

**Associations between childhood maltreatment and aggression and the role of empathy in
this association**

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Abstract

Background. Childhood maltreatment (abuse and neglect) is a significant problem world-wide and can have lifelong negative consequences. Associations between childhood maltreatment and aggression have already been documented. However, few studies have examined the role of empathy in this relationship.

Aim. The primary aim of this study is to investigate the associations between physical abuse and emotional neglect in childhood and reactive aggression and cognitive empathy in adulthood. We expected that experiencing childhood maltreatment would be associated with more aggressive traits and that empathy would act as a mediator in this association.

Methods. Data was collected with a cross-sectional study design including 156 participants recruited at the Leiden University. Childhood physical abuse and emotional neglect, reactive aggression (Anger Reaction and Anger Temperament) and cognitive empathy (Perspective Taking) were assessed with self-report questionnaires. Data was analysed with a mediation analysis, performed with the SPSS PROCESS macro.

Results. Results showed that there was no association between childhood maltreatment and reactive aggression, and cognitive empathy did not mediate the relationship between childhood maltreatment and aggression. A significant negative association was found between cognitive empathy and aggression (subscale Anger Temperament).

Conclusion. These results implicate a negative association between aggressive traits and empathy but no associations between maltreatment, and empathy or aggression. A possible explanation is that in this sample, education may have acted as a mediator between childhood maltreatment and aggression, thereby reducing the association in this highly educated sample.

Keywords: childhood maltreatment, reactive aggression, cognitive empathy.

1. Introduction

Childhood maltreatment is a significant problem world-wide, including western countries like the Netherlands. In 2010, the overall prevalence rate for maltreated children aged between 0-18 years in the Netherlands was approximately 118,836, indicating that almost 34 per 1,000 children experienced maltreatment (Alink et al., 2013). Maltreatment includes sexual abuse, physical abuse, emotional abuse, as well as emotional neglect and physical neglect. Sexual abuse is defined as “sexual contact or conduct between a minor child (younger than 17 years of age) and an adult or older person (at least 5 years older than the child)”. “Bodily assaults on a child by an adult or older person that posed a risk or resulted in injury” are characterized as physical abuse. Emotional abuse refers to “verbal assaults on a child’s sense of worth or well-being or any humiliating or demeaning behavior directed towards a child by an adult or older person”. The term physical neglect is used for “the failure of caretakers to provide for a child’s basic physical needs, including food, shelter, clothing, safety, and health care” (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997, p. 341). Emotional neglect is specified as “the failure of caretakers to meet children’s basic emotional and psychological needs, including love, belonging, nurturance, and support” (Bernstein et al., 2003, p. 175). In 2010 emotional neglect was the most prevalent type of maltreatment (8.4% of all children) and sexual abuse was the least prevalent type of maltreatment in the Netherlands (0.8%). Of the maltreated children, 43% experienced more than one type of maltreatment (Alink et al., 2013).

1.1 Consequences of maltreatment

Maltreatment may lead to considerable adverse consequences. These consequences of maltreatment include attachment problems, physical and mental health problems, behavioral problems, elevated rates of aggression, learning and developmental problems, impairments in language, social and communication skills, and severe effects on brain development and hormonal functioning (Lamont, 2010; Naughton et al., 2013; Watts-English, Fortson, Gibler, Hooper, & De Bellis, 2006). In the current study the focus was on the potential consequences of maltreatment, with a particular interest on the development of aggression in adulthood. These consequences might be severe. In a research conducted by Harlow (1999), prisoners in the United

States completed a retrospective survey about experienced maltreatment during childhood. Between 6% and 14% of the male offenders and between 23% and 37% of the female offenders reported that they had been physically or sexually abused before age of 18, compared to 5% to 8% of males and 12% to 17% females in the general adult population. Compared to non-abused prisoners, abused prisoners were more likely to serve a sentence for violent crimes, sexual assault and homicide (Harlow, 1999).

1.2 Aggression

Aggression has been defined as behavior directed towards another individual, carried out with the direct motive to cause harm. Actual harm is not required but the culprit must believe that the aggressive behavior will harm the target and that the target is inclined to avoid the behavior (Anderson & Huesmann, 2003). Two subtypes of aggression have been identified, reactive aggression on the one hand and proactive aggression on the other. Reactive aggression is an impulsive hostile response to a perceived threat. This type of aggression is mostly, albeit not exclusively, defensive in nature. Proactive or instrumental aggression is an aggressive act that is motivated by an external reward or a desired outcome. It is also known as intentionally goal-directed, premeditated, instrumental behavior (Cornell et al., 1996). Aggression is a significant problem in society and can itself lead to violence and abuse. Violence is verbal and physical aggression at the extremely high end of the aggression continuum (Anderson & Huesmann, 2003). Both reactive and proactive forms of aggression can occur in the same person, according to Barratt, Stanford, Dowdy, Liebman & Kent (1999), who found that less than one fourth of all aggressive behavior was solely due to either impulsive reactive aggression or proactive aggression.

Proactive aggression is closely associated with the social-learning theory (Bandura, 1977), which states that proactive aggression is instrumental behavior that develops in response to the modeling and reinforcement of aggressive behaviors rather than having experienced aggressive behavior in the past. With regular exposure to aggressive behavior a child learns that violence is an acceptable interaction and may in turn imitate or exhibit similar behavior within similar situations. This aggressive behavior can also be reinforced through observation of rewards and punishments following the aggressive behavior (Schelbe & Geiger, 2016). If this becomes a

sustained pattern in adulthood this might give rise to aggression towards their offspring or spouse.

Although one might expect associations with proactive aggression, childhood maltreatment has most often been linked to reactive aggression (Hoeve et al., 2015; Lee & Hoaken, 2007; Richey, Brown, Fite & Bortolato, 2016). The association between maltreatment and reactive aggression could be explained by the finding that children who have been maltreated may perceive benign situations more often as threatening, and hence tend to respond on a more regular basis in a defensive and impulsive hostile way (Lee & Hoaken, 2007). By misperceiving benign cues, perspective taking -a component of empathy- might be lacking. This is of importance as numerous studies show that empathy facilitates prosocial behavior and that a lack of empathy might encourage aggressive behavior (Joliffe & Farrington, 2004; Stranger, Kavussana, & Ring, 2012). Since maltreatment has most often been linked to reactive aggression, the focus of this research is on reactive aggression.

1.3 Cognitive Empathy

It is thought that empathy consists of two conjointly operating cognitive and affective components. Cognitive empathy is the ability to adopt another person's emotional point of view, or to reflectively engage with emotional thoughts and feelings of the other, while affective empathy is the sharing of another person's emotions (Pouw, Rieffe, Oosterveld, Huskens & Stockmann, 2013). Cognitive empathy is an ability thought to be rooted in the child's early attachment experiences, most probably with its parents. The latter transfer the capability of empathy to their children by their interactive and empathic behaviors (Tong et al., 2012). Empathic parents have the capacity to observe the child's mind, to understand and contain their mental state, and to view the child as an intentional being, hereby promoting the child's understanding of others' minds (Locher, Barenblatt, Fourie, Stein, & Gobodo-Madikizela, 2014). Additionally, when the child harms someone, empathic parents may highlight the other person's perspective, point to the other's distress, and clarify to the child that its action is the cause of the distress. This promotes the child's perspective taking as well, thus improving its cognitive empathy (Hoffman, 2000). While parents can nurture cognitive empathy, affective empathy, however, is thought to be an inborn automatic process that is not influenced by others (Hoffman,

2000).

Whereas empathic parents may use abovementioned disciplinary induction techniques by highlighting the other person's perspective, parents who maltreat their children are probably flawed in their use of those techniques. Parents who physically abuse or emotionally neglect their children will probably use power-assertive and love-withdrawal components of parental discipline techniques. Power-assertive technique components consist of demands, threats, deprivation of possessions or privileges and the use of actual force. Love-withdrawal components encompass refusing to speak to or ignoring the child and its needs, or even isolating or threatening to leave it. The latter components produce high(er) anxiety levels in the child, related to the parent's disapproval of their child. When the child's anxiety level is heightened, its attention will be almost exclusively focused on the negative consequences for itself instead of the other who is harmed by their doing. The higher anxiety levels in the child result in a lack of focusing on the other person's distress. On the other hand, a child that is raised by parents using more positive disciplinary induction techniques will have lower anxiety levels in evaluating its potentially harmful behavior towards another (Hoffman, 2000). This child could then be motivated to pay attention to the victim's distress and the child's role in causing it. Parent's guidance through disciplinary induction encourages the child to imagine the victim's perspective and thus will help enhance the child's cognitive empathic potential (Hoffman, 2000).

Perspective taking is important in interpersonal situations that are problematic or ambiguous. When people do not focus on the other person's distress, the cognitive empathic functioning will presumably be less developed. This might be the case in maltreated children who were raised by parents using power-assertive and love-withdrawal techniques, leading to underdeveloped perspective taking skills. Furthermore, maltreated children may consider problematic or ambiguous situations more often as threatening, and hence tend to respond in a reactive aggressive way (Pouw et al., 2013). Due to their hampered skills in perspective taking they may erroneously assume hostile intentions of other people in these ambiguous situations and subsequently react in a defensive hostile way. Hence, empathy may act as a mediator between maltreatment and aggression.

1.4 Aims & hypotheses of the current study

This study aims to further investigate the associations between physical abuse and emotional neglect in childhood and aggression and cognitive empathy in adulthood. Firstly, we expected that physical abuse and emotional neglect would be associated with less cognitive empathy and more aggressive traits. Secondly, we expected that empathy would be negatively associated with aggressive traits. Lastly, we hypothesized that empathy would mediate the association between maltreatment and aggression. Examining whether, and in what way, childhood maltreatment could lead to aggression, and the role of empathy in this process, may eventually result in the ability to develop more specific interventions to prevent aggression later on in life.

2 Methods

2.1 Study Design & Participants

This study had an observational design in which all participants were tested by completing computer tasks and self-report questionnaires in a laboratory. The sample consisted of 156 participants, 106 participants were included from previous comparable studies and 50 participants were newly added in the current study. Participants were recruited from the Leiden University by asking them to participate and by handing out flyers. All participants were healthy males/females, aged between 18 and 35 and fluently speaking Dutch (there were no other exclusion/inclusion criteria).

2.2 Procedure

The Ethics Committee of the psychology faculty of Leiden University approved all procedures. Information about the study was given in advance, whereupon all participants provided written informed consent. At the end of the study, all participants received a debriefing form, and were rewarded for their participation.

The total duration of the test was approximately one hour in total. First, the participants performed a word task, where they were presented with words that they had to recall after the word task. Then the participants did a working memory (N2-back) task. However, these tasks will not be reported in this thesis, as we did not use them in our research.

After completing the computer tasks, the participants filled in several questionnaires. The questionnaires were conducted in e-prime. In total 10 questionnaires were used: the Cognitive Emotion Regulation Questionnaire, the Hospital Anxiety and Depression Scale, the Perceived Stress Scale, the State-Trait Anger Scale, the Childhood Trauma Questionnaire, the Daily Hassles Scale, the Fear of Negative Evaluation Scale, the Interpersonal Reactivity Index, the Attentional Control Scale, and a questionnaire about alcohol use. For this research only the State-Trait Anger Scale, the Childhood Trauma Questionnaire and the Interpersonal Reactivity Index were used, which will be described in more detail below. At 35 minutes the questionnaires were interrupted to let the participants recall words from the word task again. After recollection of the words, the participants continued to finish the questionnaires.

2.3 Measures

2.3.1 State-Trait Anger Scale (STAS)

The State-Trait Anger Scale (Spielberger, Jacobs, Russell & Crane, 1983) is a questionnaire that consists of 20 items. The STAS consists of the subscales State-Anger and Trait-Anger, each containing 10 items. The subscale State-Anger measures “an emotional state or condition consisting of subjective feelings of tension, annoyance, irritation, fury, and rage, and is the result of activation or arousal of the autonomic nervous system” (van der Ploeg, van Buuren, & van Brummelen, 1985, p. 187). The subscale Trait-Anger (T-anger) measures individual differences among people in their disposition to perceive a wide range of situations as annoying or frustrating, and in their inclination to respond to such situations with discernible elevations in State-Anger. Trait-Anger involves stable individual differences in the frequency, duration, and intensity of state anger (Wilkowski & Robinson, 2008).

The Trait-Anger subscale assesses two distinctive components of the general tendency to experience more frequent, more intense, and longer episodes of anger: Anger Temperament; measuring the disposition to experience anger without provocation and eventually expressing it, and Anger Reaction; measuring the frequency that angry feelings are experienced after provocation or in situations that involve frustration and/or negative evaluations (Lievaert, Franken & Hovens, 2016).

In this research, we only use these components of the Trait-Anger subscale instead of the whole State Trait Anger Scale, because these components are more consistent and are linked to reactive aggression. The Dutch version of this subscale is not a literal translation of the English version. Three items were replaced during the adaption of the Trait-Anger subscale (Lubke, Ouwens, de Moor, Trull & Boomsma, 2015).

The Cronbach's alphas of this test for the Trait-Anger scale and the Anger Temperament subscale are found to range between .83 and .88, while the alpha for the Anger Reaction subscale was .77. The Cronbach's alpha of the whole test was found to be .86, indicating that the test is reliable (Lievaart, et al., 2016). In this study the Cronbach's alpha of the Anger Temperament subscale was .83 and of the Anger Reaction subscale .66. The Anger Reaction subscale consists of three items, so we considered a slightly lower criteria for the Cronbach's alpha for this subscale (Loewenthal, 2001). The Cronbach's alpha of the whole test was .85

2.3.2 *Childhood Trauma Questionnaire (CTQ)*

The Childhood Trauma Questionnaire (Bernstein & Fink, 1998) is a 28-item self-report measure for assessing child emotional, physical, and sexual abuse and emotional and physical neglect. These five types of maltreatment are each assessed by five items. Three supplementary items assess the inclination of respondents to minimize or deny abuse experiences. The questions of the items are about the childhood years and teenage years of the participant. Items are ranked by frequency on a 5-point scale ranging from never true to very often true, thus scores range from 5 to 25 for each of the abuse types. In this study the Dutch version of the CTQ is used. Analyses in a validation study of the Dutch CTQ revealed acceptable internal consistency for the subscales: .91 for physical abuse, .89 for emotional abuse, .95 for sexual abuse, .63 for physical neglect, and .91 for emotional neglect (Thombs, Bernstein, Lobbestael, & Arntz, 2009). In this research, the subscales physical abuse and emotional neglect were used. Analyses showed acceptable Cronbach's alpha in this study, respectively .71 for physical abuse and .82 for emotional neglect.

2.3.3 *Interpersonal Reactivity Index (IRI)*

Empathic tendencies were measured using the Interpersonal Reactivity Index (Davis, 1980). The IRI consists of four subscales: Perspective Taking, Fantasy, Empathic Concern and Personal Distress. These subscales assess “the tendency to spontaneously adopt the psychological point of others”, “tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters in books, movies and plays”, ““other-oriented” feelings of sympathy and concern for unfortunate others”, and ““self-oriented” feelings of personal anxiety and unease in tense interpersonal settings” (Davis, 1983, p. 114). The questionnaire consists of 28 items, with 7 items per scale. Participants can answer on a 5-point Likert scale ranging from does not describe me well to describes me well. Sum scores range from 7 to 35. In the study of Neumann et al. (2012) the Cronbach’s alphas for the four IRI subscales have previously shown to be .779 (Fantasy), .616 (Empathic Concern), .759 (Perspective taking) and .703 (Personal Distress) for students. In the current research, only the perspective taking subscale (Cronbach’s alpha: .825) was used because this subscale conforms most to cognitive empathy (Oliver et al., 2015).

2.4 *Statistical Analysis*

Statistical analyses were done using SPSS software (version 24.0). First, descriptive statistics were computed (means and standard deviations), and assumptions were checked. Analyses of the three hypotheses were done using the SPSS macro PROCESS. The hypotheses were examined with two mediation analyses. In these analyses, physical abuse and emotional neglect were the independent variables and Anger Temperament and Anger Reaction were the dependent variables. Perspective Taking (cognitive empathy) acted as the mediator in the analysis. Two simple mediation models were tested, with separate models run for each outcome variable (i.e., Anger Temperament and Anger Reaction). Bootstrapping analyses were used because these analyses are more robust to violations of normality in sample distributions. We assessed correlations between the variables but mediation analysis no longer requires evidence of simple association between childhood maltreatment and anger as a precondition (Hayes, 2013). All analyses were done using alpha level .05 for statistical significance.

3. Results

3.1 Descriptive statistics

The final sample consisted of 156 participants and was predominantly female (68.6%, $n = 107$). Age of the participants ranged from 18 to 35 years ($M = 20.68$ years, $SD = 2.40$). Female subjects' age ranged from 18 to 35 years ($M = 20.25$, $SD = 2.37$) and male subjects' age ranged from 18 to 26 years ($M = 21.97$, $SD = 2.04$). Males proved to be significantly older than females, $t(126)=3.68$, $p < .001$. No gender differences were found concerning Anger Temperament, Anger Reaction, Perspective Taking and physical abuse. However, males reported more emotional neglect than females, $t(69.51)=2.21$, $p = .031$. Table 1 shows the summarized gender differences of all variables. Considering that there were no gender differences found concerning the outcomes variables, we decided to not include gender as a covariate in the analysis.

3.2 Assumptions

For the analyses certain assumptions must be met. Histograms and scatterplots were plotted to look at the linearity and the distribution of the variables. For all variables, both assumptions were not met. A bootstrap regression analysis was used as an alternative, so the mediation analysis could still be performed. The assumption of homoscedasticity was checked with Levene's test and was met. Several outliers were found. However, the outliers were not removed from the analysis, as the mean value and the 5% trimmed mean value for these variables were almost the same and therefore not considered as distorting data.

3.3 Mediation analysis

Bivariate correlations revealed a weak linear relation between emotional neglect and physical abuse, $r = .256$, $p = .001$. Additionally, a moderate linear relation was found between Anger Temperament and Anger Reaction, $r = .420$, $p < .001$. Moreover, coinciding with our hypothesis, a moderate (negative) linear relation was observed between Anger Temperament and Perspective Taking, $r = -.309$, $p < .001$. Hence, Perspective Taking (cognitive empathy) is associated with Anger Temperament (aggressive traits). For the other variables no significant correlations were

found (all $ps > .05$). The results are summarized in Table 2. While in the past mediation would be only undertaken when there was an association between the independent and dependent variables (i.e., childhood maltreatment and aggression), using the PROCESS macro this association is no longer a precondition (Hayes, 2013).

Table 1.

Descriptives for Anger Temperament, Anger Reaction, perspective taking, physical abuse and emotional neglect per questionnaire per gender and for the full sample

Variable	Female <i>n</i> = 107	Male <i>n</i> = 49	Total <i>n</i> = 156
<i>Trait Anger</i>			
Temperament			
Mean	6.69	7.18	6.85
<i>SD</i>	2.37	2.56	2.44
Reaction			
Mean	5.50	6.20	5.72
<i>SD</i>	1.74	2.34	1.97
<i>Interpersonal Reactivity Index</i>			
Perspective Taking			
Mean	17.14	17.88	17.37
<i>SD</i>	4.15	4.39	4.23
<i>Childhood Trauma Questionnaire</i>			
Physical Abuse			
Mean	5.41	5.63	5.48
<i>SD</i>	1.27	1.78	1.45
Emotional Neglect			
Mean	9.45*	11.5*	10.10
<i>SD</i>	4.07	5.93	4.81

Note. * $p < .05$ (2-tailed) – gender difference

Table 2.

Correlations between study variables.

Variable	1	2	3	4	5
1. Perspective Taking	1				
2. Physical abuse	0.014	1			
3. Emotional neglect	-0.102	0.256**	1		
4. Anger Reaction	-0.097	0.026	0.019	1	
5. Anger Temperament	-0.309**	0.005	0.049	0.420**	1

Note. ** $p < .01$ (2-tailed).

3.4 Mediation model outcome Anger Temperament

With a simple mediation analysis conducted using ordinary least squares (OLS) path analysis, no evidence was found that physical abuse and emotional neglect indirectly influenced Anger Temperament through empathy (see Figure 1).

Results indicated that neither emotional neglect nor physical abuse were significant predictors of empathy. This finding opposes our hypothesis of emotional neglect and physical abuse being negatively associated with empathy. Also, no direct effects were found for emotional neglect and physical abuse on Anger Temperament, again opposing our hypothesis that both types of maltreatment would be positively associated with Anger Temperament. However, empathy did prove to be a significant predictor of Anger Temperament, $b = -.1770$, $t(152) = -3.9581$, $p < .001$. This indicates that for every unit increase in empathy, Anger Temperament decreases by .1770; in other words, more empathy is associated with less Anger Temperament. A bias-corrected bootstrap method based on 10,000 bootstrap samples was used to test the indirect effect of emotional neglect and physical abuse on Anger Temperament. Both emotional neglect, $ab = .0176$, $SE = 0.0168$, 95% CI [-.0060, .0642], and physical abuse, $ab = -.0222$, $SE = .0531$, 95% CI [-.1252, .0953] were not significant. So, in contrast to our hypothesis, empathy did not mediate the association between maltreatment and Anger Temperament.

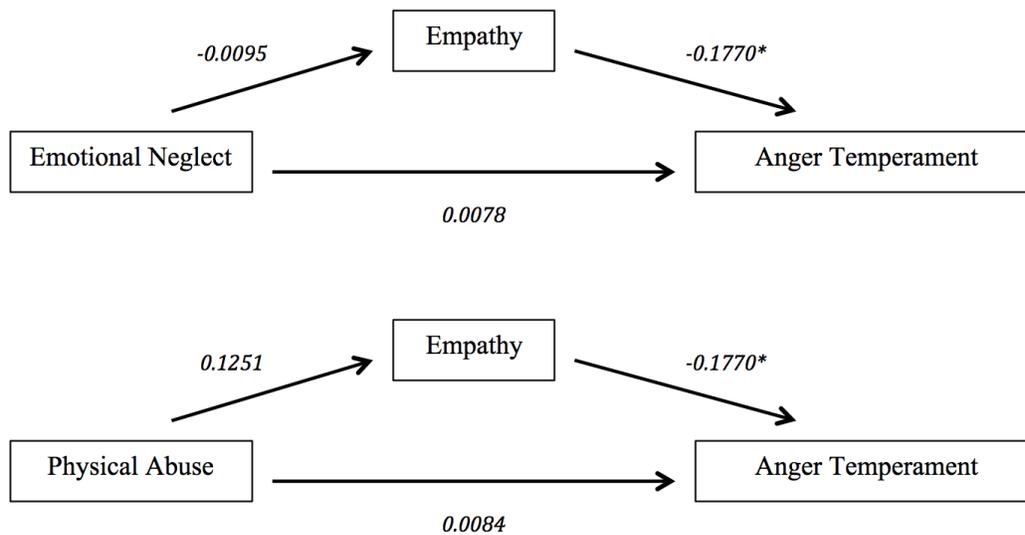


Figure 1. Indirect effect of Physical Abuse and Emotional Neglect on Anger Temperament through Empathy.

Note. * $p < .001$

3.5 Mediation model outcome Anger Reaction

With a simple mediation analysis conducted using ordinary least squares (OLS) path analysis, no evidence was found that physical abuse and emotional neglect indirectly influenced Anger Reaction through empathy (see Figure 2).

Results showed that emotional neglect, physical abuse and empathy were not directly associated with Anger Reaction. This is in contrast to our hypothesis that both types of maltreatment were positively associated to Anger Reaction and empathy being negatively associated to Anger Reaction. Next to that, both emotional neglect and physical abuse were not directly associated to empathy. So, in disagreement with our hypothesis, experiencing emotional neglect and physical abuse does not lead to less (cognitive) empathy. Again, a bias-corrected bootstrap method based on 10,000 bootstrap samples was used to test the indirect effect of emotional neglect and physical abuse on Anger Reaction. Both emotional neglect, $ab = .0040$, $SE = 0.0065$, 95% CI [-0.0028, .0262], and physical abuse, $ab = -.0050$, $SE = .0183$, 95% CI [-0.0630, .0177] were not significant. Therefore, opposing our hypothesis, empathy did not mediate the association between maltreatment and Anger Reaction.

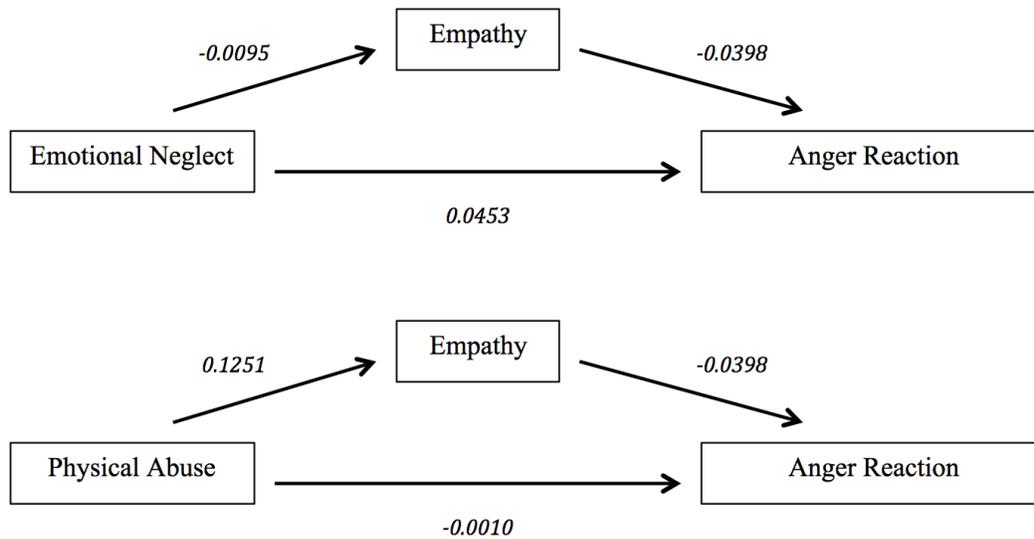


Figure 2. Indirect effect of Physical Abuse and Emotional Neglect on Anger Reaction through Empathy.

4. Discussion

The primary aim of this study was to investigate the associations between physical abuse and emotional neglect in childhood and reactive aggression and cognitive empathy in adulthood. We hypothesized that childhood maltreatment (i.e. physical abuse and emotional neglect) is associated with less cognitive empathy and more aggressive traits (measured as Anger Temperament and Anger Reaction). We also presumed that cognitive empathy would be negatively associated with aggressive traits. Finally, we expected that cognitive empathy would mediate the association between maltreatment and aggressive traits.

The results of the present study did not support most of these hypotheses. Contrarily to our hypotheses, both types of childhood maltreatment were not associated with diminished levels of cognitive empathy or higher levels of aggression. These results were surprising in light of the numerous previous studies that did find an association between childhood maltreatment and aggression. The relationship between childhood maltreatment and aggression is already well documented. Malvasa, Delfabbro and Day (2016) reviewed 62 studies on the effect of childhood

maltreatment on offending or delinquent behavior and found that only four of these studies did not find an association between any of the maltreatment variables included and offending behaviours in their analysis. It is therefore surprising that this study's results differ. Moreover, the results oppose the idea that experiencing childhood maltreatment may cause a lack in cognitive empathy, which in turn, facilitates aggressive behavior (Hoffman, 2000; Joliffe & Farrington, 2004; Lee & Hoaken, 2007; Pouw et al., 2013; Stranger, Kavusanna & Ring, 2012).

We could accept this as a null finding and conclude that childhood maltreatment may not have an association with aggression in the current sample of highly educated students. Zingraff, Leiter, Johnson & Myers (1994) looked at education as a mediator in the association between maltreatment and aggression and found that child maltreatment affects school performance and that good school outcomes generally diminish the risk of delinquency in children. Additionally there are consistent findings in the literature of lower IQ in maltreated children relative to healthy controls. These findings also show that IQ is related to the severity of maltreatment (Hart & Rubia, 2012). This could mean that individuals with severe maltreatment may have a lower IQ and therefore may not make it to university. Consequently, they are not included in this study. Most students in this study had only low levels of maltreatment, if any at all, and very few students had severe levels of maltreatment. This restriction of range might have influenced the dependent variables, resulting in restriction of range in Anger Temperament and Anger Reaction as well.

4.1 Empathy and anger temperament

It was also hypothesized that empathy was negatively associated with aggression. This hypothesis was partially supported. We expected an association between cognitive empathy and both components of Trait Anger. Looking at the components of Trait Anger, we thought that there would be an association between cognitive empathy and Anger Temperament but we especially thought that empathy would be associated with Anger Reaction (Fung, Gerstein, Chan, & Engebretson, 2015). Since Anger Reaction is the frequency that angry feelings are experienced after provocation or in situations that involve frustration and/or negative evaluations, it is more involved with the feelings of other people, while Anger Temperament is the disposition to experience anger without provocation and eventually expressing it. Therefore it was thought that

Anger Reaction would have a stronger relation with cognitive empathy than Anger Temperament. However, empathy was negatively associated with Aggression Temperament, but was not associated with Aggression Reaction. The association between cognitive empathy and Anger Temperament means that the disposition to experience anger without provocation and eventually expressing it, is negatively associated with the ability to relate to another person.

A possible explanation could be that while we tested the model with the thought that cognitive empathy reduces aggression, it could be that Anger Temperament influences cognitive empathy. It might be that individuals, who have the disposition to experience anger, do not stop to think about the feelings of others, while individuals who are calmer think more about the perspective of others and may thus develop more cognitive empathy.

4.2 Limitations and further research

The current study has several limitations that need consideration in evaluating the results. Firstly, the study had a cross-sectional design, which does not allow concrete conclusions regarding causality or temporal stability. While we cannot use experiments to determine causality in the case of childhood maltreatment, we can use longitudinal studies to determine the temporal stability of childhood maltreatment and aggression.

Next to that, all participants of this study were university students and thus may not represent the general population. All participants were well-educated and between 18 and 35 years old. Also, childhood maltreatment rarely occurred in the current sample. Therefore, before the results can be generalized to a high-risk population, replications with a high-risk sample are needed. Additionally, a sample including different education levels could give more accurate results considering that a higher level of education can act as a protective factor against aggressive behavior in adulthood. Berlin, Appleyard and Dodge (2011) examined intergenerational abuse and found a significant relationship between the education of mothers and the victimization of their offspring. In their research, education was a protective factor for aggression. This might be one of the reason that in this population no association has been found between childhood maltreatment and aggressive behavior, as education can be a protective factor. Accordingly, in further research, level of education should be included in the analysis.

Furthermore, the questionnaires were self-report questionnaires, therefore social

desirability could not be completely avoided. Rather than using questionnaires to determine the level of cognitive empathy, in an experimental setting the level of cognitive empathy could be tested by creating situations (e.g. using vignettes) and linking the participant's reaction to a level of empathy (Young, Gudjonsson, Terry & Bramham, 2008) . Therefore making it less vulnerable to social desirability bias. The Childhood Trauma Questionnaire was retrospective as well, what could have resulted in bias in memory and recall.

4.3 Conclusion & further research

In conclusion, we found that cognitive empathy is associated with aggressive traits but we did not find associations between childhood maltreatment and aggression or empathy.

To further explore associations between these variables longitudinal studies, with a group of participants that have been maltreated in their childhood versus a control group that have not experienced any form of childhood maltreatment, should be conducted. A longitudinal study design is needed to examine the temporality of empathy and aggression.

In this study, cognitive empathy did not function as a mediator in the association between childhood maltreatment and aggressive traits. However we did find an association between cognitive empathy and Anger Temperament. This could mean that cognitive empathy might act as a buffer against Anger Temperament and might thus function as a moderator in the relationship between maltreatment and aggressive traits. Understanding the association of cognitive empathy and aggression could lead to the development of specific treatment possibilities aiming to enhance cognitive empathy, in patients that have experienced childhood maltreatment, to target aggressive behavior.

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