominations were conducted to determine the aggressive status of the children. In adolescence, measures of adjustment were obtained through teacher and parent ratings, and adolescent interviews. Aggression in Grade 3 predicted teacher and parent reported externalizing problems, and self-reported internalizing problems in adolescence. That is, children who were perceived by their peers as aggressive in Grade 3 were more likely to have teachers or parents perceive them to have externalizing problems in adolescence, and were more likely to report internalizing problems themselves, than children who were not aggressive in Grade 3. Furthermore, research has shown that aggression in childhood is predictive of problems in adulthood, including unemployement, spousal violence, smoking and drinking, and violent offences (Farrington, 1991).

Another factor that several recent studies (Kupersmidt & Coie, 1990; Kupersmidt & Patterson, 1991) have considered is the role of peer rejection in predicting future adjustment in aggressive children. In the Coie et al. (1992) study described above, peer sociometric ratings were also obtained to classify children as rejected or nonrejected. These researchers found that rejection and aggression each were a significant predictor of adolescent problems, but that children who were both aggressive and rejected in childhood had the poorest outcome. In fact, 62% of aggressive-rejected children showed serious adjustment problems in early adolescence, whereas 40% of children who were aggressive but not rejected in childhood developed similar difficulties. In a seven-year longitudinal study, Kupersmidt and Coie (1990) found that both aggression and rejection put fifth grade children at risk for future maladjustment, although aggression was a stronger predictor. Particularly, children who were rated by their peers as

aggressive in Grade 5 were more likely to have police records and have dropped out of school seven years later, than nonaggressive children. In fact, 50% of the aggressive children had antisocial problems in adolescence. Peer rejection did not predict any specific outcome, but rather predicted negative outcomes in general (i.e. peer rejection predicted that some problem would occur in adolescence, but was not related to a specific problem). This indicates that aggressive behaviour in childhood is associated with particular difficulties, such as delinquency, whereas peer rejection is predictive of negative outcomes in general. This is consistent with other findings (Kupersmidt & Patterson, 1991) which suggest that peer rejection is a broad band risk factor, whereas aggression is a more specific risk factor for later difficulties.

There is also some indication that future outcomes of aggression and peer rejection may differ somewhat for boys and girls. In a longitudinal study (Kupersmidt & Patterson, 1991), peer and teacher rated aggression in young boys predicted delinquency two years later, and peer rejection predicted nonspecific negative outcomes. However, aggression in girls predicted unpopularity, future aggression, and nonspecific negative outcomes two years later, and peer rejection predicted these same factors. Furthermore, for girls, those who were both peer rejected and aggressive were at greatest risk for future problems. Therefore, it appears that some gender differences may exist in the prediction of specific adjustment difficulties. However, both boys and girls who are aggressive, or aggressive and rejected, are at risk for some form of maladjustment later in life.

The future outlook for aggressive children is not promising. It appears that aggressive children often continue to have externalizing problems in adolescence or even adulthood. Furthermore, those who are also disliked by their peers may have an even poorer prognosis. This

research exemplifies the need for researchers and clinicians to determine the best strategies for reducing aggressive behaviour in children, thereby increasing the likelihood of positive adjustment in their future. To do this, the underlying mechanisms in aggression needs to be better understood across different groups of children and in relation to gender, age, and situational context.

Children with Developmental Delays

The term developmental delay (DD) is a broad term referring to below average functioning in relation to intelligence, adaptive behaviour, and/or general development. Children with DD include those with specific deficits in these areas, or children with more pervasive developmental disorders such as autism. Overall, those with DD have challenges in their adaptation to their social, school, or work environments in comparison to most other individuals their age.

Mental retardation (MR) is a specific disorder which falls under the umbrella term of developmental delay. MR reflects specifically a delay in intellectual functioning and adaptive behaviour. Sometimes specific disorders such as MR are referred to more generally as DD. For example, some school systems use the term DD instead of MR in their special education classrooms, even though the children meet the criteria for a specific diagnosis of MR. This may reflect the notion that children with MR may have other associated delays and it may also reflect a change in the terminology that is used by practitioners. In any event, due to the population participating in this study, it is important to provide a specific definition of MR but also recognize that it falls under the general category of DD. In the following three subsections, the definition and subtypes of MR are discussed as well as how MR is identified. In the remainder of

this thesis, the term developmentally delayed is used in relation to relevant research as well as the participants in this study.

Definition of Mental Retardation

Mental retardation is a developmental disorder (APA, 1994). Three major features characterize mental retardation. First, according the the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994) those with mental retardation have "significantly subaverage intellectual functioning: an IQ of approximately 70 or below on an individually administered IQ test" (p. 46, APA, 1994). However, another professional group proposes that an IQ cutoff of 75 is more appropriate (American Association on Mental Retardation [AAMR], 1992), but this is of concern because this would double the number of people eligible for a diagnosis of mental retardation (MacMillan, Gresham, & Siperstein, 1993) because the number of people who fall between the 70 - 75 range is comparable to the entire number of people who fall below 70. Second, those with mental retardation also have deficits in their adaptive behaviour. Specifically they must have deficits in at least two of the following eleven areas: communication, self-care, home-living, social/interpersonal skills, use of community resources, self-direction, functional academic skills, work, leisure, health, and safety (APA, 1994). Because mentally retarded persons only require deficits in two of these areas, there is the possibility that those with a diagnosis of mental retardation may differ in their high and low functioning areas. However, factor analytic studies of the adaptive behaviour areas (McGrew & Bruininks, 1989) suggest that a single primary factor, which appears to be measuring personal independence, accounts for most of the variance. Therefore the construct of adaptive behaviour may not truly consist of eleven separate domains (Hodapp & Dykens, 1996). A third feature of

mental retardation is that it begins early in life (APA, 1994). That is, one cannot become mentally retarded after 18 years of age (although other medical difficulties such as head trauma may lead to similar symptomalogy). In summary, children with mental retardation are characterized by low intellectual functioning, deficits in adaptive behaviour, and these difficulties must be apparent before 18 years of age.

Subtypes of Mental Retardation

Those with mental retardation are designated as having mild, moderate, severe, or profound mental retardation, based on their level of intellectual functioning (APA, 1994). Mild mentally retarded individuals are those with IQs between 55 and 70, and include about 90% of all persons with mental retardation (APA, 1994). Most of these individuals show no clear organic cause for their mental retardation (Zigler & Hodapp, 1986) and many blend into regular society quite easily. However, children in the mild range of mental retardation are often noticed during the school years, probably because schools emphasize greater cognitive skill than typically required outside school, particularly in the early years of development, and teacher's experience with children make them more able to detect abnormalities (Hodapp & Dykens, 1996).

Children in the moderate range of mental retardation have IQ scores in the range 40 to 54 (APA, 1994). Those in the moderate range or lower more often have a clear organic cause for their mental retardation (Zigler & Hodapp, 1986), such as Down Syndrome. This group is also more adaptively impaired than those in the mild category. In contrast to those in the mild range, only a minority, about 20%, of moderately retarded individuals eventually live independently (Ross, Begab, Dondis, Giampiccolo, & Meyers, 1985).

The severe range of mental retardation is characterized by an IQ between 25 and 39

(APA, 1994). These individuals often have a clear organic cause for their retardation and many have cooccurring physical problems, such as respiratory or heart conditions (Hodapp & Dykens, 1996). Unlike those in the mild or moderate range, most of those in the severe range do not live independently, but rather require some supervision in special settings (Hodapp & Dykens, 1996).

The fourth and lowest functioning category of mental retardation is the profound type. Children in the profound range of mental retardation have IQ scores less than 25, and constitute only about 1.5% of those with mental retardation (Sattler, 1992). As with the severe types, profoundly mentally retarded individuals often have a clear organic cause for their retardation (Zigler & Hodapp, 1986), and have more severe cooccurring medical conditions that may even lead to early death (Hodapp & Dykens, 1996). Due to their severe impairments, almost all individuals with profound mental retardation live with supervision or in special homes throughout their lives.

The AAMR's recent definition of MR (AAMR, 1992) uses a different system for classifying MR subtypes. In the AAMR definition, individuals are categorized according to their level of need for support services, rather than their level of intellectual impairment. This definition puts more emphasis on the adaptive behaviour of the individual rather than their intellectual ability. Individuals are classified as requiring intermittent, limited, extensive, or pervasive levels of support. Furthermore, the level of support needed for each area of adaptive behaviour area is to be identified (for example, communication, self-care). Those requiring intermittent levels of support generally function at average level in that particular adaptive area, although they may occasionally may need some support (for example, extra training for a particularly difficult job task). At the other extreme, those requiring pervasive levels of support

in a particular adaptive behaviour area require total supervision and care. For example, some individuals with MR are incapable of any type of self-care (bathing, dressing) on their own and require nursing care.

Identification of Mental Retardation

Those with more severe levels of retardation (i.e. severe and profound) are more likely to display difficulties at a very young age, as well as cooccurring medical conditions, which would alert their parents or physician that there is a significant impairment in their development. However, those in the mild and sometimes moderate range are less likely to be identified before the school years because their difficulties are more noticeable in an academic context.

The two main criteria for diagnosis of MR are scores below 70 on an standardized intelligence test and below age-appropriate adaptive functioning. Hence, these are the two areas of functioning that clinicians assess in order to identify a child with MR. Intelligence is assessed through norm-referenced, standardized tests and adaptive behaviour is assessed either through clinical judgment or behaviour rating scales (Sattler, 1992). One widely used (Sattler, 1992) standardized intelligence test is the Wechsler Intelligence Scale for Children (WISC-III, Wechsler, 1991). The WISC-III test has a mean of 100 and a standard deviation of 15. Hence, those scoring two or more standard deviations below the mean would meet the intellectual criteria for a diagnosis of mental retardation. Although the WISC-III itself does not provide classifications for mental retardation based on IQ scores, it does classify those who score 70 or below as "Mentally Deficient" (Wechsler, 1991). However, Sattler (1992) asserts that the WISC-III, as well as other popular intelligence tests such as the Stanford-Binet, are not designed to assess intelligence in severely or profoundly retarded children. Rather, they are more appropriate

for identifying those in the mild to moderate range. This is because severely and profoundly retarded children may have difficulty understanding instructions, may have physical constraints which prevent them from responding in conventional ways, and because the tests may not assess a low enough range of ability to accurately understand the child's ability (Sattler, 1992). Sattler (1992) suggests that severely and profoundly retarded children can be assessed through informal procedures, task analysis procedures, observation, and teaching trials.

Adaptive behaviour is usually assessed using behaviour questionnaires, checklists, or interviews (Sattler, 1992). These questionnaires assess several areas of functioning such as communication, movement, and social behavior. For example, the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984) assess the adaptive behaviour of both impaired and nonimpaired children. This questionnaire is completed by someone, such as a parent, who is familiar with the child's behaviour. The VABS measures behaviour in four domains including communication, daily living skills, socialization, and motor skills. These scores are standardized, and therefore the child's functioning can be compared to the average functioning of same-age peers. Those with signficantly lower than average functioning in two or more areas would meet the criteria of adaptive behaviour difficulty required for a diagnosis of mental retardation. Many of the adaptive behaviour scales, such as the VABS, are useful for assessing adaptive behaviour in both milder and more severely retarded children (Sattler, 1992).

Aggression in Children With Developmental Delays

Developmental delay is a risk factor other psychological disorders (Benson & Reiss, 1984; Szymanski, 1994). Particularly, aggression is often a difficult problem for children and adolescents with developmental delays. Benson (1985) found that 30% of mentally retarded

persons who were referred to a mental health clinic were referred for behavioural problems with aggression, and that this was the most common reason for referrals. Behaviour problems related to aggression and anger are common diagnoses in those with developmental delays (Benson & Reiss, 1984; Reiss, 1990). Approximately 20% of children and adolescents with mental retardation have some form of severe behaviour disorder (Wing, 1971). For example, Chess & Hassibi (1970) found that 18 of 52 mentally retarded children (about 34%) had a reactive behaviour disorder. That is, their behaviour was characterized by reactive-type aggression. In comparison with typical adolescents, Cullinan et al. (1984) found that teachers rated mentally retarded adolescents as significantly more aggressive. Unfortunately, it is difficult to determine the prevalence of aggressive behaviour in chidren with different degrees of delays because studies in this area have used many different special populations and criteria for aggression. However, it does appear that those with mild disabilities are less likely to self-injure than those with more severe impairments (Sigafoos, 1995).

Aggression in children with DD is important to investigate because it is associated with both depression (Reiss & Rojahn, 1993) and low self-concept (Benson & Ivins, 1992). Developmentally delayed children and adolescents who are aggressive are four times more likely to be depressed than nonaggressive children with delays (Reiss & Rojahn, 1993). Furthermore, similar to aggressive typical children, the social behaviour of children with DD is related to peer acceptance and rejection (Siperstein, Leffert, & Widaman, 1996).

Characteristics of aggressive behaviour. Very little empirical studies have examined the characteristics of aggression in the developmentally delayed population. More research is needed which examines not only the rates of aggressive behaviour in this population but also the specific

characteristics of the aggressive behaviour in comparison to typical populations at different developmental levels. For example, research may examine how anger and aggression is displayed (ex.overt, covert) in those with DD across development. In addition, research could examine how this aggressive behaviour is typified (i.e. reactive and proactive aggression). Moreover, factors such as antecedents and consequences should also be taken into account. For example, Lieber (1994) found that mildly disabled preschoolers had a tendency to have more disputes over objects than nondisabled preschoolers. Mace, Page, Ivancic, and O'Brien (1986) evaluated specific methods for examining the environmental determinants of aggression in individual developmentally delayed children in order to develop the most appropriate treatment strategy. It was found that aggressive behaviour in a three year-old girl with mild mental retardation occurred most frequently following incidences of social disapproval (i.e. a disapproving comment from a caregiver) and divided attention (i.e. when caregivers attention is diverted away from the child). Less frequent incidences which elicited aggression were play (i.e. engaging the child in toy play) and demand (i.e. being presented with tasks).These two kinds of incidences were also the most frequent precursors to aggression in a 12 year-old profoundly retarded male (Mace et al., 1986).

Etiology of aggression in those with developmental delays. Little research has examined the utility of the various theoretical explanations of aggression in those with developmental delays. In addition, there has been very little research examining the characteristics and underlying factors of aggression in the developmentally delayed as compared to the amount of research examing treatment strategies for aggression in this population. It seems that the research has jumped from prevalence studies of aggression in this population directly to intervention

research. This is limiting because treatment programs are then often dependent on research with nondelayed populations. For example, Benson's (1994) Anger Management Training (AMT) Programme for mentally retarded individuals was based on Novaco's work (1977) with non-retarded adults.

Some researchers have outlined possible reasons for aggression and other psychological difficulties in those with DD (Fraser & Nolan, 1994; Holt, 1994). Biological or genetic factors may play à role because developmental delays are often associated with clear organic causes (especially in the moderate to profound range). Therefore, it is reasonable to hypothesize that biological factors could be related to aggression in those with DD. It has been posited that brain damage (Fraser & Nolan, 1994) and neurotransmitter functioning (Holt, 1994) may play a role in aggression for some individuals with DD.

It is plausible that aggression in the developmentally delayed is a learned behavioural strategy in reponse to environmental contingencies. For example, some children with DD may aggress because this leads to social attention (Mace et al., 1986). Therefore, it is important to consider the environmental contingencies which may be maintaining aggressive behaviour in this population.

Low intellectual level is a common component of developmental delay. Therefore, it is plausible to assume that intelligence is somehow related to aggression. Huesmann, Eron, and Yarmel (1987) examined the relationship between intelligence and aggression in a 22-year longitudinal study. IQ in young children predicted aggression levels a few years later. That is, children with lower IQs were more aggressive. However, IQ was no longer related to aggression when the subjects passed 8 years of age. In addition, aggression in childhood was shown to be

negatively correlated with intelligence even in adulthood. The authors posit that lower intelligence increases the likelihood of aggression at a young age, and that this aggression may impair continued intellectual development (Huesmann et al., 1987).

Aggression in persons with DD may also be due to a lack of necessary social cognitive abilities. For example, Sternina (1990) found that mentally retarded children were less successful in identifying facial expressions of emotion and emotions represented in paintings than nonretarded children. In addition, hostility (dislike and distrust of others) has been shown to be positively correlated with aggression in those with mild intellectual disabilities.

SIP of Children with Developmental Delays

To date, only two studies have been published which examined SIP in individuals with DD. One study involved adult men with borderline to moderate delays (Fuchs & Benson, 1995) and the other involved children (5-12 years) with mild delays (Gomez & Hazeldine, 1996).

Gomez and Hazeldine (1996) examined SIP skills in boys and girls with mild mental retardation, and compared these skills to a group of chronological age matched controls, and a group of mental age matched controls. Six peer provocation situations were depicted through six sets of pictures. Each situation depicted either a hostile, unintentional, or ambiguous intention. Participants were then asked questions related to their interpretation of the intention of the peer, as well as what they would do in that situation. These questions are related to Step 2 (interpretation) and Step 5 (response decision) of Crick and Dodge's (1994) model. The main dependent variables were the number of accurate interpretations for hostile and unintentional scenarios, the number of hostile interpretations to ambiguous scenarios, and the percentage of hostile reponses generated. The mentally retarded children were less accurate in their

interpretation of accidental cues and also gave more hostile behaviour responses in ambiguous and accidental scenarios than the chronological age matched controls. However, when hyperactivity and aggression levels were partialled out of the analyses, mentally retarded children only differed from the control groups on the amount of hostile responses to ambiguous cues. This suggests that aggressive DD children may have more deviant SIP patterns than do nonaggressive DD children. Another interesting finding in this study was that mentally retarded children tended to differ more from the chronological age controls than from the mental age controls. This indicates that mentally retarded children may have a developmental lag in their social information processing, and consequently their processing patterns are similar to those of younger children.

A second study examining SIP and developmental delays (Fuchs & Benson, 1995) included adult men with borderline to moderate retardation. These men were grouped as aggressive or nonaggressive based on checklist scores. In this study, participants were presented with hypothetical situations (which were read to them) and were asked a series of questions related to Step 2 (interpretation), Step 4 (response access), and Step 5 (response decision) of Crick and Dodge's (1994) SIP model. The situations depicted a hostile or ambiguous intention of a peer. The aggressive mentally retarded men gave more aggressive solutions than their nonaggressive peers, and tended to first give an aggressive response more often. The two groups did not differ significantly in their interpretation of cues or evaluation of responses. Fuchs and Benson hypothesized that hostile attribution bias may not be necessary in leading to aggressive behavior in this population, particularly because there was not a significant correlation between hostile interpretations and aggressive responses. Unfortunately, this study (Fuchs & Benson,

1995) did not include a control group of non-retarded adults. This would have been beneficial because relatively little is known about how SIP in individuals with DD compares to SIP in typical individuals.

These two studies provide a good start in the examination of SIP and DD. However, the findings are difficult to compare because of the different populations. One study compared children with DD to typical children, and the other compared aggressive DD adults to nonaggressive DD adults. However, there is some indication that aggressive DD children may share some SIP similarities to their aggressive peers. Moreover, DD itself may be associated with its own unique deficits and biases in SIP, which may be developmentally differentiated from other children.

Conceptual Framework for the Current Study

Aggression in children and adolescents is associated with peer rejection (Coie, Dodge, & Kupersmidt, 1990) and long-term negative outcomes (Kupersmidt & Coie, 1990; Kupersmidt & Patterson, 1991). Hence, strategies to reduce aggression in children would be beneficial in order to improve aggressive children's quality of life. Understanding of the mechanisms underlying aggression, such as social information processing, could help in the design of useful strategies to reduce aggression.

Children with DD often have aggressive behaviour problems (Benson & Reiss, 1984; Reiss, 1990). In addition, many researchers have examined various treatment strategies for reducing aggression in those with DD (Benson, 1994; Benson, Rice, & Miranti, 1986; McLain & Lewis, 1994; Zipkin, 1985). However, little research has examined the specific characteristics of aggression or underlying factors of aggression, such as SIP, in DD children. This kind of

information would provide a better foundation for the design of treatment strategies in this population. Research has established that SIP is an important factor underlying aggression in typical children (Crick & Dodge, 1994), and some research (Fuchs & Benson, 1995; Gomez & Hazeldine, 1996) has indicated that SIP may be related to aggression in children with DD as well. However, more research is needed in order to better establish and validate the role of SIP in aggressive children with DD. In fact, a well known author in the field of mental retardation (Benson, 1994) has asserted that the role of SIP in aggression should be investigated in individuals with DD. Furthermore, research is needed to determine whether SIP may differ among aggressive subtypes (i.e. reactive, proactive) of DD children, as it does in typical aggressive children (Crick & Dodge, 1996; Dodge et al., 1997).

Salient Issues with Examining SIP in Children with Developmental Delays

There are important issues to consider regarding the examination of SIP in children with DD. Most studies examining SIP have used hypothetical stories which are presented orally or visually to participants. The participants are then asked questions based on what they just heard or saw. Usually participants respond orally. Hence, children must have adequate verbal ability to complete the interviews. Verbal ability is a component of intelligence. By definition, children with DD have lower intelligence. Therefore, a salient issue is whether children with DD have the verbal ability necessary to understand the stories and questions used in an SIP interview, and the ability to provide oral answers. Little research has examined SIP in children with DD and therefore it is questionable that children with DD would have the verbal ability necessary to understand and complete an interview examining SIP. Those studies which have examined SIP in DD children did not report any examination of the utility of the hypothetical scenario instruments

with the DD group prior to using the instruments for the study (Fuchs & Benson, 1995; Gomez & Hazeldine, 1996).

A related issue when examining SIP in children with DD is time. If children with DD do have more difficulty meeting the verbal demands of an interview, the interview may also take more time than with non-delayed children. Lengthy interview time may be demanding for children with DD and interfere with their classroom activities. Therefore, one must question the amount of time necessary to complete an SIP interview with children with DD.

In order to investigate the role of SIP in children with DD, it is important to address these issues. It is imperative to evaluate the actual interview intended for use with children with DD. This would a) highlight any modifications needed which may improve the interviews appropriate use with this population, it may b) provide evidence that the instrument is appropriate for this population, and c) prevent a large investigational loss which may occur if the study was prematurely carried out and children with DD were in fact not able to complete the interviews. Based on these issues, a pilot study was carried out which examined the utility of an SIP interview (Quiggle, Garber, Panak, & Dodge, 1992) to be used in the current study with children with DD.

Pilot Study

Purpose

A small pilot study was conducted in order to determine the ability of children with DD to answer the questions in the SIP interview, and to determine the length of time required to complete the interview.

Participants

Participants included children in Grades 4-6 attending a special education class (Paced Remedial Education Program) at a public elementary school in the Calgary area. These types of classrooms include children with mild to moderate developmental disabilities. The school was located in a middle-class area of the city. Eleven children were asked to participate. Of those children, 5 (45%) had parents who provided consent. These included 4 boys and 1 girl.

Instruments

An interview assessing social information processing was conducted individually with each child (see Appendix C). This interview is described in detail in Chapter 3. This interview consists of four hypothetical stories which are read to each student. Each story is followed by two questions. One question assesses their interpretation of a peer's intent ("How much do you think the kid(s) was(were) trying to be mean?") and the other question assesses their response decision ("What would you do if this happened to you?"). Two of the scenarios depicted peer entry type situations, and the other two depicted provocation type situations.

Procedure

Children received cover letters and consent forms which were to be sent home to their parents. Children who had consented to participate were interviewed individually by the primary experimenter. Interviews took place during class time. The interview was administered as described in Chapter 3. This included the use of a visual aid for the question assessing interpretation (see Appendix C).

Results

The results for the two variables are represented in Table 2. Scores for interpretation (INT) range from 4 - 16 in total and from 2-8 for each situation type. Higher scores indicate more

hostile attributions of intent. Children's response decisions (RD) were coded as aggressive or nonaggressive. Table 2 reflects the total number of aggressive responses the five children gave which had a possible range of 0-20, and a possible range of 0-10 for each situation type. Table 3 represents the actual responses given by the participants.

The mean total INT score was 10.8 which indicates an average score of about 3 for each story, which was indicative of agreeing "*Much*" that a peer(s) was(were) trying to be mean. This means that these children generally attributed some hostile intent to a peer in the scenarios they heard. A total of 9 aggressive responses were given which indicates that each child gave an average of about 2 aggressive responses across the four stories. However, examination of Table 3 indicates that these aggressive responses were relatively mild in nature. In fact, the only type of aggressive response given was telling an adult in order to get the peer in trouble. The nonaggressive responses given reflect few assertive behaviours (ex. I would tell them to stop), and several passive behaviours (ex. I would walk away, I would go to the back of the line). Of note, it appears that the children gave more hostile interpretations and more aggressive responses after hearing the provocation scenarios than the peer entry scenarios. In general, it seemed that children were likely seek authority when provoked by a peer, and likely to leave the situation when rejected by their peers.

Table 2
Interpretation and Response Decision: Results for Pilot Sample

	INT (M)	RD (Number of aggressive responses)
PE	4.2	3
PROV	6.6	6
Total	**10.8**	**9**

Note. INT = interpretation scores. RD = response decision scores. PE = peer entry scenarios. PROV = provocation scenarios.

Table 3
Responses Given to the Question "What would you do if this happened to you?"

Aggressive Responses:

in PROV scenarios:
- I'd tell a teacher (so that he/she gets in trouble) **
- I'd tell someone in the lunchroom (so he/she gets in trouble)

in PE scenarios:
- I'd tell a teacher (so that he/she gets in trouble)*

Nonaggressive Responses:

in PROV scenarios:
- I'd ask him politely if he/she would go to the back of the line
- I'd go to the back of the line
- I'd tell them to stop
- I'd wear a different sweater

in PE scenarios:
- I'd walk away*
- I'd move to another table*
- I would just not play or play by myself
- I just wouldn't sit with them

Note. * indicates the response was given more than once. ** indicates the response was given more than five times.

All five children were able to complete each of the questions in the interview. Some children had more difficulty with the first question "How much do you think the kid(s) was trying to be mean?". However, the visual aid (Appendix C) seemed helpful in explaining that they were to pick one answer from the four possible answers presented to them. In addition, the question was repeated as necessary. The story was read a second time if the child requested. Using these strategies, all children were able to answer each question.

All five interviews were conducted in approximately 45 minutes. Interviewing time ranged from 8 - 10 minutes for each child, including the introductions and instructions.

Implications for the Current Study

The results of this pilot study indicated that children with DD had adequate verbal ability to complete the SIP interview. Furthermore, all of the children completed the interview in a relatively brief amount of time. Therefore, the same interview was used for the main study with both typical children and children with DD. No modifications to the instrument were made.

Purpose of the Current Study

The aim of this study is to better understand the underlying social cognitive factors of aggression in children with DD. Based on the existing literature, this study investigated whether there is empirical support for the contention that aggressive children with developmental delays (DD) show similar biases in their SIP as do typical aggressive children. The intent is to examine the second processing phase of interpretation, and the fifth processing phase of response decision.

Questions

The major questions to be addressed are:

a) Do aggressive children with DD have biases in their SIP?

b) Is their a relationship between SIP and aggressive type?

c) Do children with DD process social information like typical children?

d) Is SIP associated with situational context?

e) Are hostile interpretations of intent associated with aggressive behaviour in children with DD?

f) Do children with DD have higher levels of Reactive and Proactive aggression than typical

children?

g) Is social maladjustment related to aggression in children with DD?

Hypotheses

The following are the hypotheses related to these research questions:

1) It is hypothesized that children with DD will give more hostile interpretations and more aggressive responses than typical children.

2) It is hypothesized that reactive-aggressive children and reactive-proactive aggressive children will give more hostile interpretations of intent than proactive aggressive and nonaggressive children.

3) It is hypothesized that proactive aggressive and reactive-proactive aggressive children will give more aggressive responses than reactive-aggressive and nonaggressive children.

4) It is hypothesized that aggressive typical children will give more hostile interpretations than aggressive children with DD.

5) It is hypothesized that there will be a significant positive correlation between typical children's interpretation of situations and their subsequent response decisions.

6) It was hypothesized that reactive and proactive aggression would be predictive of social maladjustment in both the typical and DD groups. Specifically, it was predicted that there would be a significant positive correlation between aggression and social maladjustment.

Conclusion

There are negative consequences for children who are aggressive and therefore it is desirable to develop appropriate strategies to reduce this aggression. In order to do that however,

one must understand the factors underlying the aggression. Much research has shown that specific deficits and biases in social information processing are associated with aggression. Children with developmental delays appear to be at particular risk for developing aggressive behaviour, yet little is known about their aggression. Therefore, this study attempts to shed light on aggression in children with developmental delays. Specifically, this study examines social information processing in both typical children and children with developmental delays. This study investigates the association between aggression and developmental status with social information processing. The next section describes the design of the study and the procedures used to investigate the research questions.

CHAPTER III: METHOD

This section describes the design and procedures used in this study to investigate the research questions regarding social information processing (SIP) outlined in the previous section. First, a presentation of the research design is provided. This is followed by a description of the participants included in the study. Third, the instruments used in this study will be presented and described. This includes a detailed description of the SIP interview investigated in the pilot study. Due to some necessary re-organization of the research design, which will be elucidated in the next sections, this chapter concludes with a discussion and presentation of the modifications made.

Research Design

The design constructed for this study was a 2x4 between group by 2x2 within group factorial design. The two independent variables are developmental status (typical versus developmentally delayed [DD]) and aggressive type (Reactive Aggressive [Rv], Proactive Aggressive [Pv], Rv *and* Pv, Nonaggressive). The within group variable is situation type (provocation [PROV], peer entry [PE]). The two dependent variables are interpretation (INT) and response decision (RD). The following tables illustrate this design.

Between group.

AGGRESSIVE TYPE

DEVELOPMENTAL STATUS	Rv	Pv	RvPv	Nonagg.
	Typical	Typical	Typical	Typical
	DD	DD	DD	DD

Within group.

	SITUATION TYPE	
SIP VARIABLE	PE	PROV
	INT	INT
	RD	RD

Participants

A total of 200 participants were sought (100 DD and 100 typical) in order to ensure enough participants for each of the groups in the analyses. Participants included boys and girls in Grades 4 to 6, from the Calgary area. Typical and developmentally delayed children were recruited from both of the two major school boards in the Calgary area. These are the Calgary Board of Education (CBE) and the Calgary Catholic School District (CCSD). Entire classes were asked to participate.

Typical children. The typical children in this study were children attending regular classrooms in public schools. They were recruited from both of the two major school boards named above. In total, nine classrooms from three different schools participated. These included one Grade 4 class, two Grade 4/5 classes, three Grade 5 classes, one Grade 5/6 class, and two Grade 6 classes. Each of these schools was located in a different quadrant of the city (SW, SE, and NE). Each of these schools was located in a middle-class neighborhood and according to principals, each school was attended by a majority of Caucasian students. A total of 213 students were asked to participate. Of those children, 52 had parents who provided consent (24%).

Demographic information for this group including gender, age, and grade level are presented in Table 4. There were comparable numbers of boys and girls in the group, with an average age of 10 years 6 months. Approximately two-thirds of the children were in grade 5.

Children with DD. Children with DD were children with mild to moderate delays in their cognitive and adaptive functioning. The children with DD were attending special education classrooms in public schools. They were also recruited from each of the two public school boards. Within the CBE, this included children attending Paced Remedial Education Programs (PREP) in the Grade 4-6 age range. These are special education classrooms designed to meet the needs of children with mild to moderate developmental delays. Children in these classes have IQ scores in the range of 50 - 75 (mild to moderate mental retardation). Within the CCSD, these included children attending DD (Level 1) classes. DD1 classes are pull-out programs also for children with below average intellectual ability and mildly delayed adaptive behaviour. Typically these classrooms include 10-13 students. All 27 schools that offered these programs were asked to participate (excluding the school which participated in the pilot study). Of those 27 schools, 9 schools agreed to participate, for a total of 9 classrooms. In total, there were 93 students in these classes. Therefore, the initial pool of possible participants was lower than anticipated. Of those who were asked to participate, 26 had parents who provided consent (28%). The demographics of this group are also presented in Table 4. This group also had comparable numbers of boys and girls. A chi-square revealed there was no significant difference between the number of boys and girls in the typical group and the group with DD, $x^2 = .929$, $p > .05$. The average age was 10 years 9 months and a t-test revealed there was no significant difference between the ages for the children with DD and the typical children, $t = -1.38$, $p > .05$. Approximately one fifth of the

children were in grade 5, with the remaining children equally distributed among grade 4 and grade 6.

Therefore, in total, 306 students were asked to participate. Of those, 78 (25 %) provided consent.

Table 4
Sample Characteristics

	Typical (*n*=52)	DD (*n* = 26)
Boys	30 (58%)	12 (46%)
Girls	22 (42%)	14 (54%)
Mean Age	10.5 yrs.	10.8 yrs.
Age Range	9.0-12.0 yrs.	9.0-12.9 yrs.
Grade 4	12	11
Grade 5	31	5
Grade 6	9	10

Research assistants. The primary experimenter and one assistant completed the interviews with the children who were participating. A second assistant recoded the responses in order determine interrater agreement. Both assistants were female and in the fourth year of undergraduate psychology programs.

Training for interviews: The first assistant was trained in the interviewing procedures before data collection in approximately two one-hour sessions. The assistant first read the SIP

scenarios, subsequent questions, and corresponding verbal instructions. She then practiced the interview with a partner and the primary experimenter. This included presenting the instructions, reading the scenarios, asking the SIP questions, and recording responses. She also answered any spontaneous questions that her "mock" participant asked. Any questions or issues which arose were discussed with the primary experimenter.

Training for coding procedures: Responses to the second SIP question assessing response decision required coding as either aggressive or nonaggressive. Both assistants were trained in the coding procedures in one one-hour session. This included definitions of aggressive and nonaggressive responses, and examples for each. Assistants practiced coding the responses given by their "mock" participants, as well as additional responses generated by the primary experimenter. After training was completed, interrater reliability was analyzed by having each of the assistants code a series of 16 possible responses. Several of these responses were generated from the pilot data. Interrater reliability was analyzed by examining the number of response codings that were agreed upon with the primary experimenter divided by the number of total number of responses. Agreement with the primary experimenter was 93.75% for each of the assistants.

Instruments

Demographic questionnaire. A background information sheet was completed by the parents of the participants in order to obtain descriptive information about the participants. This questionnaire included three questions which assessed the child's grade level (grade 4, 5, or 6), birthdate, and sex (see Appendix A). This allowed for an basic examination of the chronological age and educational level of the participants in each of the groups. It also depicted whether the

groups were equally represented by both boys and girls. Although more descriptive information could have been elicited, such as ethnic background and yearly economic earnings, the questionnaire was kept concise in order to shorten the length of time required of parents to complete it and to keep it less intrusive.

Teacher rating scale for reactive and proactive aggression. The homeroom teacher of each of the students in the DD and typical group completed a rating scale developed by Dodge and Coie (1987) assessing levels of reactive and proactive aggression (see Appendix B). The results of this rating scale were used to classify students as aggressive or nonaggressive.

The teacher rating instrument consists of three items assessing reactive aggression and three items assessing proactive aggression. In a copy of the instrument obtained directly by Dodge in 1999 (personal correspondence), the instrument contained 13 filler items examining social adjustment, although other numbers of filler items in this instrument have been used in other studies (Crick & Dodge, 1996; Dodge & Coie, 1987). However, the number of filler items that are used is relatively unimportant because the filler items are not included in the RA and PA score calculations. Therefore, a total of 6 of the 13 filler items were chosen for this study in order to shorten the length of time teachers would spend completing the instrument and to get some indication of social adjustment. The 6 items chosen assessed peer interaction, isolation, acceptance, popularity, and rejection. These have all been considered measures of social adjustment (Crick and Dodge, 1994). In total, teachers completed 12 items for each child.

Each item consists of a descriptive statement using a five point Likert-type scale. The teacher is to rate the statement as 1 (Never true of this child), 2 (Rarely true of this child), 3 (Sometimes true of this child), 4 (Usually true of this child), or 5 (Always true of this child). An

example of an item on the reactive aggressive scale is "When this child has been teased or threatened, he/she gets angry easily and strikes back". An example of an item on the proactive aggressive scale is "This child gets other kids to gang up on a peer that he/she does not like". An example of a filler/social adjustment item is "This child is accepted by the peer group". Teachers were asked to rate each child in relation to children in general of the same age, as opposed to rating only in relation to their individual classroom context. Teacher ratings on this instrument result in three scores. One score for reactive aggression, one for proactive aggression, and one for social adjustment which are derived by adding the scores for the items on each scale. For each of the aggression scales, there is a minimum score of 3 and a maximum score of 15. For the social adjustment scale, there is a minimum score of 6 and a maximum score of 30.

The median split method was used to classify children into aggressive types. This is the original method employed by Dodge and Coie (1987) during the development of the instrument. Using this method, children scoring above the median on the reactive-aggressive scale are classified as reactive aggressive, those scoring above the median on the proactive-aggressive scale are classified as proactive aggressive, and those scoring above the median on both the reactive and proactive aggressive scales are classified as reactive and proactive aggressive. All those scoring below the median on both scales are classified as nonaggressive. This method has been found sensitive enough to detect differences among the aggressive types (Dodge & Coie, 1987). This method also ensures a relatively even number of participants in each group for the statistical analyses. The median for the total group was used in order that the cut-off point was the same for both the typical and DD group.

Mean social adjustment scores were obtained for the typical and developmentally delayed

group of children. These groups of children were then compared based on their mean scores (i.e. children were not divided into groups based on their social adjustment score).

The psychometric properties of this scale were examined in a series of studies which investigated the distinction between proactive and reactive aggressive children (Dodge and Coie, 1987). First, factor analyses were conducted with two samples of children in order to determine whether the three reactive and three proactive items would indeed factor as predicted into two separate scales, which would support the instruments construct validity. Six other nonspecific aggression items were also included in the analyses. In the first study of third through sixth-grade boys and girls, the three reactive items loaded most strongly on the first factor (reactive) with factor loadings ranging from .76 to .86, and a factor eigenvalue of 8.26. On the second factor (proactive), all of the loaded items were the proactive aggression items, with factor loadings ranging from .64 to .84, and a factor eigenvalue of .74. The results of the same analysis with scores for first through third-grade Black males yielded very similar results, with the same three reactive and three proactive items loading separately and most strongly on the two factors. Although the eigenvalue for the second factor (proactive) was low, Dodge and Coie (1987) suggest that teachers view children's aggressive behavior as largely unidimensional, although the distinction between reactive and proactive aggression is still reliable.

Intrascale item correlations derived from these two studies ranged from .66 to .81 for the reactive scale and .66 to .79 for the proactive scale. In the first analysis, the internal consistencies, as measured by the coefficient alpha, were high at .90 and .91 for the reactive and proactive scales respectively, and were very similar in the second sample as well. The correlation between the two scales was .76, which although high, is lower than the within-scale item

correlations, which supports the discriminant validity of the aggression subtypes (Dodge & Coie, 1987).

The concurrent validity of the reactive and proactive aggression types, as derived by this instrument, was investigated in the second study (Dodge & Coie, 1987). The behaviour of children classified as Rv, Pv, neither, or both, based on the teacher rating instrument, were contrasted based on peer rated behavioral descriptions. These groups did indeed differ on several variables. For example, the proactive-aggressive group was viewed as being higher in leadership abilities and as more bothersome than the reactive-aggressive and reactive-proactive aggressive boys.

Evidence of the concurrent validity of the teacher-rating scales of reactive and proactive aggression was found in a third study (Dodge and Coie, 1987) using a portion of the sample from the second study. In this study, teacher ratings of reactive and proactive aggression were correlated with direct observations of reactive and proactive aggressive behavior. The correlation between teacher ratings of reactive aggression and the observed rate of this type of aggression was significant at .27, even when the teacher rating of proactive aggression was partialled out. Similarly, the correlation between teacher ratings of proactive aggression and observations of proactive aggression was significant at .27, even when reactive aggression ratings were partialled out. In summary, the teacher-rating instrument developed by Dodge & Coie (1987) appears to have demonstrated adequate reliability and validity.

Social information processing interview. An adapted version of an instrument developed by Quiggle, Garber, Panak, and Dodge (1992) was used to assess children's social information processing (see Appendix C). This instrument was originally used in a study involving aggressive

and depressed third through sixth-grade boys and girls (Quiggle et al., 1992). This instrument contains four hypothetical scenarios which were read to the participants during individual interviews. Each scenario depicts a situation with a negative outcome in which the intention of the peer(s) in the story is ambiguous. After each story participants responded verbally to two questions assessing their processing of phase 2 - interpretation and phase 5 - response decision, of the SIP model (interviewers were blind to the children's aggressive status).

Two stories depict children in peer entry situations and the other two depict children in provocation situations. Peer entry and provocation situations have both been shown to elicit biased interpretations in aggressive children (Dodge, McClaskey, & Feldman, 1985). Peer entry (PE) situations involve a child being rejected when trying to enter a group. An example of a PE story is "Imagine that some kids you know are throwing a ball around. They're laughing and having a good time. You would like to join them. You go up to them and say, "Hi can I play?". They say no." Provocation (PROV) situations involve a child being ridiculed or bumbed into by a peer. An example of a PROV story is "Imagine that you are waiting in the lunch line. Another kid bumps into you; you fall and hurt your knee. You look up and the other kid has taken your place in line". The gender of the characters are left ambiguous in all of the stories.

In order to assess their interpretation, after each story is read the participants were asked "How much do you think the kid(s) was/were trying to be mean?" They responded on a four-point scale from 1(Not at all), 2 (Somewhat), 3 (Much), or 4 (Very much). A visual aid depicting this scale was used to help the children answer the question, and allow them to point to their response if they wished (see Appendix C). This question assesses their degree of agreement that a peer acted with hostile intent. This question resulted in a minimum score of 2 and a maximum

score of 8 for each situation type (4–16 in total), with higher scores indicating a more agreement with a hostile attribution.

The second question asked after each story assessed the children's response decision, that is, what they think they would do in each situation. Specifically, children were asked "What would you do if this happened to you?". The interviewer recorded the child's response verbatim. Only the child's first response was recorded and analyzed. Each response was later coded as aggressive or nonaggressive. The definitions for each classification were as follows:

Nonaggressive response - Any response in which there was no intent to cause physical or psychological harm or injury to another person.

Examples: "I would cry", "I would walk away", "I would ask them again if I could join"

Aggressive response - Any response in which there was an intent to cause physical or psychological harm or injury to another person. This response may be direct or indirect, physical or verbal, overt or covert.

Examples: "I would tell the teacher so he/she would get in trouble", "I would call him/her 'stupid'", "I would wreck his/her stuff", "I would kick him/her", "I would push him/her back"

The number of aggressive responses for each of the two situation types was summed for each participant. This question resulted in a minimum of 0 and a maximum of 2 aggressive responses for each situation type, and 0 to 4 aggressive responses in total.

Differences between the original version (Quiggle et al., 1992) and this adapted version of the social information processing instrument include (a) the two failure situations in the original version are not being used (they were used because these kinds of situations elicit biased

interpretations in depressed individuals, whom their study was also examining), (b) only questions assessing interpretation and response decision are being asked, whereas the original version asked several other questions assessing other variables, and (c) a more comprehensive definition of what constitutes an aggressive response is being used.

Procedure

Teachers were asked to send home a consent form (see Appendix D) and cover letter (See Appendix E), with the attached demographic questionnaire, with each of the children in their class. Parents were asked to complete and return the forms within one week if they were interested in their child participating. Teachers were also be given cover letters and consent forms for their participation (see Appendices F and G).

The teacher of each student in the study completed the teacher rating instrument for aggression at their convenience, although they were asked to complete the forms within two weeks. A key was developed which assigned a number to each participating child. Teachers were asked to provide the number (not the name) of the student on the rating scale, which was used to match the teacher ratings with the children's interview data. Teachers were also asked to keep their responses on the instrument confidential.

Children were interviewed individually by either the primary experimenter or an assistant experimenter who was in her fourth year of an undergraduate psychology program. Both experimenters were blind to the children's aggressive status. The interviews assessing SIP took approximately 8-10 minutes per child, and took place during regular class time. Short explanations were provided to the students before the stories were read. Students were told that they would hear some stories and would be asked a couple of questions about what they think.

They were also briefly introduced to the four point rating system which they used to respond to the first question assessing interpretation. Responses to the second question (RD) were coded by the interviewer at a later time. The presentation of vignettes was counterbalanced so that approximately half of the participants heard the two PE situations first, followed by the two PROV situations, and the rest of the participants heard the PROV situations first, and then the PE. Interrater agreement regarding the coding of the RD items was analyzed by having one assistant, trained in the scoring system, score 10% of the responses and assessing the level of agreement with the two interviewers.

Modified Research Design

Participant recruitment resulted in a total of 78 participants which is significantly lower than the 200 originally anticipated. Division of these children into the eight groups in the analyses would result extremely low numbers in each group that would be inadequate for the statistical analyses. Therefore, the design of the study was modified from a 2x4 between group to a 2x2 between group. Instead of classifying children as either Rv, Pv, Rv and Pv, or Nonaggressive, children were classified as Aggressive or Nonaggressive. Below is a visual representation of this design.

Between group (2x2).

AGGRESSIVE TYPE

DEVELOPMENTAL STATUS	Aggressive	Nonaggressive
	Typical	Typical
	DD	DD

Children who had been classified as Rv, Pv, or Rv and Pv, were all classified as aggressive. The remaining children were still classified as Nonaggressive. However, children still had *scores* for both reactive and proactive aggression. The independent variable of developmental status remained the same, as did the within group variable (situation type). Due to these changes, some of the questions and hypotheses of the study were somewhat modified and are presented below.

Questions. This study attempted to answer the following research questions:

a) Do aggressive children with DD have biases in their SIP?

b) Do aggressive children have biases in their SIP compared to nonaggressive children?

c) Do children with DD process social information like typical children?

d) Do children with DD have higher levels of reactive and proactive aggression than typical children?

e) Is SIP affected by situational context?

f) Are hostile interpretations of intent positively correlated with aggressive behaviour in

children with DD?

g) Is social maladjustment associated with aggression in children with DD?

Hypotheses. Based on these questions, the following hypotheses are made:

Hypothesis 1: It was hypothesized that aggressive children will a) more strongly believe a peer was acting with hostile intent and b) will give more severe aggressive responses than nonaggressive children.

Hypothesis 2: It was hypothesized that children with DD will a) more strongly agree that a peer was acting with hostile intent, and b) will give more severe aggressive responses than typical children.

Hypothesis 3: It was hypothesized that there would be a significant interaction between aggressive type and psychological status on interpretation. Specifically, it is posited that the aggressive children with DD will have lower scores on interpretation of hostile intent than the aggressive typical children.

Hypothesis 4: It was hypothesized that there will be a significant positive correlation between typical children's interpretation of situations and their subsequent response decisions. That is, children who agree more strongly that a peer acted with hostile intent will also give more aggressive responses.

Hypothesis 5: It was predicted that there would be a significant positive correlation between aggression and social maladjustment.

CHAPTER IV: RESULTS

Teachers rated reactive and proactive aggression for each of the students, and these ratings were used to classify children into aggressive types. The results of these ratings for typical children and children with DD are analyzed in the first section followed by a description of how children were classified based on these scores. The third section represents the results of the primary analysis investigating SIP in relation to aggressive type and developmental status. The continous variable INT was analyzed using a three-way ANOVA with two between-group variables and one within-group variable. The discrete variable RD was analyzed using chi-square analyses. Next, the effects of situation type on SIP are assessed. The fifth section describes the analysis run to determine the relationship between the two SIP variables under investigation. Social maladjustment and its relationship with aggression was then analyzed for both typical children and children with developmental delays. The last section highlights post-hoc qualitative analyses regarding SIP in the children with extremely high and low aggression scores.

The statistical software program SPSS 9.0 was used to analyze the data. A standard alpha level of .05 was used for all statistical tests.

Reactive and Proactive Aggression in Typical Children and Children with DD: Do children with DD have higher levels of these types of aggression?

Means, medians, and standard deviations of the reactive aggression scale scores (RA) and the proactive aggression scale scores (PA) are presented in Table 5. The data set was evaluated for violations of the statistical assumptions of normality, linearity, and homogeneity of variances. A alpha level of $p < .001$ was used for assumption tests because this is reported to be a conservative alpha size for small to moderate sample sizes for tests of assumptions (Tabachnick

& Fidell, 1996). All distributions were normal with the exception of PA scores for the typical group of children. There was a significant positive skewness in these scores, $z = 4.3$, $p < .001$, although the kurtosis was not significant, $z = 3.41$, $p > .001$. No data transformations were performed. Scatterplots (see Figure 2) revealed a linear relationship between RA and PA scores. Box's test for the equality of covariance matrices revealed comparable covariances among RA and PA for each group, Box's $M = 1.67$, $p > .001$.

Pearson correlations were conducted to examine the relationship between RA and PA. There was a significant positive correlation between RA and PA for the typical group, $r = .76$, $p < .001$, as well as for the DD group, $r = .83$, $p < .001$. Higher scores on RA were correlated with higher scores on PA.

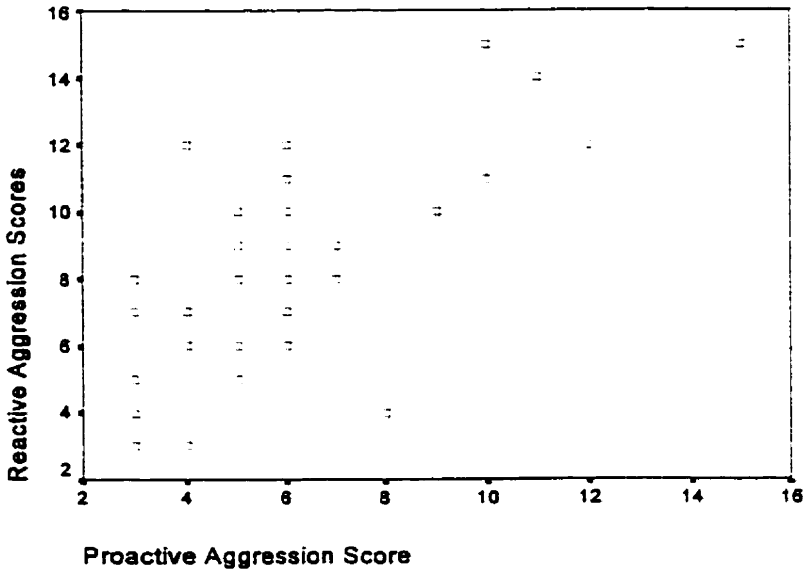
Although the means for both RA and PA in the DD group were higher than the typical group (see Table 5), a multivariate analysis of variance (MANOVA) revealed that these differences were not signficant, Wilks Lambda = . 98, $p > .05$. Table 6 represents a summary of the MANOVA.

Table 5
Means, Medians, and Standard Deviations for RA and PA

	Typical (n=52)			DD (n = 26)			Total Sample		
	M	Md	SD	M	Md	SD	M	Md	SD
RA	**7.3**	*7.0*	3.3	**8.4**	*6.5*	4.0	**7.7**	*7.0*	3.5
PA	**5.5**	*5.0*	2.7	**6.2**	*5.5*	3.3	**5.7**	*5.0*	2.9

Note. RA= reactive aggression scores. PA = proactive aggression scores. Scores range from 3 - 15.

TYPICAL GROUP



DD GROUP

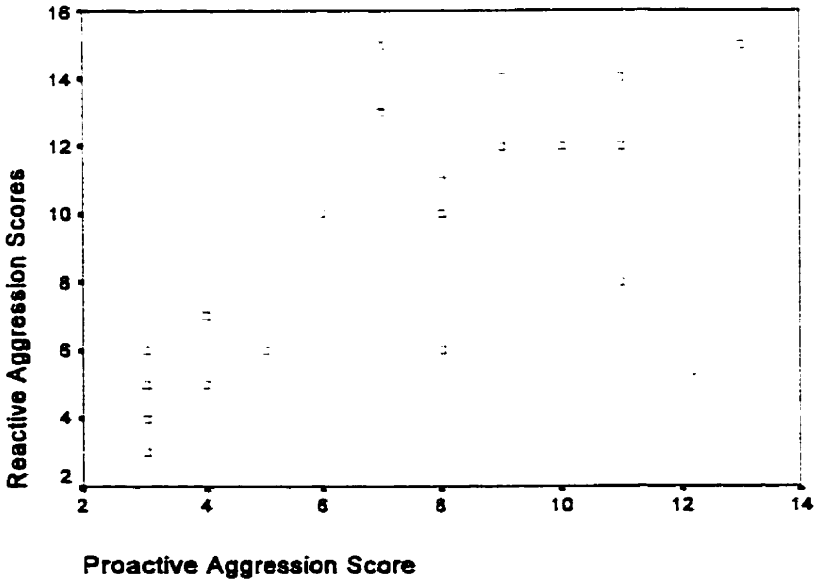


Figure 2. Scatterplots of RA and PA Scores

Table 6
Summary of MANOVA for RA and PA Between Children with DD and Typical Children

Source	df	F	
		RA	PA
	Between subjects		
Dev. Status	2	1.51	.985
Within-group error	76	(12.38)	(8.43)

Note. Dev. Status = Developmental staus. Values enclosed in parentheses represent mean square error. MANOVA was non significant, $p > .05$.

Categorization of Aggressive and Nonaggressive Children

Aggression classifications were made using the median split method described earlier. The *total group* medians for the RA and PA scores were used (see Table 5). Children who scored above the median on the RA or PA scales were classified as that aggressive type. Using this method, 7 children were classified as Reactive Aggressive (Rv), 7 were classified as Proactive Aggressive (Pv), 29 were classified as both Rv and Pv, and 35 were classified as Nonaggressive. Children who were Rv, Pv, or both Rv and Pv were all classified as *Aggressive*. The resulting sample size for each of the four groups is depicted in Table 7. Chi-square analysis indicated there were significantly more boys than girls categorized as aggressive, $x^2 = 4.90$, $p < .05$. However, an examination of Table 7 reveals that this relationship was only apparent for the children in the typical group. An ANOVA revealed no significant difference in the mean age for aggressive and nonaggressive children, $F(1, 75) = .15$, $p > .05$.

Table 7
Sample Size Within Each Group

	Aggressive		Nonaggressive	
	Typical	DD	Typical	DD
Boys	22	6	8	6
Girls	8	7	14	7
Total	30	13	22	13

Do Aggressive Children or Children with DD Show Biases in their SIP?

One child in the aggressive/DD group did not complete any questions in the interview, therefore was not included in the analyses.

Interpretation. Table 8 depicts the means and standard deviations for each group for their INT scores. Scores for INT ranged from 4-16 in total (2-8 for each situation type). The continous variable of INT was evaluated for the statistical assumption of normality. INT scores for both situation types were normally distributed, each with skewness z scores of $p > .001$. An ANOVA revealed that the order of presentation of the vignettes during the interviews (i.e. PE then PROV, or vice versa) did not have a significant impact on INT, $F(1, 75) = .47$, $p > .05$. When scores were broken down across situation types, again there was no effect of situation order, both p values $> .05$.

Table 8
INT Means and SDs

	Aggressive		Nonaggressive	
	Typical	DD	Typical	DD
INT				
PE	5.6(1.3)	6.0(1.7)	5.6(1.5)	4.7(1.7)
PROV	6.0(1.3)	6.6(1.5)	6.4(1.3)	6.3(1.6)
Total	**11.6** (2.1)	**12.6** (2.7)	**11.9** (2.4)	**11.0** (2.7)

Note. SDs are in parentheses. INT=interpretation. INT scores range from 4 - 16 in total, and from 2 - 8 for each situation type. PE = Peer Entry. PROV = Provocation.

A three-way ANOVA was conducted with the two between-group variables (aggressive type and psychological status) and the one within-group variable (situation type) in order to evaluate their effects on INT. A summary of the ANOVA is presented in Table 9. Although the aggressive and nonaggressive groups differed in their numbers of boys and girls, gender was not covaried due to the increased number of possible interactions and the relatively small cell counts. That is, in addition to any effects that gender might have on INT, there would be a potential of several two-way or three way interactions with the other variables. Therefore, the chance of making a Type I error would be increased due to the sheer number of interactions possible. The ANOVA revealed no significant main effect for aggressive type, $F(1, 73) = 1.20$, $p > .05$, or psychological status, $F(1, 73) = .00$, $p > .05$. There was a trend toward an interaction between aggressive type and psychological status, with children who were both aggressive and DD

scoring higher on INT. However, this interaction was not significant, $F(1, 73) = 2.64$, $p = .11$. The within-group effects are highlighted in the next section.

Table 9
Analysis of Variance for Interpretation Scores

Source	df	F
	Between subjects	
Developmental Status (DS)	1	.00
Aggressive Type (AT)	1	1.20
DS x AT	1	2.64
Within-group error	73	(2.84)
	Within subjects	
Situation Type (ST)	1	17.96**
DS x ST	1	1.48
AT x ST	1	3.24
DS x AT x ST	1	.58
ST x within-group error	73	(1.36)

Note. **$p<.001$. Values in parentheses represent mean square errors.

Response decision. RD was represented by the total number of aggressive responses given which ranged from 0 - 4 in total (0-2 for each situation type). Interrater reliability was analyzed by having an independant rater code 10% of the RD responses initially coded by the

two interviewers. These responses were selected using a random number table. Interrater reliability was 90%. Table 10 reveals the frequencies of aggressive responses for each group. Most children gave zero or one aggressive response. Chi-square analysis indicated that the order of presentation did not influence the number of aggressive responses given x^2=.02, p >.05. When scores were broken down across situation types, again there was no effect of situation order, both p values >.05.

Table 10
RD - Frequency of Aggressive Responses

	Aggressive		Nonaggressive	
	Typical	DD	Typical	DD
Total number of aggressive responses				
0	**11** (37%)	**0** (0%)	**10** (46%)	**4** (31%)
1	**12** (40%)	**7** (58%)	**9** (41%)	**2** (15%)
2	**6** (20%)	**1** (8%)	**3** (14%)	**6** (46%)
3	**1** (3%)	**3** (25%)	**0** (0%)	**0** (0%)
4	**0** (0%)	**1** (8%)	**0** (0%)	**1** (8%)

Note. Numbers in bold represent the number of children who gave that many aggressive responses. Numbers in parentheses represent the rounded percentage.

Chi-square analyses were run to determine the effects of aggressive status and developmental status on the number of aggressive responses children gave. Due to empty cell counts for some groups (ex. in the nonaggressive typical group no children gave three or four aggressive responses), children were coded as either a) giving zero or one aggressive response or

b) giving 2 to 4 aggressive responses. Table 11 represents this grouping. The numbers in these tables represent the number of children who gave either zero or one aggressive response, or two to four aggressive responses. A chi-square analysis revealed that aggressive children were no more likely to give more aggressive responses than nonaggressive children, $x^2=.00$, $p > .05$. An examination of Table 10 suggests that this was the case for both typical and developmentally delayed children. A second chi-square analysis revealed that children with DD gave aggressive responses more often than typical children, $x^2= 6.85$, $p = .01$.

Table 11
Representation of Chi-Square Analyses

# of Aggressive Responses	**Aggressive**	**Nonaggressive**
0-1	**30** (71%)	**25** (83%)
2-4	**12** (29%)	**10** (17%)

# of Aggressive Responses	**Typical**	**DD**
0-1	**42** (81%)	**13** (52%)
2-4	**10** (19%)	**12** (48%)

Note. Values represent the number of children in that group who gave the number of aggressive responses indicated. Percentages are in parentheses.

Is SIP affected by Situational Context?

Table 12 reveals the means and standard deviations for INT for each of the situation types across the entire sample. Table 13 reveals the frequency of aggressive responses for each of the situation types across the entire sample. For each situation type children could give a total of 0 to 2 aggressive responses.

Table 12
Means and Standard Deviations for INT by Situation Type

	Peer Entry	Provocation
INT	**5.5** (1.5)	**6.3** (1.4)

Note. SDs are in parentheses. Scores are collapsed across groups. Scores ranged from 2-8.

Table 13
RD across Situation Types: Frequency of Aggressive Responses

		PROV	
		0	1-2
PE	0	**26**	**39**
	1-2	**2**	**10**

Note.. Numbers in bold represent the number of children who gave either no (0) aggressive responses or one to two aggressive responses for each situation type. PE = Peer Entry situation type. PROV = provocation situation type.

The ANOVA conducted (see Table 9) on INT scores indicated there was a significant within-subject effect for situation type, $F(1, 73) = 17.96$, $p < .001$, with children agreeing more strongly that a peer acted with hostile intent in the PROV scenario than in the PE scenario. There was a trend toward an interaction between aggressive type and situation type, $F(1, 73) = 3.24$, $p = .08$. There was no significant interaction between developmental status and situation type, $F(1, 73) = 1.48$, $p > .05$, and no significant three-way interaction between the aggressive type, psychological status, and situation type on INT scores, $F(1, 73) = .58$, $p > .05$.

A McNemar test was conducted in order to determine the effect of situation type on RD. This test is designed for an examination of within-group effects on dichotomized variables. Children were coded as either a) giving no aggressive responses or b) giving one to two aggressive responses. There was a significant within-group effect of situation type, $x^2 = 31.61$, $p < .0001$. Children gave more aggressive responses after hearing the PROV scenarios than after hearing PE scenarios.

Are Interpretations Associated with Response Decisions?

It was hypothesized that children who more strongly attributed hostile intent to a peer would be more likely to respond aggressively. Pearson correlations were conducted for the typical group of children and the group of children with DD to determine whether INT scores were correlated with the number of aggressive responses children gave. Table 14 reveals the correlations for the typical group and the group with DD. Results revealed that there was no significant correlation between INT scores and the number of aggressive responses given for either group. Although, due to most children giving few aggressive responses, these results may be somewhat unreliable as the RD variable acts essentially as a constant.

Table 14
Pearson Coefficients between INT and RD

	DD	Typical
r value	**-.09**	**-.02**

Note. All p values > .05.

Is Social Maladjustment Related to Aggression for Typical Children and for Children with DD?

Table 15 depicts the means and standard deviations for social maladjustment scores for the DD and typical group of children. An ANOVA revealed that children with DD had significantly higher scores on the social maladjustment composite than typical children, $F(1, 75) = 19.06$, $p < .001$.

Table 15
Means and Standard Deviations for Social Maladjustment Composite

	Typical	DD
SMC	**12.5**(4.5)	**17.3**(4.9)

Note. SMC = Social maladjusment composite. Standard deviations are in parentheses. Scores range from 6 - 30. Higher scores indicate more maladjustment.

It was predicted that there would be a significant positive correlation between RA and PA with social maladjustment. Due to the high correlation between the RA and PA scales, a composite was derived by adding both scores together. Therefore the minimum score was 6 and

the maximum score was 30 for both the aggression composite (AC) and the social maladjustment composite (SMC). Pearson correlation coefficients were obtained. There was a significant positive correlation between the AC and SMC in the typical group of children, $r = .43$, $p < .01$. The AC scores predicted approximately 18% of the variance in SMC scores. There was a similar result in the DD group, $r = .63$, $p < .01$. The AC scores predicted approximately 40% of the variance in SMC scores for the DD group. For both groups, higher aggression scores were predictive of higher social maladjustment scores.

Post-Hoc Qualitative Analyses

Post-hoc qualitative analyses were conducted to further explore the SIP of aggressive and nonaggressive children. Children with extremely high aggression scores were compared to those with extremely low aggression scores. Table 16 represents the means for INT and the frequency of aggressive responses for the 10 children scoring the highest and the ten children scoring the lowest in their AC scores.

Table 16
Means for INT and Frequency of Aggressive Responses for Children with Extreme Scores

	High Aggression Scorers	Low Aggression Scorers
INT	13.0	11.3
Total # of aggressive responses	19	12
Mean # of aggressive responses	1.9	1.2

Note. One participant in the "High Aggression Scorers" group did not complete the interview and hence SIP data were not available. Data are based on the 10 high scorers with SIP data. INT means range from 4-16. The total number of aggressive responses possible range from 0 - 40. Mean number of aggressive responses range from 0 - 4.

Post-hoc analyses indicate that those with extremely high aggression scores tended to give more hostile interpretations of intent and give more aggressive responses. However, an ANOVA indicated that INT scores did not differ significantly, $F(1, 18) = 2.32$, $p > .05$; and a chi-square revealed that the very high aggression scorers were not more likely to give more aggressive responses than very low aggression scorers, $x^2 = .833$, $p > .05$. However, the small numbers of children included in the post-hoc analysis make statistical comparisons difficult due to the consequently low statistical power.

Table 17 depicts the responses given by the two extreme groups. The types of nonaggressive responses appear comparable. Most nonaggressive responses reflect passivity (ex. I would walk away) or assertiveness (ex. tell them I can wear what I want"). Only one direct

physical aggressive response (i.e. I would hit them) was given in the low aggression group, whereas seven direct physical aggressive responses were given in the high aggression group. This indicates that aggressive children may not only respond aggressively more often, but they may also use more severe aggressive responses involving physical attacks.

Table 17

Extreme Scorers Responses to the Question "What would you do if this happened to you?"

HIGH AGGRESSION SCORERS	LOW AGGRESSION SCORERS
Aggressive Responses	**Aggressive Responses**
in PROV scenarios:	*in PROV scenarios:*
- throw them to the back of the line and take back my spot	- scream/yell at them*
- stretch the sweater and make another kid wear it and laugh and call them weird	- tell a teacher so they'd get in trouble*
- tell a teacher so they'd get in trouble*	- tell him that some of his clothes are weird
- push them in the wall or girls washroom where everyone would laugh at them	
- rip their t-shirt up	
- "get bent"	
- push him back	
in PE scenarios:	*in PE scenarios:*
- say "fine, be mean and be bullies"	- hit them
- tell a teacher so they'd get in trouble*	- yell at them
- kick them in the crack	- say next time you want to play with me I'll just say no
- kick them all in the head	
Nonaggressive Responses	**Nonaggressive Responses**
in PROV scenarios:	*in PROV scenarios:*
- go sit in a corner so they couldn't bother me	- say "can I go back to my spot?"*
- laugh with them	- say "what's so funny?"
- figure out what to do by myself	- tell them it was my spot and they pushed me down
- say "that was mean, can I have an apology?"	- say "I got it for my birthday"
- say "I can wear what I want"	- change my shirt*
- walk away*	- ask why they did that
- say "I got it for my birthday and I don't care what you guys think"	- say "if you don't like it don't say anything at all"
in PE scenarios:	*in PE scenarios:*
- offer them to sit with me	- say "fine you can do that" then grab my own ball
- get my own ball and play	- say "why can't I?"*
- sit at a different table*	- go play/sit with someone else*
- walk away*	- walk away*
- ask them why not*	- tell them to scoot over
- ask someone else	

Note. * indicates the response was given more than once.

CHAPTER V: DISCUSSION

This study investigated whether aggressive children with DD show biases in their social information processing (SIP) using a hypothetical situation interview, particularly with respect to interpretation (INT) and response decision (RD). Specifically this study examined a) if aggressive children have biases in their SIP compared to nonaggressive children and b) if children with DD have biases in their SIP compared to typical children. Other questions explored in this study were c) are children with DD more reactive and proactive aggressive than typical children, d) is SIP affected by situational context, e) are more hostile interpretations associated with more aggressive responses, and f) is social maladjustment related to aggression for typical children and children with DD?

Overall, children who were more aggressive did not display different patterns of SIP, however children with DD did give more aggressive responses. Although there was a trend towards an interaction between aggressive type and development status with interpretation, this relationship did not reach significance. Other major findings were 1) children with DD were not rated by their teachers as significantly more reactive or proactive aggressive than typical children, 2) SIP was affected by situational context, 3) interpretations of intent were not predictive of the number of aggressive responses for typical children or for children with DD, and 4) social maladjustment was more apparent in children with DD and was significantly associated with aggression.

Do aggressive children have biases in their SIP?

It was hypothesized that aggressive children would agree more strongly that a peer acted with hostile intent and would give more aggressive responses. Much research has found that

aggressive children do have a hostile attribution bias (Crick & Dodge, 1996; Dodge, 1980; Dodge et al., 1990), and are more likely to generate aggressive responses (Dodge, 1986; Schwartz et al., 1998). However, aggressive children in this study did not demonstrate these biases and the hypothesis was not supported. Nor was this finding qualified by any interaction with developmental status on interpretation. This finding is inconsistent with Quiggle et al.'s (1992) study that found aggressive children to be more likely to attribute a hostile intent to another and more likely to give aggressive responses than nonaggressive children.

One explanation for this inconsistency could be that the aggressive group in this study was not subtantially different from the nonaggressives. This may be due to the median split method used to classify aggressive and nonaggressive children. In fact, this method resulted in more typical children being labelled as aggressive than nonaggressive. This was due to the fact that children had to score above the median on *either* the reactive aggression scale or the proactive aggression scale (i.e. with one scale, 50% of children were identified as aggressive; but additional children were identified as aggressive on the second scale). In Quiggle et al.'s study (1992), in order to be labelled aggressive, children had to score above the median on teacher reports of aggression *and* had to receive certain scores on peer nominated aggression. Another procedure which has been used (Crick & Dodge, 1996) to classify children as aggressive or nonaggressive, using the same teacher rating scale from this study, is to consider children scoring at least one standard deviation above the mean as aggressive. That is, only children in the upper extremity of the distribution are classified as aggressive. However, this method requires a very high number of participants because in a normal distribution only about 16% of children would score at least 1 standard deviation above the mean.

Another reason why aggressive children may not have differed from nonaggressive children in their SIP is that the entire sample itself may have been relatively non-aggressive in comparison with some of the research samples in the literature linking aggression to SIP. This was indicated by the positive skewness in the proactive aggression scores which suggested that most children displayed little of this type of aggression. It was also indicated by the fact that most children (regardless of aggressive status) gave very few aggressive responses after hearing the scenarios. Perhaps biases in interpretations of intent and response decisions are stronger in more severely aggressive individuals.

Post-hoc qualitative analyses using extreme scorers indicated that aggressive children did appear to give more hostile attributions and more aggressive responses. However, the difference in interpretation scores was relatively small (a mean difference of 1.7 on a scale ranging from 4-16), and therefore the meaningfulness of this in terms of "real life" experiences is questionable. However, using this more extreme method of classification does appear to more clearly distinguish aggressive from nonaggressive children.

Do children with DD have biases in their SIP?

Previous research has found that individuals with DD differ from typical individuals in their SIP (Gomez & Hazeldine, 1996). It was hypothesized that children with DD would agree more strongly that a peer acted with hostile intent and would give more aggressive responses. The children with DD did not demonstrate a hostile attribution bias. These children were no more likely to attribute a hostile intent to a peer than typical children. This is consistent with the findings of Gomez and Hazeldine (1996) who found that although children with mental retardation gave more inaccurate interpretations in scenarios depicting accidents, they did not

give more hostile attributions of intent in ambiguous scenarios than children without mental retardation. Therefore, it appears that children with DD interpret ambiguous situations in a similar fashion as typical children.

However, children with DD did give more aggressive responses than typical children. This is also consistent with the findings of Gomez and Hazeldine (1996). It seems that children with DD are more likely to use aggressive behaviours in situations where they were provoked or rejected from the peer group than children without such delays. However, because these children did not give more hostile interpretations, it indicates that their aggression may not be the result of how they interpret peer behaviour, as has been found in research with typical children. This is consistent with the fact that interpretations were not correlated with the number of aggressive responses given (this finding is discussed further in a later section). Perhaps their increased use of aggressive responses are a result of other deviant processing patterns, such as goal clarification or response evaluation. Regardless, it appears that developmental status is associated with unique social information processing irrespective of aggression levels.

Do children with DD have higher rates of reactive and proactive aggression?

Teachers rated the degree of reactive and proactive aggression in their students. Reactive and proactive aggression were highly correlated with one another. Therefore, it appears that children who demonstrate one of these types of aggression are also more likely to demonstrate the other. This is consistent with other findings (Dodge & Coie, 1987) which have found that these two types of aggression are highly correlated.

Previous research suggests that aggression is more common in children with DD than typical children (Benson, 1985; Reiss, 1990). However, no specific hypotheses were made

regarding the relative levels of aggression between these groups of children because little research has examined the specific types of aggression which occur in children with DD. In this study, teachers did rate children with DD as more reactive aggressive and more proactive aggressive than children without such delays, but these differences were not statistically significant. According to teacher reports, the children with DD were no more reactive aggressive or proactive aggressive than typical children. It is possible then that a) this sample of children with DD were indeed no more aggressive than typical children, b) the low number of participants and subsequently low statistical power made it difficult to detect differences, or c) children with DD demonstrate *other types* of aggression (besides reactive and proactive) more than typical children.

Of note, more boys were categorized as aggressive than girls. This is consistent with previous research (Henington et al., 1998; Lindeman et al., 1997; Tomada & Schneider, 1997). More boys than girls appear to be aggressive. However, it is interesting to note that the number of boys and girls labelled aggressive did not differ in the group of children with DD. It seems the rates of aggression are similar between boys and girls with DD.

Is SIP affected by situational context?

Both situation types used in the SIP interview (peer entry and provocation) have been found to elicit aggressive responses in children (Dodge, McClaskey, & Feldman, 1985). However, a question of this study was whether the two situation types elicited different SIP patterns. This was found to be the case. First, children were more likely to attribute hostile intent to another after hearing stories involving provocation (ex. getting bumped into) as opposed to peer entry (ex. other children not letting you play with them). Second, children were also more

likely to give an aggressive response for scenarios involving provocation. Whether children were aggressive or developmentally delayed did not qualify this effect. Therefore, being provoked appears to elicit more hostile interpretations and more aggressive responses than being rejected by peers. This implies that children may need to learn more adaptive response strategies in relation to particular situational contexts.

Is Interpretation Associated with Response Decision?

It was hypothesized that interpretation of intent would predict response decisions for the typical group of children. Several studies (ex. Crick & Dodge, 1996; Dodge, 1986) have found that how one interprets peer behaviour is associated with how they would respond. However, this study did not support this hypothesis. Children who were more likely to attribute hostile intent to another were not more likely to give an aggressive response. This was the case for both the typical children and children with DD. For typical children, this finding was surprising due to the entire premise of the SIP model that earlier stages of processing such as interpretation influence later stages of processing such as response decision. Perhaps this finding was due to the fact that regardless of their interpretation scores, most children gave nonaggressive responses. For children with DD, this finding was consistent with previous research (Gomez & Hazeldine, 1996) which has suggested that aggressive behaviour in those with DD are not influenced by hostile interpretations. This suggest that the pattern of SIP may differ for individuals with DD.

Is Social Maladjustment Related to Aggression in Typical Children and Children with DD?

A social maladjustment composite was derived by combining scores on the filler items on the teacher rating scale. These items assessed peer interaction, peer isolation, peer acceptance, peer rejection, and popularity. Teachers rated children with DD as more maladjusted than typical

children. This finding is not entirely surprising due to the fact that the children with DD were essentially separated from the mainstream classrooms and attended special education rooms, either on a pull-out basis or permanent basis.

It was hypothesized that children who were more aggressive would also be more maladjusted. This was supported in the current study. Higher levels of teacher rated aggression were predictive of higher levels of teacher rated maladjustment for both the typical children and the children with DD. This is consistent with previous research linking peer rejection to aggression (Coie et al., 1990). However, it does not indicate whether aggression leads to maladjustment, whether maladjustment leads to aggression, or whether some third factor is contributing to both. Most likely, the relationship between aggression and maladjustment is reciprocal. That is, children's aggressive behaviour may impact their social interactions and lead to social maladjustment. In turn, maladjustment may cause children to act more aggressively. Certainly, there are other factors which contribute to and mediate these behaviours. Of note, aggression and social maladjustment (Crick & Dodge, 1994) have both been linked to social information processing.

Response Patterns and Social Adjustment in Children with DD

In this study children with DD gave more aggressive response decisions and were rated by their teachers as being more socially maladjusted than typical children. Although these results are consistent with previous research (Benson, 1985; Gomez & Hazeldine, 1996; Reiss, 1990), it is important to consider the factors that may underly these difficulties.

Certainly, children with DD who are in segregated classrooms face some social stigma. These children may not only differ from other children cognitively, but may also have associated

physiological conditions (Hodapp & Dykens, 1996) which could further demarcate them from other children. For some children with DD, being different in these respects may mean being less popular, less accepted by the peer group, or perhaps rejected by the peer group altogether. Of course, these difficulties would only be in addition to the challenges they already face related to their given developmental delay. Therefore, children with DD are likely to face not only cognitive/neurological challenges, but social ones as well. In turn, these social challenges coupled with their cognitive challenges may lead to increased aggression. Perhaps this relationship occurs via social information processing. This study found that children with DD report they would use more aggressive strategies than typical children in situations in which they were provoked or rejected from the peer group. Other research has suggested that children with DD show some deficits in their interpretation of social cues. Therefore, there is some evidence to suggest that children with DD do have deficits and biases in their SIP independent of their aggression levels. In any event, it appears that issues of aggression and social maladjustment are important considerations when dealing with children with DD.

Psycho-Educational Implications from this Study

This study found that children with DD were more likely to report using aggressive responses and were rated as more socially maladjusted. This indicates that children with DD may benefit from programs that focus on response decision making skills, particularly in social situations involving provocation when the intent of others is ambiguous. These children may benefit from programs that teach alternative responses in specific social situations. In addition, these programs may focus on teaching children the positive and negative consequences of different responses. These types of programs should incorporate both direct teaching methods as

well as role-playing with the children in order that they can practice responding in new ways. Benefits from this kind of training may reduce aggressive behaviour choices and improve overall social adjustment.

Previous research has indicated that typical aggressive children have hostile attributional biases in their interpretation of other's behaviour when a negative event occurs, particularly in ambiguous situations. This study did not support this hypothesis, however research has indicated (Hudley, Britsch, Wakefield, Smith, Demorat, & Cho, 1998) that training programs that focus on appropriately interpreting other's intentions can reduce aggressive behaviour. For example, Hudley et al. (1998) used a training program with aggressive boys that included 1) strengethening their ability to accurately detect the intentions of others, 2) promoting accidental interpretations to negative outcomes, and 3) linking appropriate behaviour responses to ambiguously caused negative events. Boys who received the training exhibited less aggressive behaviour and less attributions of hostile intent. Because children with DD do not appear to exhibit a hostile attribution bias and because their interpretations do not appear to be highly related to their response decisions, they may not benefit as much from an attribution retraining program. However, they may benefit from programs emphasizing training in the third step of Hudley et al.'s (1998) program which focused on what appropriate behaviours can be used when they experience ambiguously caused negative events.

Limitations of the Study

There were a number of limitations of this study which need to be addressed. First, this study suffered from a low number of participants, which was especially apparent in the group of children with DD. Unfortunately, this number could not have been added to without changing the

criteria for inclusion, as all of the schools (in each of the two school boards) which carried the special education classrooms of interest were asked to participate. These low numbers decreased the power of the analyses and may have hindered the ability to detect differences between the groups. Furthermore, the reliability of the findings with such a small sample is also questionable. That is, it is difficult to generalize the results based on a sample of only 26, to children with DD in the larger population. However, due to the little amount of research exploring aggression and SIP in children with DD, this study provides valuable knowledge about this population and provides a good basis for further exploration.

Some research has shown that children with DD differ more from chronologically aged-matched children than from mental aged-matched children in their SIP (Gomez & Hazeldine, 1996). That is, differences in SIP appear to diminish when children with DD are compared to other children with a similar level of cognitive development. Therefore, a second limitation of this study is that children with DD were compared only to children of the same grade and age, and not to children of the same mental age. Any of the differences that existed between children with DD and typical children in this study may not have existed if they were compared with children of the same mental age (i.e. similar levels of cognitive development). Therefore, the results in this study should be interpreted with a degree of reservation.

Lastly, the generalizability of these results to more clinically aggressive children or more severely delayed children is limited because the children in this study were a community-based sample and the children with DD had only mild to moderate delays. Children who are more severely aggressive (such as those with Conduct Disorder) and/or more profoundly delayed (such as those at the severe or profound range or mental retardation) may not demonstrate the same

patterns exhibited in this study.

Delimitations of the Study

The low number of participants lead to an important delimitation of this study - reactive and proactive aggressive types could not be compared. Instead, these groups were collapsed into one aggressive type. Therefore, any processing patterns unique to reactive aggressive or proactive aggressive children could not be examined. This is unfortunate due to the amount of research demonstrating that these two aggressive types are associated with specific SIP styles. Reactive aggressive children have been shown to display more biases in the earlier stages of processing such as interpretation, whereas proactive aggressive children display more biases in later stages of processing, such as response decision. Collapsing these groups may have hindered the finding of different SIP patterns between aggressive and nonaggressive children.

A second delimitation of this study is the limited difference between aggressive and nonaggressive children. As discussed earlier, other more stringent methods have been used to classify children as aggressive or nonaggressive, but they require larger sample sizes. The method used in this study has discriminated aggressive types successfully in the past, but in this study it did not. This may partially be due to the low number of participants and a relatively nonaggressive sample. However, this indicates that subtyping aggressive children may be best suited to using more extreme cut off points. This notion was supported by the findings in the post-hoc qualitative analysis which compared children with extreme scores.

Implications for Future Research

This study was inconsistent with previous research which has suggested that aggressive children have biases in their SIP. Future research may benefit from larger samples of children

that use of more extreme cut-off points for classifying aggressive children.

As a group, children with DD gave more severe aggressive responses but did not give more hostile interpretations than typical children. More research needs to be conducted to examine aggression and SIP in children with DD. Future research should look at other social information processes such as goal clarification and response evaluation. It should also examine the relationship among the different processing phases to determine whether the SIP model is appropriate for describing social problem solving in children with DD, or whether these children have unique processing patterns. The role of aggression and developmental status should be evaluated together as they were in this study to help identify the effects of the delay and the effects of aggression on SIP. It would be helpful to compare children with DD to other children of the same chronological age *and* mental age. This would help determine whether differences in SIP were directly related to cognitive development.

In this study, children with DD were no more reactive or proactive aggressive than typical children according to their teachers. However, they were more socially maladjusted. More research needs to determine the nature of aggression in children with DD. That is, research needs to determine what types of aggression are common in this population and what are the typical antecedents and consequences of their aggressive behaviour. This could be accomplished by assessing different types of aggression via teacher or parent reports or by direct observations. Furthermore, research needs to focus on why children with DD are more socially maladjusted than typical children and what impact this has on their aggression.

Most importantly, researchers must take the knowledge from this study and others examining SIP and apply it toward treatment research. Ideally, knowledge about aggression and

SIP in children with DD should help in the development of effective treatment plans. Children with DD did not demonstrate more hostile interpretations but did give more aggressive responses, which suggests that strategies to reduce aggression should focus on teaching appropriate response decision making. If research demonstrates that children with DD have other SIP biases related to their aggression, then treatment programs should focus on those areas as well. Perhaps reducing aggressive behaviour would also improve the general social adjustment of children with DD.

Conclusions

In conclusion, this study investigated whether aggressive children with DD have biases in their SIP. Typical children and children with DD were included in the study, and were classified as aggressive or nonaggressive. Contrary to previous research, aggressive children did not demonstrate more hostile interpretations of intent or more aggressive response decisions than nonaggressive children. This was apparent for both the typical children and children with DD. However, this finding may be due to a weak discrimination between aggressive and nonaggressive children. If this is the case, it is inconclusive from this study whether aggressive DD children have *similar* biases as aggressive typical children, as *neither* of these groups exhibited any SIP biases in this study in comparison with nonaggressive children.

A significant finding in this study was that children with DD gave more aggressive responses than typical children and that these aggressive responses were not associated with more hostile interpretations. This is consistent with other research which indicates that how children with DD respond may not be influenced by how they interpret the cause of the event. This indicates that training programs aimed at reducing aggression in these children should focus

more on appropriate response decision making and less on attribution retraining. In order to develop the most appropriate treatment strategies for aggressive children with DD, more research needs to focus on aggression and SIP in these children. Future research should examine other social information processes that were not included in this study, such as goal clarification and response evaluation. If biases are found to exist, then treatment programs should incorporate training to emphasize more appropriate processing in these areas as well. For example, training may focus on teaching children what goals are appropriate in different social situations and what responses would be suitable given those goals.

Although typical aggressive children did not demonstrate a hostile attribution bias in this study, previous research indicates that treatment programs emphasizing attribution retraining are beneficial in this population. Therefore, research examining these intervention programs should be continued.

References

Achenbach, T. M., & Edelbrock, C. S. (1986). Child Behavior Checklist and Youth Self-Report. Burlington, VT: Author.

Achenbach, T. M., & Howell, C. T. (1993). Are American children's problems getting worse? A 13-year comparison. Journal of the American Academy of Child and Adolescent Psychiatry, 32, 1145-1154.

American Association on Mental Retardation (1992). Mental retardation: Definition, classification, and systems of supports. Washington, DC: Author.

American Psychiatric Association (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: Author.

American Psychiatric Association (1987). Diagnostic and statistical manual of mental disorders (3rd ed. rev.). Washington, DC: Author.

American Psychiatric Association (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

Archer, J., Pearson, N. A., & Westeman, K. E. (1988). Aggressive behavior of children aged 6-11. Gender differences and their magnitude. British Journal of Social Psychology, 27, 371-384.

Asher, S. R. (1990). Recent advances in the study of peer rejection. In S. R. Asher and J. D. Coie (Eds.) Peer rejection in childhood (pp.3-14). New York: Cambridge University Press.

Atkins, M. S., & Stoff, D. M. (1993). Instrumental and hostile aggression in childhood disruptive behavior disorders. Journal of Abnormal Child Psychology, 21, 165-178.

Baker, W., & Bramston, P. (1997). Attributional and emotional determinants of

aggression in people with mild intellectual disabilities. Journal of Intellectual and Developmental Disability, 22, 169-185.

Bandura, A. (1973). Aggression: A social-learning analysis. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A., Ross, D., & Ross, S. (1961). Transmission of aggression through imitation of aggressive models. Journal of Abnormal Social Psychology, 63, 575-582.

Barkley, R. A. (1996). Attention-deficit/Hyperactivity disorder. In E. J. Mash, & R. A. Barkley (Eds.) Child Psychopathology (pp. 63-112). New York: Guilford Press.

Barkley, R. A. (1997). Behavioral inhibition sustained, attention, and executive functions: Constructing a unifying theory of ADHD. Psychological Bulletin, 121, 65-94.

Baron, R. A., & Richardson, D. R. (1994). Human aggression (2nd Edition). New York: Plenum.

Benson, B. A. (1985). Behavior disorders and mental retardation: Associations with age, sex, and level of functioning in an outpatient clinical sample. Applied Research in Mental Retardation, 6, 79-85.

Benson, B. A. (1994). Anger management training: A self-control programme for persons with mild mental retardation. In N. Bouras (Ed.), Mental Health in Mental Retardation (pp. 224-232). Cambridge: Cambridge University Press.

Benson, B. A., & Ivins, J. (1992). Anger, depression, and self-concept in adults with mental retardation. Journal of Intellectual Disability Research, 36, 169-175.

Benson, B. A., & Reiss, S. (1984). A factor analysis of emotional disorders in mentally retarded people. Australia and New Zealand Journal of Developmental Disabilities, 10, 135-139.

Benson, B. A., Rice, C. J., Miranti, S.V. (1986). Effects of anger management training with mentally retarded adults in group treatment. Journal of Consulting and Clinical Psychology, 54, 728-729.

Bentley, K. M., & Li, A. K. F., (19?). Bully and victim problems in elementary schools and students' beliefs about aggression. Canadian Journal of School Psychology, 11, 153-165.

Berkowitz, L., & Geen, R. G. (1966). Stimulus qualities of the target of aggression: A further study. Journal of Personality and Social Psychology, 5, 364-368.

Berman, M. E., Kavoussi, R. J., & Coccaro, E. F. (1997). Neurotransmitter correlates of human aggression. In D. M. Stoff, Brieling, & Maser (Eds.) Handbook of Antisocial Behavior (pp. 305- 312).

Björkvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. Sex Roles, 30, 177-188.

Björkvist, K., Lagerspetz, K. M. J., & Kaukiainen, A. (1992). Do girl manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. Aggressive Behavior, 18, 117-127.

Björkvist, K., Lagerspetz, K. M. J, & Österman, K. (1992). The direct and indirect aggression scales. Vasa, Finland: Åbo Akademi University.

Brain, P. F., & Susman, E. J. (1997). Hormonal aspects of aggression and violence. In D. M. Stoff, J. Breiling, & J. D. Maser (Eds) Handbook of Antisocial Behavior (pp. 314-322), New York: John Wiley & Sons..

Bushman, B. J. (1995). Moderating role of trait aggressiveness in the effects of violent media on aggression. Journal of Personality and Social Psychology, 69, 950-960.

Buss, A. H. (1961). The psychology of aggression. New York: Wiley.

Cadoret, R. J., & Stewart, M. A. (1991). An adoption study of attention deficit/hyperactivity/aggression and their relationship to adult antisocial personality. Comprehensive Psychiatry, 32, 73-82.

Carey, G. (1992). Twin imitation for antisocial behavior: Implications for genetic and family environment research. Journal of Abnormal Psychology, 101, 18-25.

Carey, G. (1996). Family and genetic epidemiology of aggressive and antisocial behavior. In D. M. Stoff, and R. D. Cairns (Eds) Aggression and Violence: Genetic, Neurobiological, and Biosocial Perspectives (pp. 3-22). Hillsdale, NJ: Erlbaum.

Carey, G., & Goldman, D. (1997). The genetics of antisocial behavior. In M. Stoff, J. Breiling, & J. D. Maser (Eds.) Handbook of Antisocial Behavior (pp. 243-252). New York: John Wiley & Sons.

Chess, S., & Hassibi, M. (1970). Behavior deviations in mentally retarded children. Journal of the American Academy of Child Psychiatry, 9, 282-297.

Coie, J. D., Dodge, K. A., & Kupersmidt, J. B. (1990). Peer group behavior and social status. In S. R. Asher and J. D. Coie (Eds.) Peer rejection in childhood (pp. 17-59). New York: Cambridge University Press.

Coie, J. D., Dodge, K. A., Terry, R., & Wright, V. (1991). The role of aggression in peer relations: An analysis of aggression episodes in boys' play groups. Child Development, 62, 812-826.

Coie, J. D., Lochman, J. E., Terry, R., & Hyman, C. (1992). Predicting early adolescent disorder from childhood aggression and peer rejection. Journal of Consulting and Clinical

Psychology, 60, 783-792.

Conners, C. K. (1985). The Conners Rating Scales: Instruments for the assessment of childhood psychopathology. Children's Hospital National Medical Center, Washinton, DC.

Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. Child Development, 67, 2317-2327.

Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. Developmental Psychology, 33, 579-588.

Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression. Child Development, 67, 993-1002.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. Psychological Bulletin, 115, 74-101.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. Child Development, 66, 710-722.

Crick, N. R., & Werner, N. E. (1998). Response decision processes in relational and overt aggression. Child Development, 69, 1630-1639.

Cullinan, D., Epstein, M. H., Matson, J. L., & Rosemier, R. A. (1984). Behavior problems of mentally retarded and nonretarded adolescent pupils. School Psychology Review, 13, 381-384.

Dadds, M. R., & Powell, M. B. (1991). The relationship of interparental conflict and global marital adjustment to aggression, anxiety, and immaturity in aggressive and nonclinic children. Journal of Abnormal Child Psychology, 19, 553-566.

Dalgard, O. S., & Kringlen, E. (1976). A Norwegian twin study of criminality. British Journal of Criminology, 16, 213-232.

Davidson, P. W., Jacobson, J., Cain, N., Palumbo, D., Sloane-Reeves, J., Quijano, L., Van Heyningen, J., Geisow, V., Erhart, J., & Williams, T. (1996). Characteristics of children and adolescents with mental retardation and frequent outwardly directed aggressive behavior. American Journal on Mental Retardation, 101, 244-255.

Dodge, K. A. (1980). Social cognition and children's aggressive behavior. Child Development, 51, 162-170.

Dodge, K. A. (1986). A social information processing model of social competence in children. In M. Perlmutter (Ed.), The Minnesota Symposium on Child Psychology. (Vol 18, pp. 77-125). Hillsdale, NJ: Erlbaum.

Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. Journal of Personality and Social Psychology, 53, 1146-1158.

Dodge, K. A., Coie, J. D., Pettit, G. S., & Price, J. M. (1990). Peer status and aggression in boys' groups: developmental and contextual analyses. Child Development, 61, 1289-1309.

Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. Journal of Abnormal Psychology, 106, 37-51.

Dodge, K. A., McClaskey, C. L., & Feldman, E. (1985). Situational approach to the assessment of social competence in children. Journal of Consulting and Clinical Psychology, 53, 344-353.

Dodge, K. A., & Newman, J. P. (1981). Biased decision-making processes in aggressive boys. Journal of Abnormal Psychology, 90, 375-379.

Dodge, K. A., Pettit, G. S., Bates, J. E., & Valente, E. (1995). Social information-processing patterns partially mediate the effects of early physical abuse on later conduct problems. Journal of Abnormal Psychology, 104, 632-643.

Dodge, K. A., & Price, J. M. (1994). On the relation between social information processing and socially competent behavior in early school-aged children. Child Development, 65, 1385-1397.

Dodge, K. A., Price, J. M., Bachorowski, J., & Newman, J. P. (1990). Hostile attributional biases in severely aggressive adolescents. Journal of Abnormal Psychology, 99, 385-392.

Dodge, K. A., & Somberg, D. R. (1987). Hostile attributional biases among aggressive boys are exacerbated under conditions of threats to the self. Child Development, 58, 213-224.

Dollard, J., Doob, L. W., Miller, N. E., Mowrer, O.H., & Sears, R. R. (1939). Frustration and aggression. New Haven, CT: Yale University Press.

Eron, L. D., Huesmann, L. R., Dubow, E., Romanoff, R., & Yarmel, P. W. (1987). Aggression and its correlates over 22 years. In D. Crowell, I. M. Evans, & C. R. O'Donnell (Eds.) Childhood aggression and violence. New York: Plenum.

Fabes, R. A., & Eisenberg, N. (1992). Young children's coping with interpersonal anger. Child Development, 63, 116-128.

Farrington, D. P. (1991). Childhood aggression and adult violence: Early precursors and later life outcomes. In D. J. Pepler, K. H. Rubin, et al. (Eds.) The development and treatment of

childhood aggression (pp. 5-29). Hillsdale, NJ: Lawrence Erlbaum Associates.

Farrington, D. P. (1992). Explaining the beginning, progress, and ending of antisocial behavior from birth to adulthood. In J. McCord et al. (Eds) Facts, frameworks, and forecasts: Advances in criminological theory, (Vol. 3) (pp.253-286). New Brunswick, NJ: Transaction Publishers.

Feshbach, S. (1970). Aggression. In P. Mussen (Ed.) Carmichael's manual of child psychology. (pp. 159-259). New York: Wiley.

Fraser, W., & Nolan, M. (1994). Psychiatric disorders in mental retardation. In N. Bouras (Ed.) Mental Health in Mental Retardation: Recent Advances and Practices (pp. 79-92). Cambridge: Cambridge University Press.

Freud, S. (1959). Beyond the pleasure principle. (James Strachey, Trans.). New York: Bantam Books.

Freud, S. (1923). The complete psychological works of Sigmund Freud, Vol. 19, The ego and the id and other works. London: Hogarth Press.

Frodi, A., Macaulay, J., & Thome, P. R. (1977). Are women always less aggressive than men? Psychological Bulletin, 84, 634-660.

Fuchs, C., Benson, B. A. (1995). Social information processing by aggressive and nonaggressive men with mental retardation. American Journal on Mental Retardation, 100, 224-252.

Geen, R. G. (1968). Effects of frustration, attack, and prior training in aggressiveness upon aggressive behavior. Journal of Personality and Social Psychology, 9, 316-321.

Gouze, K. R. (1987). Attention and social problem solving as correlates of aggression in

preschool males. Journal of Abnormal Child Psychology, 15, 181-197.

Gomez, R., & Hazeldine, P. (1996). Social information processing in mild mentally retarded children. Research in Developmental Disabilities, 17, 217-227.

Grotpeter, J. K., & Crick, N. R. (1996). Relational aggression, overt aggression, and friendship. Child Development, 67, 2328-2338.

Grove, W. M., Eckert, E. D., Heston, L. L., Bouchard, T. J., Jr., Segal, N., & Lykken, D. T. (1990). Heritability of substance abuse and antisocial behavior: A study of monozygotic twins raised apart. Biological Psychiatry, 27, 293-304.

Guerra, N. G., & Slaby, R. G. (1990). Cognitive mediators of aggression in adolescent offenders: II. Intervention. Developmental Psychology, 26, 269-277.

Gustafson, R. (1986). Human physical aggression as a function of frustration: Role of aggressive cues. Psychological Reports, 59, 103-110.

Harris, M. B. (1996). Aggressive experiences and aggressiveness: Relationship to ethnicity, gender, and age. Journal of Applied Social Psychology, 26, 843-870.

Heath, L., Bresolin, L., & Rinaldi, R. C. (1989). Effects of media violence on children: A review of the literature. Archives of General Psychiatry, 46, 376-379.

Henington, C., Hughes, J. N., Cavell, T. A., & Thompson, B. (1998). The role of relational aggression in identifying aggressive boys and girls. Journal of School Psychology, 36, 457-477.

Hinshaw, S. P. (1991). Stimulant medication and the treatment of aggression in children with attention deficits. Journal of Clinical Child Psychology, 20, 301-312.

Hodapp, R. M., & Dykens, M. (1996). Mental retardation. In E. J. Mash & R. A. Barkley

(Eds.), Child Psychopathology (pp. 362-389). New York: Guilford.

Holt, G. (1994). Challenging behaviour. In N. Bouras (Ed.) Mental Health in Mental Retardation: Recent Advances and Practices (pp. 126-132). Cambridge: Cambridge University Press.

Hudley, C., Britsch, B., Wakefield, W. D., Smith, T., Demorat, M., & Cho, S. (1998). An attribution retraining program to reduce aggression in elementary school students. Psychology in the Schools, 35, 271-282.

Huesmann, L. R. (1988). An information model for the development of aggression. Aggressive behavior, 14,13-24.

Huesmann, L. R., & Eron, L. D. (1984). Cognitive processes and the persistence of aggressive behavior. Aggressive Behavior, 10, 243-251.

Huesmann, L. R., Eron, L. D., Lefkowitz, M. M., & Walder, L. O. (1984). Stability of aggression over time and generations. Developmental Psychology, 20, 1120-1134.

Huesmann, L. R., Eron, L. D., & Warnick Yarmel, P. (1987). Intellectual functioning and aggression. Journal of Personality and Social Psychology, 52, 232-240.

Huesmann, L. R., & Malamuth, N. M. (1986). Media violence and antisocial behavior: An overview. Journal of Social Issues, 42, 1-6.

Kamiol, R., & Heiman, T. (1987). Situational antecedents of children's anger experiences and subsequent responses to adult versus peer provokers. Aggressive Behavior, 13, 109-118.

Keenan, K., & Shaw, D. S. (1994). The development of aggression in toddlers: A study of low-income families. Journal of Abnormal Child Psychology, 22, 53-

Kingery, P. M., Coggeshall, M. B., & Alford, A. A. (1998). Violence at school: Recent

evidence from four national surveys. Psychology in the Schools, 35, 247-258.

Kirsh, S. J. (1998). Seeing the world through Mortal Kombat-colored glasses: Violent video games and the development of a short-term hostile attribution bias. Childhood, 5, 177-184.

Krahé, B. (1998). Sexual aggression among adolescents. Psychology of Women Quarterly, 22, 537-554.

Krakowski, M. (1997). Neurologic and neuropsychologic correlates of violence. Psychiatric Annals, 27, 674-678.

Kruesi, M. J. P., Hibbs, E. D., Hamburger, S. D., Rapoport, J. L., Keysor, C. S., & Elia, J. (1994). Measurement of aggression in children with disruptive behavior disorders. Psychometric Measurement, 9, 159-172.

Kupersmidt, J. B., & Coie, J. D. (1990). Preadolescent peer status, aggression, and school adjustment as predictors of externalizing problems in adolescence. Child Development, 61, 1350-1362.

Kupersmidt, J. B., Griesler, P. C., DeRosier, M. E., Patterson, C. J., & Davis, P. W. (1995). Childhood aggression and peer relations in the context of family and neighborhood factors. Child Development, 66, 360-375.

Kupersmidt, J. B., & Patterson, C. J. (1991). Childhood peer rejection, aggression, withdrawal, and perceived competence as predictors of self-reported behavior problems in preadolescence. Journal of Abnormal Child Psychology, 19, 427-448.

Lagerspetz, K. M. J., Björkvist, K., & Peltonen, T. (1988). Is indirect aggression typical of females? Gender differences in aggressiveness in 11- to 12-year-old children. Aggressive Behavior, 14, 403-414.

Lancellota, G. X., & Vaughn, S. (1989). Relation between types of aggression and sociometric status: Peer and teacher perceptions. Journal of Educational Psychology, 81, 86-90.

Langley, T., O'Neal, E. C., Craig, K. M., & Yost, E. A. (1992). Aggression-consistent, -inconsistent, and -irrelevant priming effects on selective exposure to media violence.

Lieber, J. (1994). Conflict and its resolution in preschoolers with and without disabilities. Early Education and Development, 5, 5-17.

Lindeman, M., Harakka, T., & Keltikangas-Järvinen, L. (1997). Age and gender differences in adolescents' reactions to conflict situations: Aggression, prosociality, and withdrawal. Journal of Youth and Adolescence, 26, 1997.

Lochman, J. E., & Dodge, K. A. (1994). Social-cognitive processes of severely violent, moderately aggressive, and nonaggressive boys. Journal of Consulting and Clinical Psychology, 62, 366-374.

Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. Annual Review of Psychology, 48, 371-410.

Maccoby, E. E., & Jacklin, C. N. (1974). The psychology of sex differences. Stanford, CA: Stanford University Press.

Mace, F. C., Page, T. J., Ivancic, M. T., & O'Brien, S. (1986). Analysis of environmental determinants of aggression and disruption in mentally retarded children. Applied Research in Mental Retardation, 7, 203-221.

MacMillan, D. L., Gresham, F. M., & Siperstein, G. N. (1993). Conceptual and psychometric concerns about the 1992 AAMR definition of mental retardation. American Journal of Mental Retardation, 98, 325-335.

Mallick, S. K., & McCandless, B. R. (1966). A study of the catharsis of aggression. Journal of Personality and Social Psychology, 4, 591-596.

McGrew, K., & Bruininks, R. (1989). Factor structure of adaptive behavior. School Psychology Review, 18, 64-81.

McLain, W., & Lewis, E. (1994). Anger management and assertiveness skills: An instructional package for persons with developmental disabilities. In M. J. Furlong, D. C. Smith, et al. (Eds.) Anger, hostility, and aggression: Assessment, prevention, and intervention strategies for youth (pp. 473-507). Brandon, VT: Clinical Psychology Publishing Co..

Melburg, V., & Tedeschi, J. T. (1989). Displaced aggression: Frustration or impression management? European Journal of Social Psychology, 19, 139-145.

Molitor, F., & Hirsch, K. W. (1994). Children's toleration of real-life aggression after exposure to media violence: A replication of the Drabman and Thomas studies. Child Study Journal, 24, 191-204.

Murphy, B. C., & Eisenberg, N. (1996). Provoked by a peer: Children's anger-related responses and their relations to social functioning. Merrill-Palmer Quarterly, 42, 103-124.

Murphy, D. A., Pelham, W. E., & Lang, A. R. (1992). Aggression in boys with attention deficit-hyperactivity disorder: Methylphenidate effects on naturalistically observed aggression, response to provocation, and social information processing. Journal of Abnormal Child Psychology, 20, 451-465.

Novaco, R. W. (1977). Stress inoculation: A cognitive therapy for anger and its application to a case of depression. Journal of Consulting and Clinical Psychology, 45, 600-608.

Offord, D. R., Alder, R. J., & Boyle, M. H. (1986). Prevalence and sociodemographic

correlates of conduct disorder. American Journal of Social Psychiatry, 4, 272-278.

Olthof, T., Ferguson, T. J., & Luiten, A. (1989). Personal responsibility antecedents of anger and blame reactions in children. Child Development, 60, 1328-1336.

Olweus, D. (1979). Stability of aggressive reaction patterns in males: A review. Psychological Bulletin, 86, 852-875.

Olweus, D. (1989). Bully/victim questionnaire. Norway: University of Bergen.

Pederson, P. & Thomas, C. (1992). Prevalence and correlates of dating violence in a Canadian university sample. Canadian Journal of Behavioural Science, 24, 490-501.

Peterman, F. (1987). Behavioral assessment and reduction of children's aggression. Journal of Human Behavior and Learning, 4, 48-54.

Pettit, G. S., Dodge, K. A., & Brown, M. M. (1988). Early family experience, social problem solving patterns, and children's social competence. Child Development, 59, 107-120.

Pope, A. W., Bierman, K. L., & Mumma, G. H. (1991). Aggression, hyperactivity, and inattention-immaturity: Behavior dimensions associated with peer rejection in elementary school boys. Developmental Psychology, 1991, 663-671.

Quiggle, N. L., Garber, J., Panak, W. F., & Dodge, K. A. (1992). Social information processing in aggressive and depressed children. Child Development, 63, 1305-1320.

Reiss, S. (1990). Prevalence of dual diagnosis in community-based day programs in the Chicago metropolitan area. American Journal of Mental Retardation, 94, 578-585.

Reiss, S., & Rojahn, J. (1993). Joint occurrence of depression and aggression in children and adults with mental retardation. Journal of Intellectual Disability Research, 37, 287-294.

Renfrew, J. W. (1997). Aggression and its causes: A biopsychosocial approach. New

York: Oxford University Press.

Renshaw, P. D., & Asher, S. R. (1983). Children's goals and strategies for social interaction. Merrill-Palmer Quarterly, 29, 353-374.

Richard, B. A., & Dodge, K. A. (1982). Social maladjusment and problem solving in school-age children. Journal of Consulting and Clinical Psychology, 50, 226-233.

Richters, J. E. (1993). Community violence and children's development: Toward a research agenda for the 1990s. Psychiatry, 56, 3-5.

Rule, B. G., & Ferguson, T. J. (1986). The effects of media violence on attitudes, emotions, and cognitions. Journal of Social Issues, 42, 29-50.

Sattler, J. M. (1992). Assessment of children: Revised and updated third edition. San Diego, CA: Author.

Schwartz, D., Dodge, K. A., Coie, J. D., Hubbard, J. A., Cillessen, A. H. N., Lemerise, E. A., & Bateman, H. (1998). Social-cognitive and behavioral correlates of aggression and victimization in boys play groups. Journal of Abnormal Child Psychology, 26, 431-440.

Sigafoos, J. (1995). Factors associated with aggression versus aggression and self-injury among persons with intellectual disabilities. Developmental Disabilities Bulletine, 23, 1995.

Siperstein, G. N., Leffert, J. S., & Widaman, K. (1996). Social behavior and the social acceptance and rejection of children with mental retardation. Education and Training in Mental Retardation, 31, 271-281.

Skinner, M. L., Elder, G. H., & Conger, R. D. (1992). Linking economic hardship to adolescent aggression. Journal of Youth and Adolescence, 21, 259-276.

Smith, S. L., & Donnerstein, E. (1998). Harmful effects of exposure to media violence:

Learning of aggression, emotional desensitization, and fear. In R. G. Geen, E. Donnerstein, et al. (Eds.) Human aggression: Theories, research, and implications for social policy (pp. 167-202). San Diego, CA: Academic Press.

Sparrow, S. S., Balla, D. A., & Cichetti, D. V. (1984). Vineland adaptive behavior scales. Circle Pines, MN: American Guidance Service.

Sternberg, C. R., & Campos, J. J. (1990). The development of anger expressions in infancy. In N. L. Stein, B. Leventhal, & T. Trabasso (Eds.), Psychological and biological approaches to emotion. (pp. 247-282). Hillsdale, NJ: Lawrence Erlbraum Associates.

Sternina, T. Z. (1988). Mentally retarded children's comprehension of another person's emotional state.

Stone, M. H. (1991). Aggression, rage, and the "destructive instinct" reconsidered from a psychobiological point of view. Journal of the American Academy of Psychoanalysis, 19, 507-529.

Susman, E. J., Worall, B. K., Murowchick, E., Frobose, C. A, & Schwab, B (1996). Experience and neuroendocrine parameters of development: Aggressive behavior and competencies. In D. M. Stoff, R. B. Cairns (Eds.) Aggression and violence: Genetic, neurobiological, and prosocial perspectives (pp. 267-289). Mahwah, NJ: Lawrence Erlbaum Associates.

Tabachnick, B. G., & Fidell, L. S. (1996). Using multivariate statistics. New York: Harper Collins.

Tomada, G., & Schneider, B. H. (1997). Relational aggression, gender, and peer acceptance: Invariance across culture, stability over time, and concordance among informants.

Developmental Psychology, 33, 601-609.

Törestad, B. (1990). What is anger provoking? A psychophysical study of perceived causes of anger. Aggressive Behavior, 16, 9-26.

Underwood, M. K., Coie, J. D., & Herbsman, C. R. (1992). Display rules for anger and aggression in school-age children. Child Development, 63, 366-380.

Vitaro, F., Gendreau, P. L., Trembly, R. E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. Journal of Child Psychology and Psychiatry, 39, 377-385.

Wechsler, D. (1991). Manual: Wechsler Intelligence Scale for Children - Third Edition (WISC-III). San Antonio, TX: The Psychological Corporation.

Weiner, B. (1995). Judgements of responsibility: A foundation for a theory of social conduct. New York: Guilford.

Wing, L. (1971). Severely retarded children in a London area: Prevalence and provision of services. Psychological Medicine, 5, 405-415.

Wood, W., Wong, F. Y., & Chachere, J. G. (1991). Effects of media violence on viewers' aggression in unconstrained social interaction. Psychological Bulletin, 109, 371-383.

Zigler, E., & Hodapp, R. M. (1986). Understanding mental retardation. New York: Cambridge University Press.

Zipkin, D. (1985). Relaxation techniques for handicapped children: A review of the literature. Journal of Special Education, 19, 283-289.

Appendix A

Background Information Sheet

Please complete the following few questions about your son or daughter. This information will be used as descriptive information about the participants in the study. Please return this sheet *with* your consent form in order that this information can be linked with the name of your child. Once this information has been collected and analyzed, any connection between your child's name and this information will be destroyed.

1. Grade ____

2. Date of Birth: (Yr.) ___ (Mo.) ___ (Day) ___

3. Sex: Female ___ Male ___

Appendix B

Teacher Rating Scale

Below are a number of statements which can be used to describe children's behaviour. Please indicate which response best applies to the child you are rating in comparison to kids in general of the same age. Use the following scale:

1.....2.....3.....4.....5
Never True Rarely True Sometimes True Usually True Always True

a. This child gets along well with peers of the same sex. 1 2 3 4 5

b. This child gets along well with peers of the opposite sex. 1 2 3 4 5

c. This child isolates him/herself from the peer group. 1 2 3 4 5

d. This child is accepted by the peer group. 1 2 3 4 5

e. Other children like this child and seek him/her out for play. 1 2 3 4 5

f. Other children actively dislike this child and reject him/her for play. 1 2 3 4 5

g. When this child has been teased or threatened, he/she gets angry easily and strikes back. 1 2 3 4 5

h. This child always claims that other children are to blame in a fight and feels that they started the trouble. 1 2 3 4 5

i. When a peer accidentally hurts this child (i.e. by bumping into him/her), this child assumes the peer meant to do it, then overreacts with anger/fighting. 1 2 3 4 5

j. This child gets other kids to gang up on a peer that he/she does not like. 1 2 3 4 5

k. This child uses physical force (or threatens to use force) in order to dominate other kids. 1 2 3 4 5

l. This child threatens or bullies others in order to get his/her own way. 1 2 3 4 5

Appendix C

Social Information Processing Interview

Entry Story #1

Imagine that some kids you know are throwing a ball around. They're laughing and having a good time. You would like to join them. You go up to them and say, "Hi can I play?". They say "No".

Q#1 - How much do you think the kids were trying to be mean?

1.....2.....3.....4
Not at all Somewhat Much Very much

Q#2 - Now, let's remember the story again, about the kids not letting you play. What would you do if this happened to you?

1. _____ Code: Aggressive or Nonaggressive

Entry Story #2

Imagine that some kids you know are sitting a a table eating lunch. You can see that they are having a good time and you'd like to sit with them. You walk up to the table and ask them if they'd make room for you so you could sit down too. They tell you "No".

Q#1 - How much do you think the kids who said "No" were trying to be mean?

1.....2.....3.....4
Not at all Somewhat Much Very much

Q#2 - Now, let's remember the story again, about the other kids not letting you sit at the table. What would you do if this happened to you?

1. _____ Code: Aggressive or Nonaggressive

Provocation Story #1

Imagine that you are waiting in the lunch line. Another kid bumps into you; you fall and hurt your knee. You look up and the other kid has taken your place in line.

Q#1 - How much do you think the kid was trying to be mean?

1.....2.....3.....4
Not at all Somewhat Much Very much

Q#2 - Now, let's remember the story again, about the other kid bumping into you. What would you do if this happened to you?

1. _____ Code: Aggressive or Nonaggressive

Provocation Story #2

Imagine that you got a new sweater for you birthday. It fits a little funny but you wear it anyway. When you get to school one of the kids says "Where did you get that weird sweater?" And the other kids laugh.

Q#1 - How much do you think the kids were trying to be mean?

.1.....2.....3.....4
Not at all Somewhat Much Very much

Q#2 - Now, let's remember the story again, about the other kids laughing at you. What would you do if this happened to you?

1. _____ Code: Aggressive or Nonaggressive

Very Much
4

Much
3

Somewhat
2

Not at All
1

Appendix D

Parent Cover Letter

Dear Parent/Guardian,

My name is Colleen Sjoblom. I am a graduate student in the Department of Educational Psychology at the University of Calgary, conducting a research project under the supervision of Dr. Jac Andrews as part of the requirements for an M.Sc. degree. I am writing to provide information regarding my research project entitled "Aggression and Social Information Processing in Typical Children and Children with Developmental Delays" so that you can make an informed decision regarding your child's participation. Children who will participate in the study will be randomly selected from all of those who provide consent.

The purpose of the study is to examine how children problem solve in social situations when a negative event has occurred (for example, getting bumped by another child). Specifically, this study will examine whether children's social problem solving differs depending on their level of aggression and psychological status (i.e. typical children and those with developmental delays). This study will be conducted with children attending special education classes as well as those in regular classrooms.

Children will participate in short interviews with me or one of my assistants, regarding their social problem solving, and their teachers will complete a questionnaire regarding their view of the child's level of aggression. The interview will take approximately 8-10 minutes. Please be advised that children should not participate if they would have difficulty understanding and responding to the following questions: "How much do you think the kids in the story were trying to be mean?" (answered on a 4 point scale), and "What would you do if this happened to you?"

Teachers will be asked to complete the questionnaires for participating students within two weeks time, and will also be asked to keep their responses confidential. You should be aware that even if you give your permission, your child is free to withdraw at any time for any reason without penalty.

Participation in this study will involve no greater risks than those ordinarily experienced in daily life.

Data will be gathered in such a way as to ensure anonymity. Children who participate in the study will be assigned numbers, and these numbers (not their names) will be recorded on the teacher questionnaires and on data from the interviews. Once the data has been collected, any record linking the child's name to their assigned number will be destroyed. Once collected, responses will be kept in strictest confidence and only groups results will be reported in any published studies. The raw data will be kept in a locked filing cabinet at the researcher's residence, only accessible to the researcher. All files will be destroyed two years after completion of the study.

You will be offered a written summary of the results (via your child's teacher) approximately 3-4 months after all of the data has been collected, and a phone number to call will be made available to you should you have any additional questions.

If you have any questions, please feel free to contact me at 220-5700, my supervisor at 220-7503, the Office of the Chair, Faculty of Education Joint Ethics Review Committee at 220-5626, or the Office of the Vice-President (Research) at 220-3381. Two copies of the consent form are provided. Please return one signed copy to your child's school within one week, and retain the other copy for your records. In addition, please return it with the completed background information sheet provided. Thank you for your cooperation.

Sincerely,

Colleen Sjoblom
M.Sc. student, Department of Educational Psychology
University of Calgary

Appendix E

Parent Consent Form

I/We, the undersigned, hereby give my/our consent for _____ to participate in a research project entitled "Aggression and Social Information Processing in Typical Children and Children with Developmental Delays".

I/We, understand that such consent means that _____ may be randomly selected to participate in the project. My child will participate in an individual interview with an experimenter, in which they will hear four short stories and then answer brief questions about their thoughts regarding these stories. This interview will take approximately 8-10 minutes, and will take place during regular class time. In addition, my child's teacher will complete a brief questionnaire regarding my child's classroom behaviour.

I/We understand that participation in this study may be terminated at any time by my/our request, my child's request, or the investigators. Participation in this project and/or withdrawal from this project will not affect my/our request or receipt of other services from the school board or the university.

I/We understand that this study will not involve any greater risks than those ordinarily occurring in daily life.

I/We understand that the responses will be obtained anonymously and kept in strictest confidence.

I/We understand that only group data will be reported in any published reports.

I/We understand that all raw data will be kept locked file cabinets and destroyed two years after publication of study results.

I/We understand that we will be offered a written summary of the results approximately 3-4 months after all of the data has been collected.

I/We have received a copy of this consent form for my(our) records. I/We understand that if at any time I have questions, I can contact the researcher at 220-5700, their supervisor at 220-7503, the Office of the Chair, Faculty of Education Joint Ethics Review Committee, at 220-5626, or the Office of the Vice-President at 220-3381.

_____	_____
Signature of Parent/Guardian	Signature of Parent/Guardian
_____	_____
Date	Date

Appendix F

Teacher Cover Letter

Dear Teacher,

My name is Colleen Sjoblom. I am a graduate student in the Department of Educational Psychology at the University of Calgary, conducting a research project under the supervision of Dr. Jac Andrews as part of the requirements for an M.Sc. degree. I am writing to provide information regarding my research project entitled "Aggression and Social Information Processing in Typical Children and Children with Developmental Delays" so that you can make an informed decision regarding your participation.

The purpose of the study is to examine how children problem solve in social situations when a negative event has occurred (for example, getting bumped by another child). Specifically, this study will examine whether children's social problem solving differs relative to their level of aggression and psychological status (i.e. typical children and those with developmental delays). This study will be conducted with children attending special education classes as well as those in regular classrooms. Children will be randomly selected from those who agree to participate. As part of this study, you will be asked to complete a brief questionnaire for each child in your class who is participating in the study. This questionnaire is a rating scale which examines children's behaviour, such as aggression. Each rating scale will take approximately 2-4 minutes to complete. You will be asked to complete the questionnaires for the participating students within two weeks time. You will also be asked to keep your responses confidential. Children will participate in short interviews with me or one of my assistants regarding their social problem solving which will take place during class time. The interviews will take approximately 8-10 minutes for each child. You should be aware that even if you give your permission, you are free to withdraw at any time for any reason without penalty.

Participation in this study will involve no greater risks than those ordinarily experienced in daily life.

Data will be gathered in such a way as to ensure anonymity. Children and teachers who participate in the study will be assigned numbers, and these numbers (not their names) will be recorded on the teacher questionnaires and on data from the interviews. Once the data has been collected, any record linking the child's name or the teacher's name to their assigned number will be destroyed. Once collected, responses will be kept in strictest confidence and only groups results will be reported in any published studies. The raw data will be kept in a locked filing cabinet at the researcher's residence, only accessible to the researcher. All files will be destroyed two years after completion of the study.

You will be offered a written summary of the study results approximately 3 to 4 months after all of the data has been collected, and a phone number will be made available to you should you have any additional questions.

If you have any questions, please feel free to contact me at 220-5700, my supervisor at 220-7503, the Office of the Chair, Faculty of Education Joint Ethics Review Committee at 220-5626, or the Office of the Vice-President (Research) at 220-3381. Two copies of the consent form are provided. Please return one signed copy to me, and retain the other copy for your records. Thank you for your cooperation.

Sincerely,

Colleen Sjoblom
M.Sc. student, Department of Educational Psychology
University of Calgary

Appendix G

Teacher Consent Form

I, the undersigned, hereby give my consent to participate in a research project entitled "Aggression and Social Information Processing in Typical Children and Children with Developmental Delays".

I understand that such consent means that I will complete a brief questionnaire for each of the participating students in my class, which examines their behaviour, such as aggression. Each questionnaire will take approximately 2-4 minutes to complete, and I will be asked to complete these at my leisure, and have all questionnaires completed within two weeks. I also understand that the participating students in my classroom will be taking part in interviews with an experimenter during regular class time and that these interviews will take approximately 8-10 minutes.

I understand that participation in this study may be terminated at any time by my request, or the investigator. Participation in this project and/or withdrawal will not adversely affect me in any way.

I understand that this study will not involve any greater risks than those ordinarily occurring in daily life.

I understand that the responses will be obtained anonymously and kept in strictest confidence.

I understand that only group data will be reported in any published reports.

I understand that all raw data will be kept locked file cabinets and destroyed two years after publication of study results.

I understand that I will be offered a written summary of the results approximately 3 to 4 months after all of the data has been collected.

I have received a copy of this consent form for my records. I understand that if at any time I have questions, I can contact the researcher at 220-5700, their supervisor at 220-7503, the Office of the Chair, Faculty of Education Joint Ethics Review Committee, at 220-5626, or the Office of the Vice-President at 220-3381.

_____ _____

Date Signature

_____ _____

Teacher's Printed Name School