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Empathy and its association with aggression in early childhood

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1

General Introduction

The first signs of aggressive behavior can be observed early in infancy, as soon as infants develop the motor ability to use force against others (Hay et al., 2010). Such early signs of aggression manifest as physical aggression, such as hitting and biting, which are part of the typical development of young children (Alink et al., 2006; Hay et al., 2010; Tremblay et al., 1999; Tremblay et al., 2004). Although virtually all young children show physical aggression at least occasionally, persistently high levels of physical aggression in toddlerhood have been shown to be an important risk factor for aggressive behavior later in childhood and adolescence (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006). Intervening to reduce or prevent chronic aggressive behavior at school age is difficult and expensive, and intensive individualized training programs are required to reach significant effects (Hoogsteder et al., 2014; Smeets et al., 2015). It is important to study risk factors of aggression early on, as these may form important components of developmental prevention programs (Cote et al., 2006; Farrington, Gaffney, Lösel, & Ttofi, 2017; Tremblay, 2010; Tremblay et al., 2004). Impaired empathy has been considered an important risk factor for aggressive behavior, and negative associations between empathy and aggression have consistently been found in school-aged children and adolescents. However, there is a lack of research on the association between empathy and aggression in the preschool period, when children typically learn to inhibit aggressive behavior (Alink et al., 2006; Bons et al., 2013; Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988; Vachon, Lynam, & Johnson, 2013; van Langen, Wissink, van Vugt, Van der Stouwe, & Stams, 2014). Therefore the aim of the studies described in this dissertation is to study early manifestations of empathy as a predictor of aggression during the first years of life.

Empathy originates from the Greek word *empathia*, which translates to in (em) and feeling (pathos); empathy generally refers to the ability to share and understand the feelings of another person (Cuff, Brown, Taylor, & Howat, 2014; Decety & Moriguchi, 2007). Although empathy has been studied for hundreds of years, the definition of empathy is still under debate (Cuff et al., 2014). For example, there is discussion on how to discriminate empathy from related concepts such as sympathy and compassion, whether empathy is a cognitive or an affective concept, and whether the feelings of the observer should be congruent with those of the observed person. Along with several other emotions, including guilt and shame, empathy has been viewed as playing a fundamental role in morality (Eisenberg, 2000). In particular, empathy has been suggested to motivate prosocial and altruistic behavior, and to inhibit aggression (Blair, 1995; de Waal, 2008; Eisenberg, 2000).

Self-report is the most common method to study empathy, for example by asking how children feel in response to emotional stories, pictures or movies to measure situationally-induced empathy or by using questionnaires to measure dispositional

empathy (Eisenberg, 2000; Zhou, Valiente, & Eisenberg, 2003). In addition to self-reports, other-reports have been used to examine dispositional empathy in children. Parents, teachers or peers report on empathy to obtain information that is less biased by social desirability, to obtain information from multiple perspectives, or to examine empathy in children that are too young to provide self-reports. Situationally-induced empathy has also been examined by observation of behavioral responses to empathy-evoking situations, such as facial, vocal or gestural reactions (Eisenberg & Fabes, 1990; Zhou et al., 2003). Furthermore, physiological responses to empathy-evoking situations have been used to examine empathy. Physiological measures, such as heart rate responses, are more objective than observational measures and relatively free from conscious control and social desirability bias. However, interpreting physiological measures is difficult, as physiology is also influenced by multiple non-emotional factors, such as attention and physical activity (Eisenberg & Fabes, 1990; Zhou et al., 2003).

EARLY MANIFESTATIONS OF EMPATHY

The first signs of empathy in humans can already be observed a few hours after birth. For example, motor mimicry has been shown in newborns, which refers to the automatic mimicry of emotional expressions of others and has been considered a motor aspect of empathy (Blair, 2005; Bons et al., 2013; Meltzoff & Moore, 1977). In addition, infants become more distressed in response to crying of other infants, compared to recordings of their own cries, to silence, and to noise, which is referred to as contagious crying or emotional contagion (Dondi, Simion, & Caltran, 1999; Sagi & Hoffman, 1976; Simner, 1971). In infancy, empathy-eliciting situations are often emotionally challenging and result in high levels of psychophysiological arousal (Eisenberg, 2010; Geangu, Benga, Stahl, & Striano, 2010; Hoffman, 2000). Such high levels of arousal manifest as personal distress (e.g. crying) and seeking comfort (e.g. sucking on their thumb or seeking comfort from their parents) because vicarious emotional responses cannot be regulated yet and become aversive. In other words, empathy evokes self-oriented behavior in order to relieve the infants' own distress (Liew et al., 2011; McDonald & Messinger, 2011). This empathic distress is considered to be a basic expression of empathy, because of its strong relation with automatic and relatively primitive processes such as emotional contagion and emotional resonance (de Waal, 2008).

In addition to empathic distress, early forms of other-orientation can also be observed in infants. For example, when a peer shows distress, infants have been shown to pay more attention to the distress of the other, by looking at their peer or the mother of their peer, than to their own distress, as indicated by looking at their own mother (Hay, Nash, & Pedersen, 1981; Liddle, Bradley, & McGrath, 2015). During the second and third year of life, infants start to show empathic concern. They increasingly

focus on the other's distress instead of focusing solely on one's own distress, because they are improving in regulation of empathic distress, in understanding that vicarious feelings are caused by feelings of the other and not by the child's own feelings, and in cognitively taking the perspective of the other in order to understand the feelings and needs of the other. Such empathic concern includes concern for the wellbeing of others (sympathy) and trying to understand the cause of the feelings of the other, which motivates prosocial attempts to reduce the other person's distress (Eisenberg, Eggum, & Di Giunta, 2010; McDonald & Messinger, 2011). At the age of three, over 50% of children perform some act of prosocial behavior in response to their mother's distress (Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008; McDonald & Messinger, 2011).

Empathic distress and empathic concern can be considered separate aspects of empathy, as distinct neural systems have been shown to underlie empathic distress and empathic concern (Decety & Michalska, 2010; Han et al., 2017; Singer & Klimecki, 2014). In addition, they are qualitatively different because empathic distress is focused on relieving one's own distress, whereas empathic concern is focused on relieving the other's distress. Although empathic distress may not lead to altruistic helping as empathic concern does, it is considered an important aspect of empathy because it reflects the extent to which an individual is affected by the suffering of another person (Batson, Fultz, & Schoenrade, 1987; Eisenberg et al., 2010; Singer & Klimecki, 2014). During the first and second year of life, children typically respond to empathy-evoking events with empathic distress, which has been suggested to be a precursor of empathic concern (de Waal, 2008; Hoffman, 2000; McDonald & Messinger, 2011; Zahn-Waxler & Radke-Yarrow, 1990). In addition to this hierarchical relation, empathic distress and empathic concern are positively associated and can occur simultaneously throughout development (Gill & Calkins, 2003; Israelashvili & Karniol, 2018; Liew et al., 2011; Lin & Grisham, 2017; Nichols, Svetlova, & Brownell, 2015; Young, Fox, & Zahn-Waxler, 1999). In contrast to the important role of empathic distress for empathy development in infancy and toddlerhood, high levels of empathic distress are known to be less adaptive at a later age. In adulthood, excessive levels of sharing feelings of others is a risk factor for negative feelings, stress, and burn-out, for example in healthcare professionals such as nurses and therapists (Singer & Klimecki, 2014). In contrast, the ability to control empathic distress and to show empathic concern is related to better health outcomes.

Both empathic distress and empathic concern result from sharing feelings of others, also referred to as affective empathy, whereas the definition of empathy also comprises the understanding of the feelings of others, which is referred to as cognitive empathy (Cuff et al., 2014; Decety & Moriguchi, 2007). Affective empathy and cognitive empathy have been suggested to be separate, but complementary aspects of empathy that rely on different neural networks (Decety, 2010; Decety, Meidenbauer, & Cowell,

2017; Singer, 2006; Smith, 2006). Cognitive empathy adds to affective empathy by providing the ability to fully understand the situation of another person while taking into account factors such as the context of the situation, and the goals and beliefs of the other (Decety, 2010; Singer, 2006). Early signs of understanding the feelings of others have been observed in toddlers who helped persons that were hurt, even when this person did not show any emotions that could induce affective empathy (Vaish, Carpenter, & Tomasello, 2009). This indicates that these children used some form of perspective taking to understand the possible emotion of the other in absence of overt emotion cues. Cognitive empathy is closely related to Theory of Mind, emotion recognition, executive functioning, and perspective taking, which rapidly develop from the age of four years (Blair, 2005; Bons et al., 2013; Decety, 2010; Rodger, Vizioli, Ouyang, & Caldara, 2015; Tonks, Williams, Frampton, Yates, & Slater, 2007). In line with this development, cognitive empathy has been shown to increase from age four and to become fully developed during adolescence (Pons, Harris, & de Rosnay, 2004; van der Graaff et al., 2014). Furthermore, neuro-imaging studies also indicated that brain structures associated with affective empathy mature earlier than brain structures associated with cognitive empathy (Decety, 2010; Singer, 2006).

Empathy is an important aspect of social development. Research has shown that higher levels of empathy were associated with higher levels of social competence (Sallquist, Eisenberg, Spinrad, Eggum, & Gaertner, 2009; Zhou et al., 2002), less prejudice and racism (Pettigrew & Tropp, 2008; Stephan & Finlay, 1999), better conflict resolution in friendship relations (de Wied, Branje, & Meeus, 2007), and more prosocial and altruistic behavior (de Waal, 2008; Eisenberg et al., 2010). Also, differences in empathy development can be expected to be associated with individual differences in other domains, such as temperament and other aspects of social cognition (e.g., social attention) (Bons et al., 2013; Liew et al., 2011; Young et al., 1999).

Regarding temperament, neurodevelopmental theories indicate that children who are more emotionally reactive themselves, might also be more sensitive to the distress of others and therefore become more empathic (Decety, 2010; Preston & de Waal, 2002; Spinrad & Stifter, 2006). Temperament refers to stable personality traits that are a function of biological predispositions and are expressed behaviorally, and emotional reactivity is a core aspect of temperament. In childhood, most studies indicate that emotional responses to challenge are positively associated with empathy (Eisenberg, 2000, 2010). However, across different studies in infants and toddlers, both positive and negative associations between negative emotional responses to challenge and empathy have been found (Eisenberg, 2000, 2010; Hastings & Miller, 2014). Possibly, these mixed results are due to the fact that the autonomic nervous system, which plays an important role in the psychophysiology of emotional responses, matures rapidly

during this developmental period. In infancy, diverse physiological responses occur in response to emotions, which become more stable around age 5 years (Alkon, Boyce, Davis, & Eskenazi, 2011; Quigley & Moore, 2018). Therefore, emotional responses to challenge might be an important precursor of empathy, however, the association between emotional responses to challenge and empathic behavior is not clear in infancy and toddlerhood.

In addition to emotional reactivity, social attention might play an important role in empathy development, as children who naturally attend to social cues (i.e. emotional faces), might also be better able to share and understand feelings of others (Bons et al., 2013; Yan, Pei, & Su, 2017). Social attention is necessary in order to recognize emotions of others and therefore, has been considered a prerequisite of empathy (Bons et al., 2013). Despite the importance of social attention for sharing and understanding emotions of others, research on the role of social attention in relation to empathy in early childhood is scarce (Bons et al., 2013; Wegrzyn, Vogt, Kireclioglu, Schneider, & Kissler, 2017). One study indicated a positive association between social attention and empathy, as five-year-old children who were high in empathy fixated more quickly on the eyes and mouth of presented faces, they did so for longer duration and also more frequently in response to painful expressions (Yan et al., 2017).

Further research on empathy and its associated domains of development in early childhood can help to provide better insight on how to foster empathy development, recognize empathy impairments, and develop interventions focusing on the enhancement of empathy to stimulate social development (Feshbach & Feshbach, 2011). In particular, it may also provide insights into the effects of impaired empathy on antisocial development.

EMPATHY AND AGGRESSION

Development of aggression starts, like the development of empathy, during infancy. As early as six months of age, as soon as infants develop the motor ability to use force against others, the first signs of aggressive behavior can be observed (Hay et al., 2010). Early signs of aggression manifest as physical aggression, such as hitting and biting, and peak during the second and third year of life, when virtually all children show physical aggression at least occasionally (Alink et al., 2006; Hay et al., 2010; Tremblay et al., 1999; Tremblay et al., 2004). During the fourth year of life, physical aggression declines again, due to brain development that enables children to inhibit physical aggression. At this age other forms of aggression start to develop, such as verbal aggression or indirect forms of aggression. High levels of physical aggression in toddlerhood have been shown to be an important risk factor for later antisocial development, as approximately one out of six children show high and stable levels

of aggression from toddlerhood to pre-adolescence (Cote et al., 2006). Furthermore, early physical aggression has been shown to be a better predictor of physical and non-physical offending in adolescence than hyperactivity and oppositional behavior (Broidy et al., 2003). The longitudinal associations seemed to be stronger for boys than for girls, which is in line with other studies indicating that boys are more aggressive than girls from toddlerhood onwards (Alink et al., 2006; Archer, 2004; Card, Stucky, Sawalani, & Little, 2008; Hay et al., 2011). In order to reduce and prevent aggression as early as possible, it is important to study risk factors of aggression early on (Cote et al., 2006; Tremblay, 2010; Tremblay et al., 2004).

Impaired empathy is considered an important risk factor of aggressive behavior, since the observation of distress in others prompts the withdrawal of aggression by increasing autonomic arousal (Blair, 1995, 2006). This arousal is experienced as aversive and may be considered a physiological marker of affective empathy. Thus, when an individual experiences and learns to understand the causal link between aggression and aversive arousal during early development, this person becomes motivated to refrain from actions that harm others. Therefore, aggression has been associated with a lack of affective empathy and not with impaired cognitive empathy (Smith, 2006). Empirical studies support this theory, indicating that affective empathy rather than cognitive empathy is negatively associated with aggression (Blair, 2005; Bons et al., 2013; van Zonneveld, Platje, de Sonnevile, van Goozen, & Swaab, 2017; Winter, Spengler, Bermpohl, Singer, & Kanske, 2017). More specifically, reduced physiological arousal responses to emotional stimuli (i.e. affective empathy) have been found in school-aged children with high levels of aggression, such as children at risk of criminal behavior (van Zonneveld et al., 2017) and boys with disruptive behavior disorders (Anastassiou-Hadjicharalambous & Warden, 2008; Bons et al., 2013; de Wied, Boxtel, Posthumus, Goudena, & Matthys, 2009; Herpertz et al., 2005; Marsh, Beauchaine, & Williams, 2008).

Toddlerhood is an important developmental stage to study the association between empathy and aggression. Since approximately one in six children show high and stable levels of aggression from toddlerhood to pre-adolescence, interventions targeting empathy at very young ages may help reduce the chances of developing such high and consistent levels of aggression (Cote et al., 2006; Tremblay, 2010; Tremblay et al., 2004). Although both aggressive and empathic behavior can be observed in toddlers, research on the association between empathy and aggression has mainly focused on childhood, adolescence, and adulthood (Hay et al., 2010; Lovett & Sheffield, 2007; McDonald & Messinger, 2011). From school age to adulthood, low to moderate negative associations of empathy and aggression have consistently been found in both community samples and criminal offenders (Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988; Vachon et al., 2013; van Langen et al., 2014). However, there is a lack

of research into the association between empathy and aggression in the preschool period and the results of previous studies are mixed.

In children under the age of 6 years, negative associations between empathy and aggression have been found in studies using observational measures of aggression in peer-play group interactions and assessment of empathy using videotaped vignettes, parent reports and teacher reports (Strayer & Roberts, 2004), parental reports of aggression and observations of empathy during dyadic play (Hughes, White, Sharpen, & Dunn, 2000), or teacher reports of both empathic and hostile behavior (Belacchi & Farina, 2012). In contrast, positive associations between empathy and aggression were found in boys aged 4-5 years (Feshbach & Feshbach, 1969), with aggression obtained by teacher reports and empathy by verbal affective responses to slides showing affective situations. Another study, using maternal reports to measure aggressive behavior and behavioral responses of 2-year-olds to a recording of a crying infant and an experimenter pretending to hurt herself to measure empathy, also demonstrated positive associations between empathy and aggression (Gill & Calkins, 2003). Other studies in children under the age of 6 years did not demonstrate significant results in either direction, using similar measurement methods or paradigms as the studies described above (MacQuiddy, Maise, & Hamilton, 1987; Zahn-Waxler, Cole, Welsh, & Fox, 1995). One study, using both behavioral and physiological markers of empathy, did not demonstrate concurrent associations between empathy and aggression, but only longitudinal associations from age 4-5 to 6-7 years (Hastings et al., 2000). In contrast, another longitudinal study from age 14-36 months to 4-17 years did not reveal significant results (Rhee et al., 2013). In order to explain these mixed results, the authors suggested that positive associations between empathy and aggression can be explained by the influence of inhibition (Gill & Calkins, 2003). Various studies indicate that poor inhibition is associated with high levels of aggressive behavior during the preschool period (Hughes et al., 2000; Raaijmakers et al., 2008; Waller, Hyde, Baskin-Sommers, & Olson, 2017). Furthermore, inhibition has also been shown to be negatively related to empathy at this age (Liew et al., 2011; Young et al., 1999). Possibly, a lack of inhibition leads to impulsive behavior (e.g. approaching the other) in both empathy- and aggression-evoking events in toddlerhood (Gill & Calkins, 2003). Thus, a positive association between empathy and aggression may be expected under conditions of impaired (or not yet sufficiently developed) inhibition, whereas good inhibition may result in a negative association between empathy and aggression.

In addition, sex differences could play an important role in the association between empathy and aggression. Females have been shown to be more empathic from birth until adulthood and sex differences in empathy have been suggested to have a neurobiological origin (Christov-Moore et al., 2014; Schulte-Ruther, Markowitsch,

Shah, Fink, & Piefke, 2008). Furthermore, boys have been shown to be more aggressive than girls in toddlerhood (Alink et al., 2006; Baillargeon et al., 2007) and boys are more likely to follow high and stable trajectories of aggression from toddlerhood to adolescence (Cote et al., 2006; Tremblay, Hartup, & Archer, 2005; Tremblay et al., 2004). Therefore, it is important to take sex differences into account when examining empathy and aggression.

Besides the mixed results regarding the association between affective empathy and aggression at preschool age, the association between cognitive empathy and aggression during this developmental stage is also unclear. Two studies including preschool aged children examined affective and cognitive empathy in relation to constructs closely related to aggression. One study on 3-6 year-old children indicated that both affective and cognitive empathy, according to teacher reports, were negatively associated with hostile roles in bullying (i.e. being a bully, assistant, or reinforcer) (Belacchi & Farina, 2012). In addition, parents of 3-13 year-old children reported that impaired affective empathy was associated with psychopathic traits (which include aggression), but only in boys, and that impaired cognitive empathy was associated with psychopathic traits in both sexes, although this association disappeared for boys during early adolescence (Dadds et al., 2009). These results are surprising given the fact that from a theoretical point of view, only affective empathy is expected to be associated with aggression (Blair, 2005; Smith, 2006). Furthermore, congruent with theory, studies in older children, adolescents and adults did not find associations between cognitive empathy and aggression (Bons et al., 2013; van Zonneveld et al., 2017; Winter et al., 2017).

AIMS AND OUTLINE OF THIS DISSERTATION

There is a lack of research on precursors of empathy, and on the association between empathy and aggression in early childhood. The results of previous studies are mixed and it is likely that these contradictory results can be explained by taking into account other factors that are related to empathy and aggression. Therefore, our main aim was to study early manifestations of empathy as a predictor of aggression during the first years of life, while taking into account the role of precursors of empathy and possible moderators of the association between empathy and aggression. In particular, we aimed to investigate (1) emotional responses in infancy as a precursor of empathy in toddlerhood, (2) sex differences in the association between empathy and aggression in toddlerhood, (3) the association between inhibition, empathy, and aggression in toddlerhood, and (4) the association between indicators of social attention, affective empathy, cognitive empathy and aggression in the preschool period.

In the first study (chapter 2), we aimed to predict empathic behavior at age 20 months from emotional responses at 6 months of age. We expected that children who were more emotionally reactive to mildly arousing emotional challenges would be more sensitive to the distress of others and become more empathic later on. We used two mild emotional challenges to examine behavioral and physiological reactivity at age 6 months. During the still face paradigm, the mother was affectively unavailable for a short time and during the car seat task, the mother was physically unavailable for a short time. Both behavioral and physiological responses to the challenges were used to examine emotional responses. At age 20 months, behavioral responses of the children were videotaped when the experimenter pretended to hurt her toe to a piece of furniture. Both empathic distress and empathic concern were coded afterwards in order to assess whether these empathic responses could be predicted from behavioral and physiological responses to mild emotional challenges in infancy.

In the second study (chapter 3) it was examined whether empathy is associated with aggression at age 20 months and whether empathy is a predictor of the development of aggression from 20 to 30 months of age. Empathic distress and empathic concern in response to distress simulation by the experimenter at age 20 months were examined in relation to maternal reports of physical aggression at age 20 and 30 months. Furthermore, sex differences were taken into account as previous studies have suggested that girls are more empathic and less aggressive than boys from toddlerhood onwards, and that the association between empathy and aggression might differ for boys and girls (Archer, 2004; Christov-Moore et al., 2014; Feshbach & Feshbach, 1969).

In order to explain the contradictory results regarding the association between empathy and aggression in previous literature, the aim of the third study (chapter 4) was to test the hypothesis that inhibition moderates the association between empathy and aggression (Gill & Calkins, 2003; Lovett & Sheffield, 2007). Impaired inhibition in aggressive children may cause impulsive responses to both empathy and aggression-evoking situations. Therefore, empathy might be negatively associated with aggression in children with relatively good inhibition, but positively associated with aggression in children with relatively poor inhibition. Empathy and aggression were examined at age 30 months. Similar to the procedure at age 20 months in Chapters 2 and 3, both empathic distress and empathic concern were coded, and physiological responses to the distress simulation were measured. Inhibition was examined with a delay task, in which the child had to wait to receive a gift from the experimenter. Behavior of the child during the task was videotaped and coded afterwards. Maternal reports of physical aggression at age 30 months were used.

The fourth study (chapter 5) aimed to examine affective empathy and cognitive empathy in relation to aggression at age 45 months. Furthermore, social attention was taken into account because social attention is needed to recognize emotions of others and is therefore a possible prerequisite of empathy (Bons et al., 2013). Affective empathy, cognitive empathy and social attention were assessed with a single paradigm during which the children watched three video clips of peers showing emotions (fear, sadness and happiness). Affective empathy was measured by comparing physiological responses from non-social baseline clips to the emotional clips, cognitive empathy was measured by asking questions about the emotions in the clips, and eye tracking was used to measure social attention by calculating the time the children watched the face of the emotional children. Similar to the procedures at age 20 and 30 months, maternal reports were used as an indicator of aggressive behavior of the child. At this age, a broad measure of aggression was used, which took into account multiple types of aggression and not exclusively physical aggression, because during the fourth year of life levels of physical aggression are declining, whereas other forms of aggression (e.g. verbal aggression) are increasing (Alink et al., 2006; Hay et al., 2010; Tremblay et al., 1999).

In chapter 6, the results and conclusions of the studies above are summarized and discussed. Implications for prevention of aggression as well as directions for future research are suggested.

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Chapter 1

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