Early childhood aggression

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1

General introduction

Introduction

The assessment, development, and risk factors of childhood aggression are important research topics because of the costs of aggressive or antisocial behavior to society in terms of material, physical, and emotional damage. A useful guiding framework for research regarding those issues is provided by the developmental psychopathology perspective. This research paradigm is defined as "the study of the origins and course of individual patterns of behavioral maladaptation" (Sroufe & Rutter, 1984, p. 18). According to this perspective, development is organized around a number of salient developmental issues every child negotiates (Sroufe, Egeland, Carlson, & Collins, 2005; Sroufe & Rutter, 1984), and behavior must be considered in light of these developmental issues. Similar specific behaviors may have different meanings throughout development, and conversely the same behavioral pattern may consist of various specific behaviors depending on the developmental level of the child. Developmental psychopathology focuses on both normative and abnormal pathways, as well as risk and protective factors for the development of psychopathology (Cicchetti & Cohen, 1995). The current thesis addresses these developmental psychopathology issues with respect to the development of aggression in young children. Before going into early childhood aggression, the definition and ethological background of aggression in general will be discussed.

Aggression

The word *aggression* has originally been derived from the Latin word *aggressare* (to approach, to attack), which is compiled of *ad* (towards) and *gradus* (a step). The New Oxford Dictionary of English (1998, 1st edition) defines aggression as "hostile or violent behaviour or attitudes towards another; readiness to attack or confront." A somewhat more extensive definition can be found in the Oxford Dictionary of Psychology (2006, 2nd edition): "Behaviour whose primary or sole purpose or function is to injure another person or organism, whether physically or psychologically." The latter definition describes the function of the behavior, but the origins and evolutionary function of the behavior remain unclear. These issues are addressed by ethologists. From an ethological point of view a specific behavior can be explained by answering four questions: (1) How does the behavior influence survival? (2) What makes the behavior happen at a given moment? (3) How do the relevant behavioral structures and processes develop as the individual grows up (ontogeny)? (4) How have the behavior systems of each species evolved until they became what they are now (behavioral phylogeny)? (Tinbergen, 1968).

Aggression occurs in a wide range of species across the animal kingdom. Ethologists have proposed a number of general functions of this behavior that all enhance the chance of survival. The most important evolutionary functions of aggressive behavior are warding off danger, obtaining resources that are scarce, protecting territory and possessions, and (for males) competing with other males for available resources that furnish reproductive opportunities (see

Archer, 1995; Manson & Wrangham, 1991). In contrast to these more or less antisocial functions, De Waal (2000) described a social function of aggression. He proposed a framework in which aggression is considered a tool of competition and negotiation. De Waal argued that species that are dependent on one another for survival will seek reconciliation after an aggressive encounter. Thus, instead of less contact after a fight, the individuals will increase contact in order to restore the social damage. As a result, aggression between individuals can be quite common without endangering the relationship.

As far as the direct causes of aggression are concerned, Lorenz (1966) argued that animals and humans have an internal urge to attack. He advocated the idea of a hydraulic/cathartic model and stated that there is a reservoir in which aggressive energy accumulates. When the reservoir is full, the energy must be released. This is possible through direct expression and/or vicarious expression of aggression. Thus, according to Lorenz, the internal state regarding the readiness to attack varies based on the amount of aggressive energy. Furthermore, Lorenz argued that aggression concerns preprogrammed behavior. He described it as instinctive behavior that is not a (socially) learned reaction, but an innately organized response pattern. According to Tinbergen (1968), the development of aggression in an individual is driven by both instinct and experience. This development is characterized as a series of events, starting with the innate programming instructions which straightaway start to interact with the environment.

From an evolutionary perspective, aggression is adaptive. However, in modern times, most adaptive functions of aggression in humans have disappeared. Defending your territory or impressing females by being aggressive is in most cases not promoting survival of the human species, nor of the specific genes. These functions of aggression may have petered out, but the behavior itself has not. In addition, in explaining serious and destructive types of aggression in (adult) humans, Tinbergen (1968) stated that our cultural evolution proceeds at a much faster pace than our genetic evolution. One of his arguments pertains to the phenomenon that warriors are now brainwashed into believing that fleeing is despicable, whereas in evolution this behavior was adaptive in the sense that it could end an attack. Tinbergen also described man's ability to make and use killing tools. With these tools, victims can be reached from long distance and therefore the distress signals from the victim are not being noticed. To date, findings in the literature indeed indicate that human aggression is problematic. It must be noted that the types of aggression that were referred to by ethologists concern the more serious aggressive behaviors, inflicting severe damage to an opponent or at least threatening to do so. Of course, early childhood aggression does not (yet) cause serious harm, but from the ethological perspective, these behaviors are instinctive and may be precursors to the more dangerous counterparts that are maladaptive in modern times. Therefore, it is relevant to study this behavior and focus first on the ontogenetic development in humans.

A developmental perspective on aggression

Early childhood aggression

Another issue brought up by ethologists concerns the choice of outcome measures used in studies of aggression (Archer, 1995). A clear descriptive basis of the behavior that is studied is needed in order to be able to draw clear conclusions. Identifying aggression in (very young) children requires a developmental approach, because what constitutes aggression at one age does not necessarily map on to other developmental periods (Reebeye & Moretti, 2005). Various manifestations of aggression have been distinguished, including verbal, relational, and physical aggression (Coie & Dodge, 1998; Gendreau & Archer, 2005; Loeber & Hay, 1997). From a developmental perspective, it is important to establish which of these aspects is relevant in early childhood. Of the different subtypes, *physical* aggression seems the most relevant manifestation to investigate in early childhood. In the first years of life, children are already capable of performing physically aggressive acts, whereas other subtypes require certain cognitive, language, or social skills that are insufficiently developed at this age. Physical aggression refers to concrete behaviors, such as hitting, kicking, or biting, and is therefore relatively easy to assess.

Physical aggression has also been shown to be remarkably stable over time (Coie & Dodge, 1998). In middle childhood and adolescence this behavior may inflict serious harm on other people or objects. Research has shown that childhood physical aggression is predictive of both violent and nonviolent behavior problems in adolescence (Broidy et al., 2003; Nagin & Tremblay, 1999). These studies however investigated aggression in late-preschool and school-aged children. High levels of earlier physical aggression may predict later behavior problems as well. It is thus highly relevant to investigate physical aggression in early childhood. Several researchers have hypothesized that in terms of frequency of physically aggressive behaviors the preschool period is the most aggressive developmental stage (for an overview, see Coie & Dodge, 1998; Tremblay, 2004; Tremblay et al., 1999, 2004). Yet, it is surprising to note that so little empirical evidence exists regarding the normative development of early childhood aggression.

Normative and abnormal development

A central feature of the developmental psychopathology perspective is its focus on both normal and abnormal development. In order to be able to investigate and understand pathological or abnormal development, the normal or normative course of development must be known (Cicchetti & Cohen, 1995; Rutter & Sroufe, 2000; Sroufe & Rutter, 1984). According to the developmental psychopathology perspective, the same factors and processes that are operational in normal development govern the development of disturbance (see for example Sroufe et al., 2005). Thus, the first step in examining the development of abnormally high levels of aggressive behavior is to investigate the normative developmental

course of aggression. The focus on *early* development is in line with Bowlby's (1973) elaboration of Waddington's (1957) developmental pathways model. This model has been described by Bowlby as follows:

> The … model resembles a [railway] system that starts as a single main route which leaves a central metropolis in a certain direction, but soon forks into a range of distinct routes. … The further each route goes from the metropolis, however, the more branches it throws off and the greater the degree of divergence of direction that can occur. (p. 413)

Early in life, different routes or pathways may be entered. In the course of development however, people become increasingly constrained to the particular pathway already entered. Bowlby emphasized that it is not impossible to get back to the convergent track after having left it. Nevertheless, early development and experiences in the first years of life are of major (but not solitary) value for the following course of development.

The importance of early entrance on deviant developmental pathways has been underlined by several researchers. It has been shown that extremely high levels of externalizing or internalizing problems during the preschool years are predictive of psychopathology at later ages (Egeland, Pianta, & Ogawa, 1996; Lavigne et al., 1998; Mesman & Koot, 2001). However, little is known on the role of physical aggression in the *first* years of life in the prediction of later behavior problems. To be able to investigate the consequences of early deviant levels of physical aggression, the normative development of physical aggression must be known. Therefore, in the current thesis the normative course of the early development of aggression will be investigated.

The observation of early aggression

Investigating the development of physical aggression using parent reports is relatively easy. However, when observing physical aggression in toddlers and preschoolers in a standardized way several issues come into play. One of these is the issue of intent. The *intention* to inflict harm on others is included in many definitions of aggression (e.g., Brook, Zheng, Whiteman, & Brook, 2001; Estrem, 2005; Ostrov, Woods, Jansen, Casas, & Crick, 2004). However, since infants and toddlers are not yet fully able to oversee the consequences of their behavior and to understand the feelings of other people (e.g., Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992), it is problematic to consider intent as a necessary element for aggressive behaviors in early childhood. Another drawback of the inclusion of intent is that it is difficult to measure in general, even in adults. Most studies that include intent in their definition do not directly assess the intentionality of the behaviors they measure.

Other developmental issues that are relevant when observing early aggression concern the motor limitations and playful and exploratory character of behavior typical for infants and toddlers. Children of these ages have minimal control over the power of their behaviors and as a result they may put down a toy with more force than necessary. Relatively rough behaviors may also be due to exploration or play. For example, to investigate whether all objects fall

downwards, infants may throw their stuffed toys, blocks, and cars from the stairs, without necessarily being aggressive.

Taking these developmental issues into account, we defined physical aggression in early childhood as behavior that is aimed at and may cause harm to people, objects, or animals, and is not due to motor limitations, or part of age-appropriate play and exploration. This definition is the basis of an observational measure of early childhood physical aggression that is used in the current thesis. The instrument was originally developed by Shaw, Keenan, and Vondra (1994). However, its reliability and convergent and discriminant validity were never investigated. In the current thesis, the psychometric qualities of this observational instrument are examined.

Risk and protective factors

Because high levels of aggression in the first years of life may be predictive of later behavior problems, knowledge about factors that may explain individual differences in the development of aggression is needed. Developmental psychopathology delineates two types of influencing factors: risk and protective factors (Cicchetti & Cohen, 1995; Sameroff, 2000; Werner, 2000). Risk factors influence the detraction from normal adaptive pathways and increase the risk for developing psychopathology across different domains of development (emotional, social, cognitive, representational, linguistic, and biological). Protective factors promote competent adaptation in the child by reducing the impact of risk factors (Rutter, 1990). Risk and protective factors may be internal (biology, psychology; for example a difficult or an easy temperament) or external (family, school, broader social economic environment; for example an insecure or a secure attachment relationship), and their effect may depend on the particular developmental phase of the child (Cicchetti & Cohen, 1995).

Previous studies have provided evidence for several factors that influence the development of aggression. Living in low social economic circumstances, having a teenage mother, being exposed to harsh and insensitive parenting, having high levels of testosterone and low levels of cortisol are all factors that may increase the risk of becoming aggressive (for an overview, see Coie & Dodge, 1998; Connor, 2002). However, most studies focused on preschoolers, school aged children, and adolescents, and as a result little is known on the effect of such factors during infancy and toddlerhood. In the current thesis two domains of factors that may influence the early development of aggression are addressed: parenting and biological factors.

Parenting and aggression

In infancy and toddlerhood, the family is usually the most important environment for the child's development. The relationship with the parents is believed to be an important causal factor in the development of the child's personality (Bowlby, 1969; Erikson, 1963). Sroufe et al. (2005) stated that in the first years of life, the behavior of the child is characterized by its dyadic organization. Parents play a crucial role in the regulation of their children's emotions and behavior. According to Bowlby (1969), early experiences of parent-child interactions may function as a blueprint for later social exchanges. Based on the relationship with their

parents, children form "working models" of the self and others. These working models guide the children's expectations and behaviors in social situations and accordingly, they set the direction for later development.

Two salient aspects of parenting that are relevant in early childhood are sensitivity and discipline. These factors reflect the two parenting dimensions responsiveness and demandingness, distinguished by Maccoby and Martin (1983). Both sensitivity and discipline have been shown to be associated with the development of aggression (e.g., NICHD, 2004b; Olson, Bates, Sandy, & Lanthier, 2000; Shaw, Gilliom, & Giovannelli, 2000), but little is known about their effect on *early* aggression and their interrelation in the prediction of aggression. For example, we do not know whether both (in-)sensitivity and (negative) discipline uniquely predict child aggression (i.e., independent of each other). Another possibility is that sensitivity moderates the influence of negative discipline on child aggression, with high levels of sensitivity being a protective factor for the negative influences of negative disciplining. Finally, negative discipline may mediate the relation between insensitivity and high levels of child aggression. In the current thesis the interplay of maternal sensitivity and discipline in the prediction of the early development of aggression is investigated by testing these three hypotheses.

Biological aspects of aggression

Recently, child development research has become more focused on the biological aspects of behavior. A presumed biological marker of aggressive behavior is the functioning of the hypothalamic-pituitary-adrenocortical (HPA) axis. The end products of this system are glucocorticoids (mainly cortisol in human and non-human primates, and corticosterone in rodents; Gunnar & Cheatham, 2003). The most important function of the HPA axis is to produce a stress response. A cascade of hormonal and biochemical events is triggered by the experience of stress, resulting in heightened levels of cortisol. Signals from the body and higher centers of the brain activate the production of corticotrophin-releasing hormone (CRH) by the hypothalamus. In turn, CRH sets off the release of adrenocorticotropic hormone (ACTH) in the pituitary, which travels in the blood stream to the adrenal glands, where it stimulates the production of cortisol (Gunnar & Cheatham, 2003; Sapolsky, 2004; Stansbury & Gunnar, 1994). This activity of the HPA axis promotes the survival of the organism by mobilizing energy during stress; fat and protein stores are metabolized, the immune system, digestion, and growth are inhibited in order to direct energy to the immediate problem. In addition, cortisol affects cognition to facilitate memory for the details of the emergency (Sapolsky, 2004). Cortisol is not only produced during stress, but the HPA axis is also active during non-stressful or basal conditions. The basal levels of cortisol follow a circadian rhythm, peaking during the last few hours of sleep with the highest point usually about 20-30 minutes after awakening, and then declining throughout the day (Gunnar & Cheatham, 2003; Sapolsky, 2004; Stansbury & Gunnar, 1994).

The basal functioning and stress response of the HPA axis varies among individuals. Apart from physical conditions, several social and psychological factors may contribute to these individual differences, including developmental history, developmental level, current resources, and coping strategies (Stansbury & Gunnar, 1994). There is evidence that serious dysregulation of the HPA axis

(both basal functioning and stress response) is related to psychopathology (for a review, see Stansbury & Gunnar, 1994). More specifically, a number of researchers have theorized that low basal cortisol levels and the absence or blunting of the expected cortisol increase after a stressor would be related to an increase in aggressive behavior (e.g., Lahey, McBurnett, Loeber, & Hart, 1995; Van Goozen, 2005). Several mechanisms for this relation have been proposed. For example, children with low basal levels of cortisol and an inhibited stress response may be underaroused and less anxious, and may thus more easily engage in outgoing and aggressive behaviors (Raine, 1996; Van Goozen, 2005). In addition, McBurnett, King, and Scarpa (2003) argued that a common factor may affect both the functioning of the HPA axis and the level of aggressive behavior. According to these authors, children with (aggressive) conduct problems are likely to have been exposed to prenatal and postnatal stress and these early stressors may also cause permanent alteration of the HPA axis. Despite these clear hypotheses, the research findings to date are equivocal and there is considerable variation in the research methods that were used. Thus, the time is ripe for an overview of the results so far. In the current thesis, the results of studies linking cortisol to aggression in children and adolescents are combined in a meta-analysis.

The current thesis

Aims of the study

The general aim of the current thesis is to provide more insight in the early development of physical aggression. The study is guided by the developmental psychopathology perspective and the main themes of this view are addressed. The specific aims of the thesis are as follows:

(1) Investigating the early development and stability of parent-reported aggression in a general population sample.
(2) Testing the reliability and convergent as well as discriminant validity of an observational instrument of physical aggression in early childhood, based on our definition of aggression.
(3) Examining the influence of maternal sensitivity and discipline and their interplay on the early development of aggression.
(4) Delineating the relation between the functioning of the HPA axis and aggressive behavior using a meta-analytic approach.

The context of the current study

The data used for the current thesis are derived from the SCRIPT study (Screening and Intervention of Problem behavior in Toddlerhood). The main purpose of this study was to test the effectiveness of an intervention aimed at reducing externalizing problems in early childhood by means of enhancing maternal sensitivity and discipline strategies. In order to obtain a sample of

children showing high levels of externalizing problems, a general population screening was performed using the Child Behavior Checklist for 1½-5-year-olds (CBCL/1½-5; Achenbach & Rescorla, 2000). Children who scored above the 75th percentile on the CBCL syndrome Externalizing Problems and their mothers were invited for a pretest in the laboratory. After this pretest, children were randomly assigned to either an intervention or a control group. In the following year, the intervention took place, consisting of six sessions (Mesman et al., in press; Van Zeijl et al., in press). Families in the control group received six phone calls in which neutral developmental topics were discussed. No information was given on intervention issues. Approximately one and two years after the pretest, the families came to the laboratory for posttests. For the current study, only data from the pretest and the first posttest were used, since data from the second posttest are still being processed. Because the intervention may have affected maternal sensitivity and discipline and child aggression, we only focused on children in the control group when investigating the effects of parenting on the development of child physical aggression. Between 1 and 3 years after the general population screening, a follow-up took place in which all families who responded the first time again received questionnaires. For the current study we only used follow-up data from families who returned the questionnaires approximately one year after the screening phase.

In the screening and follow-up phases of the SCRIPT study, parents were asked, among other things, to complete a questionnaire on the aggressive behaviors of their children. These data were used for study 1, described in Chapter 2. The laboratory sessions consisted of several highly structured and less structured episodes with mother and child (e.g., playing together, making puzzles, cleaning up). The sessions were videotaped and afterwards the behavior of the mothers and their children (e.g., aggression) was coded by independent observers. Studies 2 and 3 (chapters 3 and 4) focused on these observational data.

Outline of the present thesis

In the following chapter the longitudinal development and stability of parent reported physical aggression in a general population sample of 1-, 2-, and 3-year-olds are investigated. In chapter 3, the reliability and validity of the observational instrument for physical aggression are assessed. Chapter 4 addresses the effects of parenting (i.e., sensitivity and discipline) on the development of aggression. Chapter 5 reports on two meta-analyses examining a possible biological correlate of aggression: the levels of the stress-hormone cortisol. One meta-analysis investigates the relation between basal cortisol and aggression, the other focuses on cortisol reactivity. Finally, in chapter 6 the central results of the four studies are integrated and discussed.