Empathy and its association with aggression in early childhood

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6 Summary and General Discussion

The studies described in this dissertation aimed to provide insight into 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. 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-age 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, 2014; van Langen, Wissink, van Vugt, Van der Stouwe, & Stams, 2014). Furthermore, 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. We investigated emotional responses in infancy as a precursor of empathy in toddlerhood (Chapter 2), sex differences in the association between empathy and aggression in toddlerhood (Chapter 3), the association between inhibition, empathy, and aggression in toddlerhood (Chapter 4), and the association between indicators of social attention, affective empathy, cognitive empathy, and aggression in the preschool period (Chapter 5). The main findings of the studies described in chapters 2, 3, 4, and 5 are discussed below, followed by a discussion of the strengths and limitations of the research, recommendations for further research and concluding remarks.

In Chapter 2, the association between infant physiological and behavioral reactivity to emotional challenge at age 6 months and behavioral responses to an empathy-eliciting event at age 20 months was examined. Although emotional reactivity is theorized to be important in the development of empathy, findings regarding the prediction of early empathic behavior by infant behavioral and physiological reactivity are mixed (Decety, 2010; Hastings & Miller, 2014; Preston & de Waal, 2002). This study examined whether behavioral and physiological reactivity to mild emotional challenge in 118 infants at age 6 months predicted empathic distress and empathic concern during an empathy-evoking task at age 20 months. The still face paradigm and the car seat task were used as mild emotional challenges (Goldsmith & Rothbart, 1999; Tronick, Als, Adamson, Wise, & Brazelton, 1979). Physiological measures of reactivity consisted of the difference in autonomic arousal (indicated by pre-ejection period and respiratory sinus arrhythmia [RSA]) between baseline and the mild emotional challenges. Behavioral measures of reactivity consisted of observations of struggle, self-soothing behavior and distress vocalizations during the emotional challenges (Goldsmith & Rothbart, 1999; Miller, McDonough, Rosenblum, & Sameroff, 2002; Shapiro, Fagen, Prigot, Carroll, & Shalan, 1998). Distress simulation by the experimenter was used to elicit empathy in

toddlers. Personal distress and comfort seeking were coded as indicators of empathic distress, and concerned expressions, hypothesis testing and prosocial behavior were coded as indicators of empathic concern (Liew et al., 2011; Lin & Grisham, 2017). In general, stronger reactivity to emotional challenge at age 6 months was positively related to empathic distress at 20 months. Specifically, shortened pre-ejection period and RSA suppression from baseline to the car seat task, but not the still face paradigm, were positively associated with empathic distress. In addition, struggle during the car seat task and still face paradigm was positively associated with empathic distress. These results confirm previous findings indicating that behavioral and physiological responses to challenge are positively related to empathic distress until age two (Liew et al., 2011; Ungerer et al., 1990; Young, Fox, & Zahn-Waxler, 1999). Furthermore, the results showed that behavioral and physiological reactivity to the car seat task independently predicted empathic distress, which stresses the importance of both behavioral and physiological reactivity for the development of empathy. Furthermore, quadratic associations between behavioral responses at 6 months, and empathic distress and empathic concern at 20 months were present, which indicates that moderate levels of behavioral responsivity predict the highest levels of empathic distress and empathic concern.

In Chapter 3, aggression at age 20 and 30 months was predicted from empathic behavior at age 20 months. Impaired empathy is considered to be an important risk factor of aggression, but results are contradictory in toddlerhood (Lovett & Sheffield, 2007). Empathy can be expressed, especially during infancy and toddlerhood, as empathic distress and in empathic concern (de Waal, 2008; McDonald & Messinger, 2011). The association between empathy and aggression may differ for empathic distress and empathic concern because empathic distress derives solely from affective arousal, which motivates the inhibition of aggression, whereas empathic concern is also under the influence of factors such as socialization and perspective taking (Farrant, Devine, Maybery, & Fletcher, 2012; Vaish, Carpenter, & Tomasello, 2009). In addition, the association between empathy and aggression may also differ for boys and girls, as girls typically are more empathic and less aggressive than boys (Archer, 2004; Christov-Moore et al., 2014; Feshbach & Feshbach, 1969). Therefore, empathic distress and empathic concern at age 20 months were examined in relation to aggression at age 20 and 30 months, while taking a potential moderating effect of sex into account. Empathic behavior was observed during a distress simulation task 20 months post-partum (Spinrad & Stifter, 2006; Zahn-Waxler, Robinson, & Emde, 1992). Since physical aggression has been shown to be a better predictor of continued problem behavior than other types of problem behavior during toddlerhood, maternal reports of physical aggression were used to measure aggression (Broidy et al., 2003). Physical aggression was assessed with

the Physical Aggression Scale for Early Childhood 20 and 30 months post-partum ($N_{20\ months}$ = 133, 69 boys; $N_{30\ months}$ = 119, 62 boys), (Alink et al., 2006). Hierarchical linear regression analyses revealed sex differences in the associations between empathic concern and empathic distress, and physical aggression at age 20 months. Furthermore, physical aggression at age 30 months was predicted by the interaction of sex with empathic concern at age 20 months, while controlling for aggression at age 20 months. The results indicated that more empathic behavior was associated with less physical aggression in girls, but not in boys. In addition, empathic distress was a more robust predictor of physical aggression over time than empathic concern.

Possibly, the sex differences in the association between empathy and aggression can be attributed to differences in inhibition between boys and girls. Specific impairments in inhibition have been shown in aggressive preschool children, in particular in boys (Raaijmakers et al., 2008). Therefore, boys might have responded more impulsively (e.g. approaching the victim) to the distress simulation task, which could have resulted in more behavioral responses, such as prosocial behavior, hypothesis testing, and comfort seeking (Gill & Calkins, 2003). Such inhibition impairments could explain why no association between empathy and physical aggression was found for boys (Eisenberg et al., 2010; Gill & Calkins, 2003; Lovett & Sheffield, 2007).

In Chapter 4, it was examined whether inhibition fulfils such a moderating role in the association between empathy and aggression in 103 30-month-old children. During a lab visit at 30 months post-partum, maternal reports of physical aggression in their child were obtained (Alink et al., 2006), inhibition was examined using a gift delay task (Kim, Nordling, Yoon, Boldt, & Kochanska, 2013; Kochanska, Murray, & Harlan, 2000), and behavioral observations (empathic distress and empathic concern) as well as physiological measures (heart rate and RSA responses) of empathy were obtained during a simulated distress paradigm (Spinrad & Stifter, 2006; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Reduced inhibitory control, low baseline heart rate and high baseline RSA were associated with higher levels of aggression. In addition, hierarchical regression analyses revealed a significant interaction effect of inhibition and heart rate response to an empathy-eliciting event, in the prediction of aggression: a negative association between empathy and aggression was present at higher levels of inhibition, but a positive association was found in toddlers who demonstrated lower levels of inhibition. These results suggest that children are less aggressive when they have both higher levels of empathy and inhibitory control. Therefore, inconsistencies between previous findings on the association between empathy and aggression in toddlerhood may be explained by heterogeneity within samples of children regarding inhibition (Eisenberg, Eggum, & Di Giunta, 2010; Gill & Calkins, 2003; Lovett & Sheffield, 2007).

In Chapter 5, the association between empathy and aggression was investigated at age three. At this age, cognitive empathy develops rapidly and cognitive empathy was examined in addition to affective empathy. In addition, the association of social attention and sex differences with empathy and aggression, and the association between empathy and aggression were taken into account. Theory and previous research suggest that impaired affective empathy, and not cognitive empathy, is a risk factor for aggression in children, adolescents and adults (Bons et al., 2013; Smith, 2006; van Zonneveld, Platje, de Sonneville, van Goozen, & Swaab, 2017). However, studies including children during the pre-school period found both affective and cognitive empathy to be associated with aggression (Belacchi & Farina, 2012; Dadds et al., 2009). This study extended previous research by combining physiological measures of affective empathy and standardized task scores of cognitive empathy instead of questionnaire data (Bons et al., 2013; van Zonneveld et al., 2017). In addition, sex differences and eye-tracking measures of social attention were taken into account as possible moderators of this association. Previously, less social attention has been suggested to be associated with less empathy and more aggression (Bons et al., 2013; Dadds, El Masry, Wimalaweera, & Guastella, 2008; Yan, Pei, & Su, 2017). Furthermore, sex differences were taken into account because girls have been shown to be more empathic and less aggressive than boys (Archer, 2004; Christov-Moore et al., 2014; Feshbach & Feshbach, 1969). Sixty-one mother-child dyads participated in a lab visit at age 45 months, during which maternal reports of aggression in their children were obtained by the Child Behavior Checklist (Achenbach & Rescorla, 2000). Children watched three video clips of peers in emotion-inducing situations (happy, sad, and fear), while heart rate responses were recorded to examine affective empathy, questions about the clips were asked to examine cognitive empathy and attention to emotional faces was observed by eye tracking to examine social attention. Consistent with our hypothesis, theory and previous literature, a negative association between affective empathy and aggression was present (Blair, 2005; Miller et al., 2013; Smith, 2006; van Zonneveld et al., 2017; Zahn-Waxler, Cole, Welsh, & Fox, 1995). Social attention was also negatively related to aggression and moderated the effect of affective empathy on aggression. The highest levels of aggression were found when low affective empathy was combined with low social attention, and high social attention served as a protective factor for the negative effect of low affective empathy on aggression. No association was found between cognitive empathy and aggression, and no sex differences were found for any of the measures. These results indicate that affective empathy and social attention are already negatively related to aggression at age three.

EMPATHY IN EARLY CHILDHOOD

The studies described in this dissertation add to the literature by examining early manifestations of empathy using different measures and by examining different elements of empathy. In Chapters 2, 3, and 4, empathic distress and empathic concern were examined as manifestations of empathy. At age 20 months, the results regarding empathic distress and empathic concern differed (Chapter 2). Infant emotional responses were both linearly and quadraticly associated with empathic distress in toddlerhood, while only quadratic associations were found for empathic concern. In addition, empathic distress at age 20 months was negatively associated with physical aggression at age 20 and 30 months in girls (Chapter 3), while empathic concern was only associated with aggression in girls at age 20 months. However, in Chapter 4 no association was found between physical aggression and either empathic distress or concern. Based on these results, we conclude that empathic distress and empathic concern are both important aspects of empathy development, in particular at a very young age. During the first years of life, empathy-evoking situations are challenging and overwhelming, and children typically respond to these situations with empathic distress, which is a precursor of empathic concern (de Waal, 2008; Eisenberg, 2010; Hoffman, 2000; McDonald & Messinger, 2011). Empathic distress is stable over time, but becomes relatively less important over the course of childhood because empathic concern starts to develop during the second and third year of life and increases over time. In our studies, this development of empathic concern is evident by the fact that different indicators of empathic concern could be represented as a single factor at age 30 months (Chapter 4), while they were independent of each other at age 20 months (Chapter 2). In addition, observations of indicators of empathic concern were still relatively scarce at age 20 months.

In addition to behavioral observations of empathic distress and empathic concern in response to simulated distress by an experimenter, empathy was also examined by physiological responses to simulated distress or empathy-inducing video clips. Behavioral observations of both empathic distress and empathic concern were positively associated with concurrent heart rate responses (Chapter 4). However, physiological responses to video clips were not associated with concurrent behavioral measures of cognitive empathy (Chapter 5). Together these results corroborate previous suggestions that physiological responses to emotions of others are an important indicator of affective empathy, but not cognitive empathy in early childhood (Hastings & Miller, 2014; Hastings, Miller, Kahle, & Zahn-Waxler, 2014; Zhou, Valiente, & Eisenberg, 2003). Therefore, it is important to take physiological measures into account, in addition to behavioral measures, when examining affective empathy.

Both physiological and observational measures of empathy had clear advantages for the measurement and understanding of empathy. One advantage of observation of empathy is that co-occurring manifestations of empathy, such as empathic distress and empathic concern can be examined, while physiological measures cannot discriminate between co-occurring manifestations (Hastings & Miller, 2014; Hastings et al., 2014; Zhou et al., 2003). Due to the fact that we included empathy observations in our methodology, we were able to reveal differences in predictability between empathic distress and empathic concern. Empathic distress at age 20 months, was better predicted by emotional responses at age 6 months than empathic concern (Chapter 2) and empathic distress was a better predictor of aggression at age 30 months than empathic concern (Chapter 3). Physiological measures of empathy (e.g., heart rate and RSA), however, are more objective than observational measures and relatively free from conscious control and social desirability bias (Zhou et al., 2003). Examining both observational and physiological measures of empathy in infancy and toddlerhood provides unique opportunities to further investigate early empathy and its stability over time. In Chapter 2, infant observational and physiological measures of emotional responses were examined to predict empathy in toddlerhood. Based on our studies it seems to be a valid conclusion that empathy in toddlerhood can be predicted from infant indicators of empathy in addition to infants' own emotional responses. Therefore, future research could focus on examining infant indicators of empathy, such as physiological measures of infants' arousal and behavioral measures of contagious crying in response to another infant's distress (Dondi, Simion, & Caltran, 1999; Geangu, Benga, Stahl, & Striano, 2010; Sagi & Hoffman, 1976; Simner, 1971).

EMPATHY AND AGGRESSION IN EARLY CHILDHOOD

In the current dissertation, negative associations between empathy and aggression were found at the ages of 20 months, 30 months and 45 months (Chapters 3, 4, 5), meaning that low levels of empathy are already related to high levels of aggression at a very young age (Blair, 2005; Hughes, White, Sharpen, & Dunn, 2000; Lovett & Sheffield, 2007; Miller et al., 2013; Strayer & Roberts, 2004). Nevertheless, it is still largely unclear which factors influence the strength and direction of the association between empathy and aggression at a very young age. For example, more research is needed on the role of sex differences in empathy and aggression. Girls showed more concerned expressions and personal distress than boys in one study at age 20 months (Chapter 2). However, these differences became smaller and were not significant anymore when additional participants were included in a second study (Chapter 3). In addition, the association between empathy and aggression was only present for girls at age 20 months (Chapter 3), while no sex differences in the association between empathy

and aggression were found at age 30 and 45 months (Chapter 4, 5), which might suggest that sex influences a specific window of development. Previous literature is mixed as well. Studies with toddlers have shown that girls generally express more empathic behavior than boys (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Spinrad & Stifter, 2006; Zahn-Waxler, Radke-Yarrow, et al., 1992; Zahn-Waxler, Robinson, et al., 1992). However, several studies on toddlers did not find sex differences regarding empathy (Gill & Calkins, 2003; Roth-Hanania, Davidoy, & Zahn-Waxler, 2011; Vaish et al., 2009). Furthermore, two studies indicated that the association between empathy and aggression differs for boys and girls, but the results were contradictory. A study in 4–7 year-old children demonstrated a positive association between empathy and aggression in boys, but not in girls (Feshbach & Feshbach, 1969), while another study demonstrated a negative association between empathy and psychopathic traits (which include aggression) in 3–13 year-old boys, but not in girls (Dadds et al., 2009). Based on our findings and the suggestion that sex differences are present in the development of the relation between empathy and aggression it is important to take sex differences into account in further research examining empathy and aggression in order to gain further insight in development of sex differences in empathy over time and in the underlying mechanisms that cause these sex differences. Possibly, more cultural or environmental influences, like bias in measures of empathy, caused by expectations based on stereotypic gender roles, can explain some of the inconsistencies (Eisenberg, Spinrad, & Knafo, 2015).

In addition to sex, our studies indicated that inhibition moderates the association between empathy and aggression. A negative association between physiological response to empathic situations and aggression was present in children with high levels of inhibition, whereas a positive association was present in children with low levels of inhibition. Overall, boys have lower cognitive inhibition ability than girls (Cross, Copping, & Campbell, 2011; Raaijmakers et al., 2008). Therefore, positive associations between empathy and aggression may occur more often in boys than girls and relatively poor inhibition in boys could explain why no association between empathy and aggression was found for boys at age 20 months (Chapter 3). Furthermore, differences in previous findings on the association of empathy and aggression in toddlerhood may be (partially) explained by heterogeneity within samples of children regarding inhibition (Eisenberg et al., 2010; Gill & Calkins, 2003; Lovett & Sheffield, 2007). Future research on empathy and aggression in toddlerhood could benefit from taking inhibition into account.

Another factor that moderates the association between empathy and aggression is social attention. Social attention is necessary in order to recognize emotions of others and can be considered a prerequisite of empathy (Bons et al.,

2013). In Chapter 5, reduced attention to emotional faces was associated with higher levels of mother-reported aggression and social attention moderated the association between affective empathy and aggression. The negative association between affective arousal and aggression was reduced in children with relatively high social attention and increased in children with relatively low social attention. Therefore, we conclude that higher levels of social attention serve as a protective factor for the negative effect of low affective empathy on aggression. However, in contrast to previous research (Yan et al., 2017), no association was found between cognitive or affective empathy and social attention. At this age, the association between social attention and empathy might be still under development and more research is necessary to examine which factors influence this association (Bons et al., 2013).

Finally, it is important to examine the influence of emotional responsivity on the association between empathy and aggression in further research. Our results indicated a positive association between emotional responsivity and empathy (Chapter 2) and studies using the same paradigms indicated that emotional responsivity is also associated with aggression in infancy and toddlerhood (Calkins & Dedmon, 2000; Hay et al., 2010; Moore, Cohn, & Campbell, 2001). Therefore, examining the associations between emotional responsivity, empathy and aggression simultaneously may provide insight into the possible mediating or moderating role of emotional responsivity in the association between empathy and aggression.

STRENGTHS AND LIMITATIONS

This dissertation consists of four studies on subsamples of a longitudinal study (MINDS-Leiden), which enabled us to investigate predictors of empathy and aggression. Multiple innovative methods were used to examine emotional responses and empathy. We consider it a strength that the current study combined sympathetic and parasympathetic measures of the autonomic nervous system in order to predict empathy from early emotional reactivity. In addition, physiological and behavioral measures of empathy were combined, and affective empathy, cognitive empathy, and social attention have been examined within one paradigm. Also, women were included in the study during pregnancy and followed until their child reached the age of 4, which provided the opportunity to investigate different aspects of empathy, such as empathic distress, empathic concern and cognitive empathy, early in their development.

One might consider it a limitation of our studies that there is a lack of variation in the measurement of aggression. Maternal reports of aggression were used at each time point, which makes it at least possible to examine stability and development of aggression over time. Although maternal reports provide ecologically valid information about behavior in daily situations that toddlers cannot report yet on themselves,

they might be biased by maternal factors such as personality, memory capacity, and tendency of social desirability response (Kagan, Snidman, Arcus, & Reznick, 1994). Future research would benefit from using multiple informants of aggression, such as fathers and teachers (Kerr, Lunkenheimer, & Olson, 2007). Furthermore, observational measures of aggression could be used to prevent bias due to adult reports (Hay, Castle, & Davies, 2000; Hay et al., 2011).

Another limitation is the fact that a part of the children from MINDS-Leiden were at risk for high levels of aggression due to maternal risk factors, but there was no specific group of children included that showed clinical levels of aggression. Furthermore, the use of the experimenter to simulate distress during the distress simulation task limits the implications of the results. We decided that the distress simulation would be performed by a trained experimenter instead of the child's mother in order to reduce bias caused by differences in the credibility and intensity of the distress simulation. Although this strengthens the reliability of the empathy measure, a limitation is that distress in unfamiliar people evokes less empathic concern and more empathic distress in toddlers compared to when distress is expressed by their mothers (Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008; Young et al., 1999; Zahn-Waxler, Robinson, et al., 1992). Therefore, our setting might have prevented toddlers from showing empathic concern, resulting in low variance on empathic concern and stronger results for empathic distress. In future research it would be valuable to add a second distress simulation by the mother in order to compare the results of both conditions.

IMPLICATIONS

Due to the study of early manifestations of empathy, knowledge was gained on the typical development of empathy and risk factors of atypical development. Chapter two indicated that children who were more emotionally reactive in situations that were distressing to themselves were also more sensitive to the distress of others later on. Therefore, children who display a lack of emotional reactivity in infancy might show difficulties in sharing the feelings of others when they become older. This is in line with findings in other studies showing that that underarousal is a risk factor for impaired empathic responding later on (Liew et al., 2011; Ungerer et al., 1990; Young et al., 1999). Furthermore, underarousal is also widely known as a risk factor of aggression (Baker, Shelton, Baibazarova, Hay, & van Goozen, 2013; Raine, 2002) and the current dissertation indicates that empathy and aggression are negatively associated during early childhood. Possibly, empathy plays a role in the association between underarousal and aggression (Raine, 2002). For example, underarousal may result in a lack of empathy, which in turn could lead to aggression.

The current dissertation might have implications for early interventions that aim to reduce or prevent aggression. Early childhood is a particularly important developmental stage for the study of interventions because on one hand aggression is stable over time and approximately one out of six children show high and stable levels of aggression from toddlerhood to pre-adolescence (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006; Tremblay, 2010; Tremblay et al., 2004). On the other hand, empathy training has been shown to be more effective if administered at younger age (Malti, Chaparro, Zuffiano, & Colasante, 2016). Based on the results from the current dissertation that empathy and aggression are already negatively associated in early childhood, interventions targeting empathy at very young ages may help reducing the chances of developing high and consistent levels of aggression. In addition to targeting empathy at early age, the results from the current dissertation also suggest that intervention programs could be more effective when possible moderators of the association between empathy and aggression, such as inhibition and social attention, are targeted simultaneously with empathy itself.

Although some efforts have been made to implement interventions in kindergarten and preschool, most studies have included older children and more attention is necessary for the development, implementation, and evaluation of preventive interventions (McMahon, Washburn, Felix, Yakin, & Childrey, 2000). “Second step” is a widely used program that aims to decrease aggression by increasing empathy, which has been applied from kindergarten until middle school (Frey, Hirschstein, & Guzzo, 2000; Frey, Nolen, Van Schoiack Edstrom, & Hirschstein, 2005; McMahon et al., 2000; McMahon & Washburn, 2003). Effect studies indicate that Second step increases empathy and decreases aggression (McMahon et al., 2000; McMahon & Washburn, 2003). In line with the results of Chapter 4, Second step does not only focus on improvement of empathy, but also on increasing inhibition, in order to reduce aggression (McMahon et al., 2000; McMahon & Washburn, 2003).

Another preventive intervention program called “Roots of empathy” aims to improve both affective and cognitive aspects of empathy by empathy education in children (Schonert-Reichl, Smith, Zaidman-Zait, & Hertzman, 2011). The program has been found effective in decreasing aggression and increasing prosocial behavior in children aged 8-12 years (Schonert-Reichl et al., 2011). Based on the results of Chapter 5 that aggression is associated with affective, but not cognitive empathy, we expect that the underlying effects of the program are mainly linked to components of the program that are focused on affective empathy.

CONCLUSION

Empathy is an important aspect of social development that develops from birth onwards. The studies in the current dissertation indicate that early manifestations of empathy can be predicted from emotional responses in infancy, as infants who are more emotionally reactive themselves are also more sensitive to emotions of others during toddlerhood. In addition, our studies indicate that impaired empathy already is a risk factor of aggression from the age of 20 months. Therefore, it is valuable to invest in recognizing impairments in empathy development, fostering empathy development, and targeting empathy in interventions that aim to prevent and reduce aggressive behavior, in particular in early childhood. The studies from the current dissertation also indicate that high levels of aggression are associated with low levels of affective empathy, but not cognitive empathy. Furthermore, the negative association between empathy and aggression was stronger for girls, children with high levels of inhibition, and children with low levels of social attention. It is important to take these factors into account in further research and intervention programs that target empathy and its association with aggression in early childhood.

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