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Mentalization mediates the relation between early traumatic experiences and aggressive behavior in adolescence

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The aim of the study was to examine whether mentalization serves as a protective factor against aggressive behavior in adolescence in the context of early traumatization. We present data from a non-clinical sample of adolescents from Germany (n=97) and calculate a mediation model to test the link between early traumatic experiences and aggressive behavior with mentalizing skills as a mediator. Mentalization was assessed with the Reflective Functioning Scale on the Adult-Attachment-Interview and aggressive behavior was measured with the Reactive-Proactive-Aggression-Questionnaire. Traumatic experience was operationalized as physical and/or sexual abuse as reported in the Childhood Experience of Care and Abuse Questionnaire. Results show a complete mediation for Reflective Functioning on the relationship between early abuse and aggressive behavior. Thus, the findings of the study support an understanding of mentalizing as a protective factor for the relationship between early abusive experience and the development of aggressive behavior. Clinical implications are discussed.

Keywords: *mentalization, abuse, aggressive behavior, adolescence, mediation model*

Externalizing disorders involving aggressive behavior are common in childhood and adolescence. The prevalence ranges from 5% to 10% in children, whereby boys are more frequently diagnosed than girls (Angold & Costello, 2001). Especially an early begin of externalizing disorders can lead to life-long antisocial behavior as well as several health problems (Moffitt, Caspi, Harrington, & Milne, 2002). Genetic and environmental factors are both discussed to cause externalizing disorders. Environmental causes are frequently identified as parental hostility, abuse and family violence (Jaffee et al., 2005). Representative longitudinal studies provide evidence for the relation between stressful life-events and psychopathology in childhood, adolescence and later adulthood. Risk factors that refer to the parent-child interaction were found to be highly relevant for long-

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term outcomes, e.g. divorce, parental loss and physical or sexual abuse are the strongest predictors of maldevelopment (Farrington, 1995, 2003; Heck & Walsh, 2000; Loeber, Burke, & Lahey, 2002; Loeber & Dishion, 1984; Loeber, Green, & Lahey, 2003; Loeber & Stouthamer-Loeber, 1986; Moffitt, Caspi, Harrington, & Milne, 2002; Olweus, 1984; Patterson & Stouthamer-Loeber, 1984; Pfeiffer, Wetzels, & Enzmann, 1999; Rutter, Giller, & Hagell, 1998). The likelihood to develop psychopathologies increases if several risk factors accumulate (Maugham & Rutter, 2001). However, risk factors can be mitigated or compensated by protective factors like intelligence or social success (Lösel & Bender, 2003). The purpose of this paper is to examine if mentalization can be considered a protective factor preventing the development of aggressive behavior in adolescence. We present data from a study on male and female adolescents testing the link between early abusive experiences and current aggressive behavior by using the extent of attachment-related reflective abilities or mentalizing skills as a mediator. As mentalization roots in attachment theory, we shall start by examining the role of attachment for the development of aggressive behavior and continue by describing the additional value of mentalization theory for the understanding of the link between early trauma and aggression.

THE ROLE OF ATTACHMENT FOR AGGRESSION IN ADOLESCENCE

Attachment theory describes an essential human behavioral system that is activated by stress, separation and danger to provide survival "from the cradle to the grave" (Bowlby, 1969). In children the activation of the attachment system leads to specific attachment behavior (e.g. crying) that in turn prompts care-giving behavior by the attachment figures (e.g. soothing). Children internalize these mainly interactive experiences with increasing age into so-called inner working models of attachment (IWM), which then serve as generalized expectations. The safety- and protection-providing behavior of the attachment figure thus becomes subsequently replaced by an inner feeling of safety on the representational level that is available without the caregiver's physical presence (Bretherton & Munholland, 1999; Bretherton & Munholland, 2008; Main, 1995). Thereby attachment has life-long relevance particularly in social contexts. The internalized expectations or IWMs arise from the best possible developed strategies for the satisfaction of attachment-needs that were learned in childhood (Grossmann & Grossmann, 2004). If the attachment figures were mainly responsive, caring, sensitive, and helpful the child will probably internalize the experience that his or her needs of safety and caring would be satisfied appropriately when he or she shows attachment signals (secure attachment). But some children repeatedly make the experience that their attachment behavior is followed by none or inappropriate reactions leading to no or only limited satisfaction of needs and emotional regulation. This results either in a reduced expression of the child's needs (insecure-avoidant attachment) in the case of dominantly rejective parental behavior, or to IWMs characterized by insecurity and ambivalence (insecure-ambivalent attachment) in the case of

parental behavior that switches in the degree of availability and responsivity (Bowlby, 2002).

A secure IWM contains the implicitly encoded expectation to be basically able to autonomously establish a feeling of safety in different social contexts. This model also enables the individual to a high degree of social flexibility. In contrast, insecure IWMs seem to be rigid, inflexible, and less adaptive. Consequently, different strategies in dealing with (attachment-related) stress evolve. If attachment-related stress becomes so intense that the regulation strategies at the child's disposal no longer work, disorientation and helplessness emerges (disorganized attachment). As early as during early childhood, attachment-related stress can lead to the disruption of behavioral organization (type "D" by Main, 1995). Disorganisation of attachment is indicated by the disruption of attention-related and behavioral strategies. It may manifest among children, who are scared of their attachment figures. Main has characterized this as "look of fear with no-where to go". The appearance of high rates of disorganized attachment in samples of abused children obvisiously reveals that such behavior has interpersonal roots. Its development involves the paradoxical situation that in case of danger the potential source of protection (the attachment figure) itself becomes a source of anxiety. Hence, the accumulation of disorganized attachment as a failure of appropriate stress-reducing strategies in the context of abuse seems plausible.

The need for attachment-related safety becomes more frequent during developmental transitions. In particular, changes occurring at adolescence impose high requirements in physical, cognitive and social domaines. Adolescents have to redefine the relationship to their parents and establish new relationships while managing a balance between autonomy and affiliation (Allen, Hauser, Bell, & O'Connor, 1994). As the relationship to one's primary caregivers becomes less important and is progressively complemented by relationships to peers, internalized childhood experiences in the form of IWMs become essential. Further, attachments representations appear to consolidate into stable psychic structures that become generalized to relationships beyond the family. A recent interactive observation study (Feeney, Cassidy, & Ramos-Marcuse, 2008) demonstrated that IWMs are not only transferred to new important relationships but also generalized insofar as they are applied in in unfamiliar situations with strangers.

So far, aggressive behavior in childhood and adolescence had been mainly linked to avoidant attachment patterns (Allen, Porter, McFarland, McElhaney, & Marsh, 2007; Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989; Rosenstein & Horowitz, 1996). Preschoolers with insecure-avoidant attachment showed increased aggressive behavior, dependent conflict resolutions and attributed hostile intentions to others (Suess, Grossmann, & Sroufe, 1992). In a prospective longitudinal study (N=1.060) insecure-avoidant three-years-old children had higher scores in instrumental aggression related to insecure-ambivalent children, e.g. they showed non-provoked physical strategies to take toys away from other children (McElwain, Cox, Burchinal, & Macfie, 2003). Adolescents with avoidant attachment patterns showed more disruptive conflict

resolution strategies by excluding others. Thus, avoidant adolescents tend to make less use of the resources of social relationships (Zimmermann, Maier, Winter, & Grossmann, 2001) which may lead to additional disadvantages (Becker-Stoll, 2002; Seiffge-Krenke & Beyers, 2005). As a consequence, avoidant attachment is seen as an additional risk factor for externalizing behavior (Allen et al., 2002; Rosenstein & Horowitz, 1996). However, the relation between attachment avoidance and externalizing disorders has only been demonstrated for high risk samples (Belsky & Fearon, 2002) while samples with generally low risks showed no relation between externalizing disorders and attachment-avoidance (overview by Deklyen & Greenberg, 2008). One study on aggressive adolescents with matched healthy controls revealed that aggressive youths showed significantly more often disorganized attachment patterns compared to a healthy and matched control group (Taubner & Juen, 2010). Two thirds of the aggressive group had an unresolved-trauma assessed by the Adult-Attachment-Projective-Picture-System which also indicates a failure of affect regulation in the context of attachment-distress (George & West, 2008). Moreover, disorganized attachment refers to traumatic experiences within attachment relationships. Several studies have confirmed that the positive relation between social skills and secure attachment in adolescence is mainly explained by higher emotion-regulating capacities in difficult situations (Zimmermann et al., 2001). Therefore, it seems plausible that the ability to regulate attachment-related distress and to reflect on IWMs may play a central role in understanding the relation between adverse early experiences, insecure/disorganized attachment and externalizing behavior.

MENTALIZATION AND AGGRESSION IN ADOLESCENCE

The theory of mentalization locates the roots of intersubjectivity and empathy in the early bond between the child and its attachment figure (Fonagy, Gergely, & Target, 2007). Mentalization is defined as the ability to attribute mental states because self and others are seen as intentional agents whose behavior is based on mental states (Fonagy, Gergely, Jurist, & Target, 2002). Mentalization is a dynamic skill that can vary in different interpersonal and affective social contexts (Humfress, O'Connor, Slaughter, Target, & Fonagy, 2002). It is influenced by stress and arousal, especially in attachment relationships (Allen, Fonagy, & Bateman, 2008). As stress increases it seems that a switch occurs from controlled modes of mentalizing to more automatic modes (Taubner, Nolte, Luyten, & Fonagy, 2010). Dependent on individual coping strategies (Mikulincer & Shaver, 2007) the activation of the attachment system influences three key parameters: 1) the intercept (threshold) of the occurrence of the switch; 2) the strength of relationship between attachment stress and controlled or automatic mentalizing (slope), and 3) the time to recover from stress back into controlled modes (Luyten, Fonagy, Lowyck, & Vermote, 2012). This makes mentalizing a highly differentiated capacity relating to actual situations. Hence, environmental challenges have to be processed with an appropriate mentalizing to promote mental health (Fonagy, Bateman, & Luyten, 2012; Lane & Garfield, 2005; Jurist, 2005).

Fonagy et al. (2002) proposed that the significant increase of psychopathologic symptoms in adolescence is related to difficulties in the development of mentalization. Mentalization is seen as a key function for the integrative challenges in adolescence (Target & Fonagy, 1996). The authors exemplify that adolescent breakdowns are not caused by "usual" inner turmoil in this developmental phase but rather psychic breakdowns are considered as consequences of hidden developmental malfunctioning. Thus, affective disorders in adolescence are understood as deficient consolidations of mentalization (Fonagy et al., 2002). Mentalization as a developmental capacity is thought to be inhibited because of specific challenges in early attachment relationships. For example, Derryberry and Rothbart (1997) assume that children who have not experienced support and calming in anxious situations by their early caregivers primarily develop avoiding strategies to hide or deny the anxiety-provoking situation instead of experiencing inner and social coping possibilities. Furthermore, children will not benefit from positive consequences of felt anxiety in the sense of affect regulation, impulse control, empathy, and anxiety consciousness.

Fonagy and colleagues (2002) have proposed a similar model by conceptualizing inhibited mentalization as an adaptation to a brutalized attachment relationship. Within this theoretical framework an inhibition of mentalizing skills serves as a much needed immediate protection because children no longer need to think about a perpetrator's motive when simultaneously depending existentially on him or her. But considering that others' actions are not interpreted with regard to their motives, wishes, emotions and cognitions, the understanding becomes concrete. The social environment is by the inhibition of mentalizing no longer interpreted from the "intentional stance" but from a "physical stance" (Dennett, 1987). In this case, an angry voice can be perceived as being loud only and a threatening gesticulation is seen as a raised arm only (Hill, Fonagy, Lancaster, & Broyden, 2007). This specific non-intentional approach to anxiety-provoking situations was demonstrated for children with externalizing disorders. Selected stories of externalizing children (n=41) from the „MacArthur Story Stem" were compared with the stories of a control group (n=25) by Hill et al. (2007) as well as Hill, Murray, Leidecker, and Sharp (2008). The externalizing children told significantly less intentional stories if the protagonist was an anxious child and significantly more dysregulated aggressive stories if the protagonist was situated in a social dilemma.

Mentalization can be assessed with various empirical methods (for an overview compare Luyten et al., 2012) ranging from self-report questionnaires to scenario-based tests (Vrouva & Fonagy, 2009) or movie-based assessments (e.g. Movie for the Assessment of Social Cognition, Dziobek et al., 2006). The gold standard is the "Reflective-Functioning-Scale" (RFS) (Fonagy, Target, Steele, & Steele, 1998) as an empirical approach to investigate mentalizing skills in an emotional charged context of biographically relevant (attachment)-figures in contrast to rather cognitive theory-of-mind-tests. Investigations on adults provide evidence that especially violent offenders receive significantly lower ratings on the RFS compared to non-violent participants (Fonagy et al., 1997). This

finding is observed even when controlling for the effects of personality disorders (Levinson & Fonagy, 2004). Comparably, Fossati et al. (2009) developed a new measure of reactive aggression and investigated the relation to attachment and affect mentalizing assessed with an alexithymia scale in non-clinical adults (N=637). They could verify a partial mediation of poor affect mentalizing in the relationship between insecure attachment styles and reactive aggression.

Bateman and Fonagy (2012) suggested reactive aggression as an evolutionary adequate adaptation relating to the attachment context. For example, Mayberry and Espelage (2007) examined the differences between proactive and reactive aggression subtypes on self-reported measures of empathy, social competence and reward expectations in adolescents (N=433). High empathy and social competence together with low expectations of reward were linked to non-aggressive youths. According to those findings Bateman and Fonagy (2012) propose a probable mediation among childhood maltreatment and externalizing problems by an inadequate interpersonal understanding as well as limited behavioral flexibility in response to demands of the environment.

Stein, Fonagy, Wheat, Kipp, & Gerber (2004) used a combined sample of participants from a day treatment program for emotional distress (N=77), a healthy control group (N=48), and psychiatric inpatients (N=25). Mentalization was assessed with the Reflective Functioning Scale, abuse was assessed with the Childhood Experience of Care and Abuse Interview (CECA; Bifulco, Brown, Neubauer, Moran, & Harris, 1994), and adult social functioning was gathered by the Adult Personality Functioning Assessment (APFA; Hill, Harrington, Fudge, Rutter, & Pickles, 1989). Results showed that mentalizing fully accounted for the relationship between childhood maltreatment and impairment in adult romantic relationships.

From this theoretical point of view, “the absence of interpersonal understanding is what makes the perpetration of violent acts possible” (Bateman & Fonagy, 2012, p. 298). There is some evidence that aggressive behavior in adolescence is in fact related to an inhibition of mentalization: Within a qualitative study on 18 young offenders the level of mentalizing could be related to different patterns of thinking about reprocessing the offence (Taubner, 2008): offenders with average RF were conflicted about their roles as offenders, adolescents with low RF dealt with reconciliation in behavioral terms without acknowledging the victims’ psychological pain or anxiety, least the few cases with negative RF (antireflective) were not able to participate in the mediation constructively due to a constant misattribution of hostility towards the victim. A follow-up study was able to show for the first time that adolescents with externalizing disorders have significantly lower mentalizing skills than matched controls (Taubner, Nolte, Wiswede, & Roth, 2010). Within the scope of mentalization new findings exemplify the ubiquitous importance of reflective abilities in confrontational situations: A recent EEG-Study revealed that aggressive adolescents showed less frontal activation in a laboratory aggression test. Frontal activation could be linked to the inhibition of aggression in the control group (Wiswede et al., 2011).

In sum, mentalization seems to have a key role in the development of aggressive behavior. But to date there is a lack of empirical studies focusing

on mediating variables which go beyond an assessed adversity of insecure or disorganized attachment. This is especially true for non-clinical samples of adolescents, who have suffered early traumatic experiences.

HYPOTHESIS

We assume that all central variables – traumatic experience, aggressive behavior and mentalization – are to be related to each other, i.e. the presence of abuse in childhood would be related to increased levels of aggression and decreased levels of RF, whereas RF and aggression are expected to be inversely correlated. Furthermore, we expect that mentalization plays a mediating role in the relationship between traumatic experience and aggressive behavior. Within the mediation model we expect that the relation between aggressive behavior and traumatic experience is completely explained by mentalization.

Methods

The question, how mentalizing skills influence the relation between traumatic experiences and aggression, was tested in a cross-sectional study on adolescents from comprehensive schools[3] in Germany. The study protocol was approved by the ethics committee of the University of Kassel. All participants and parents of underage participants gave their written and informed consent.

Sample. The study included male and female pupils between 15–18 years of age and with a sufficient knowledge of German. Drug addiction, psychotic disorder and mental retardation (IQ<80) were exclusion criteria. Each adolescent was paid for study participation with 40€. 97 teenagers from 10th grade of 4 high schools in a middle-size town in Germany participated. Age ranged from 15 to 18 years with a mean of 15.94 (SD=.78) years. The sample consisted of 47 (48%) female and 50 (52%) male participants. Nearly half of the sample (46.9%) had a migration background, the majority was born in Germany. 12 participants (12.3%) have migrated to Germany during childhood. The sample resembles the reality of the participating high schools and can be seen as representative for this age group in the population of a middle-size town in Germany.

Instruments

Mentalization: The capacity to mentalize was measured using the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996). RF was coded according to the RF Scale (Fonagy et al., 1998) from AAI transcripts. The AAI consists of 20 questions asked in a set order with standardized probes. Individuals are asked to describe their childhood relationship with their parents, choosing five adjectives to characterize each relationship and substantiating these descriptors with specific memories. To elicit attachment-related information, they are asked how their parents responded to them when they were in physical or emotional distress (e.g., during times when they were upset, injured, or sick as children). They are also asked about memories of separation, loss, experiences of rejection, and times when they might have felt threatened. The interview requires that participants reflect on their parents' styles of parenting and that they consider how childhood experiences with their parents may have influenced

3 The German term for comprehensive school is "Gesamtschule"; this school type offers school education for all different levels of learning success in one school and with the same staff. Comprehensive schools can be considered integrating within the tripartite school system in Germany and are very equivalent to high schools.

their personality. The RF Scale assesses whether participants understand attachment-related experiences in terms of mental states (Fonagy et al., 1998). Statements are coded on an 11-point scale from anti-reflective (–1) to exceptionally reflective (9). Qualitative markers of RF are the acknowledgement of opacity of mental states, separateness of minds, developmental aspects, and efforts to understand behavior in terms of mental states. Scoring focuses on eight questions from the AAI that are considered "demand questions" that explicitly probe for RF. The global score is obtained by individually weighting and aggregating the ratings of the individual questions. The RF Scale has been validated with the coherence scale of the AAI and shows a good interrater reliability after training (Fonagy, Steele, Steele, Moran, & Higgitt, 1991; Taubner et al., 2012). All interviews were administered by trained students. Interviews were audiotaped, transcribed verbatim, and coded by two trained and reliable assessors (ST and CC). Interrater reliability for 30% of the sample had a good Spearman correlation of r =.82.

Trauma: Traumatic experiences were operationalized as abusive experience. Abuse was assessed by a structured anamnesis of trauma using the "Childhood Experience of Care and Abuse Questionnaire" (CECA.Q; Bifulco, Bernazzani, Moran, & Jacobs, 2005) which is significantly associated to the parallel CECA Interview (Bifulco et al., 1994). The questionnaire enquires into the lack of parental care (neglect and antipathy), parental physical abuse, and sexual abuse from any adult before age 17. Participants fill out screening items (e.g., "When you were a child or teenager were you ever hit repeatedly with an implement or punched, kicked or burnt by someone in the household?" or "When you were a child or teenager did you ever have any unwanted sexual experiences?"). The questionnaire shows satisfactory reliability and validity as a self-report measure for adverse childhood experience. For our study we encoded both physical and sexual abusive experiences in one binary variable "abuse" as absent ("0") or present ("1") according to the answer of the screening items.

Aggressive Behavior: Level of aggression was recorded via the Reactive–Proactive-Aggression Questionnaire (RPQ; Raine et al., 2006), which consists of 23 items that load on a total aggression score that can be divided into two subscales: reactive and proactive aggression. The questionnaire assesses the frequency of aggressive behavior by asking the participant to score certain acts (e.g., "Had fights with others to show who was on top" or "Damaged things because you felt mad") between 0 (never) and 2 (often). The total aggression scale can range from 0 to 46. In the current sample, the total aggression scale showed good internal consistencies, with Cronbach's Alpha (α) =.83. Same was true for both subscales with Cronbach's alpha α=0.83 for proactive aggression and α=0.80 for reactive aggression. This is in line with a recent validation study of the German Version of the RPQ replicating the two-factor structure with good internal consistencies on a sample of 250 pupils from grade five to ten (Beckers & Petermann, 2012). For the current analysis, only the total aggression scale was used for the mediation model.

Results

Statistical analyses were performed using the Statistical Package for the Social Science (SPSS 19.0). RF, total aggression, and age were all normally distributed (Kolmogorov-Smirnov Test).

First, Pearson correlations were computed with all key variables, controlled for age and sex (see Table 1). RF had an average of M=3.96 (SD=1.38) as expected in non-clinical adult populations (Fonagy et al., 1998) and ranged from 1 (absent RF) to 7 (marked RF). Total aggression ranged from 1 to 32 with a mean of M=10.84 (SD=6.35). This is higher than mean values of Raine's et al. (2006) validation study, which may be explained by the fact that subjects of the validation study were younger in comparison to the present study. Although it is a non-clinical

sample, 18.4% of the participants reported abusive experiences. All key variables correlated moderately in the expected direction independent of age whereby male participants showed higher aggression scores and lower RF in comparison to female participants. Therefore, we controlled for sex in subsequent analyses.

Table 1: *Descriptive statistics and correlations, raw correlations are presented above the diagonal, and partial correlations with age and sex as covariates are presented below the diagonal. ‘ p<.1, * p <.05. ** p <.01. ***p<.001(two-tailed-test)*

			Measure				
Measure	M	SD	Age	Sex	RF	RPQ	Abuse
1. Reflective Functioning (RF)	3.96	1.38	-.17	-.20*	– –	-.38***	-.19‘
2. Aggressive Behavior (RPQ)	10.84	6.35	-.07	.31**	-.37***	– –	.20*
3. Abuse	Yes 18.4%	No 81.6%	-.11	.07	-.20*	.27**	– –

Second, a mediation model was calculated using abuse as independent variable, RF as mediating variable, the extent of aggressive behavior (RPQ) as dependent variable, and sex as covariate. All variables were standardized. Mediation was statistically run by the “product-of-coefficients” approach (MacKinnon, Fairchild, & Fritz, 2007), which allows a direct examination of mediation effects (Fritz & Mackinnon, 2007). The calculation is underlying 95% BCa bootstrap confidence intervals for the product of regression coefficients with 5000 bootstrap recalculations. The regression coefficients using the total aggression score as dependent variable were 0.2067 and –0.2957, yielding a product of –0.0611 with a confidence interval ranging from –0.1624 to –0.006. As expected, the confidence interval for the effect of RF on the relation between abuse and aggression was not zero, meaning it is estimated as significant. Figure 1 summarizes the mediation paths of the model. The results show that the relation between abuse and aggression is completely explained through RF as a mediator because without RF there is no significant relation between abuse and aggression (c’).

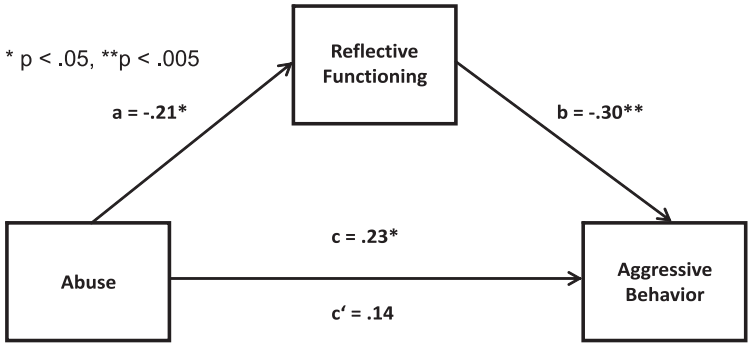

Figure 1. *RF mediates the relation between abuse and aggressive behavior*

DISCUSSION

Adverse childhood experiences are considered risk factors for the development of health-related, social and psychic impairments (Anda et al., 1999). But it remains still unknown what specific mechanisms relate adverse experiences with later malfunctioning. Within the framework of attachment theory and research, the inhibition of mentalization has been proposed to be one possible link between dysfunctional attachment behavior and the development of psychopathology (Fonagy et al., 2002). Firstly, results of the present study confirm a correlational relationship between the presence of early abuse and elevated scores of aggression. This result is in line with longitudinal research, demonstrating that abuse serves as a risk factor for later aggressive behavior (e. g. Teisl & Cicchetti, 2008). Second, the presence of abuse in this sample is negatively correlated with RF which also confirms the hypothesis assuming an inhibition of mentalization in the presence of abuse. The present study is the first confirming the relation between abuse and an inhibition of RF in an adolescent sample empirically. However, the effect size is small which may be attributed to the fact that the sample in the present investigation is a community sample including no clinical cases. Furthermore, the abuse variable created in this investigation did not allow a differentiation between abuse within or outside of the attachment relationship respectively. Therefore, we cannot rule out empirically the impact of abuse by a caregiving person on mentalization in contrast to abuse by a non-caregiver. Thirdly, RF and aggression were negatively correlated. This result replicates findings demonstrating the relation between elevated aggression and low RF in adolescents (Taubner, Nolte, Wiswede et al., 2010; Taubner et al., 2013).

A mediator-analysis protocol supported our hypothesis that the relation between abuse and aggressive behavior is completely mediated by the level of RF. Thus, the mediation analysis gives first evidence to confirm conceptual proposals by Bateman and Fonagy (2012) explaining childhood and externalizing problems (e. g. aggressive behavior) by limited mentalizing. In addition, results of RF as a mediator for the relation between abuse in childhood and aggression in adolescence replicates findings by Stein et al. (2004) who could demonstrate the mediational effect of RF on early abuse and impairment in adult romantic relationships. The result indicates further evidence that the expression of aggressive behavior in individuals with traumatic experiences relies on a deficit in reflective functioning, i.e. a pronounced deficit in understanding self and others in highly affective situations. Bearing in mind the limitations of cross-sectional analyses, these findings extend previous evidence of deficits in empathic responding of individuals with traumatic experiences to an ecologically valid, affectively charged, narrative-based attachment context.

The relationship between the key variables was only significantly correlated with the global aggression scale but not with the subscales of the RPQ (reactive vs. proactive aggression) which is in contrast to conceptual proposals (Bateman & Fonagy, 2012) and empirical evidence (Fossati et al., 2009) stressing

the adaptive function of reactive/impulsive aggression and mentalization in attachment relationships. We can only attribute this to a sample effect which should be investigated in future studies.

Resilience studies give evidence that abusive experiences alone do not predict a psychopathological development. But the risk of developing types of aggressive behavior in the presence of early abuse is high: Retrospectively 80–90% of offenders report an abusive past and prospectively about one quarter of people is judged as offenders if they have suffered from serious childhood abuse (Lewis, Feiring, McGuffog, & Jaskir, 1984). It has to be considered that parental physical violence mostly involves other burdens for the child, e.g. higher confrontationally family situation, increased intimate partner violence and lacking parental caring (Belsky, 1993; Hemenway, Solnick, & Carter, 1994 cited by Wetzels, 1997). In regard to potential protective factors Alink, Cicchetti, Kim, and Rogosch (2009) convincingly demonstrated that early abuse leads to psychopathology only in case of an insecure mother-child-attachment. The current study was able to show that mentalizing skills can be seen as a protective factor as well which has been demonstrated for the transmission of attachment in former studies (Fonagy, Steele, Steele, Higgitt, & Target, 1994). The data indicates that pronounced reflective abilities may interrupt the development of aggressive behavior as a consequence of abuse. This result has important clinical implications for the prevention and treatment of aggressive behavior by enhancing attachment-related reflective abilities. If an interventional focus on improving RF, such as is the case in Mentalization-based treatments (Bateman & Fonagy, 2008; Bateman & Fonagy, 2012) and school prevention programs such as "Peaceful schools" (Twemlow, Fonagy, Sacco, Vernberg, & Malcom, 2011; Fonagy et al., 2009) or early prevention programs such as "Minding the Baby" (Sadler, Slade, & Mayes, 2006), is to lead to less or no aggressive behavior, this would be an important step in the prevention of further aggressive crime.

LIMITATIONS AND FUTURE DIRECTIONS

There are several limitations to this study that need to be addressed. Cross-sectional protocols such as this study employ low statistical power and high error-proneness (Preacher & Hayes, 2008). Although our mediation model was administered properly, we have to acknowledge that our findings do not estimate causality. In fact, the relationship between the variables could be in a different direction, e.g. abusive trauma could lead to low RF if aggressive behavior is more pronounced. Thus, there is a need for comparative studies including reference groups to estimate the validity of mediation effects (Preacher & Kelley, 2011).

The use of only self-report data for the assessment of aggression and abuse may have led to uncontrolled bias, e.g. false-positive or positive-false reports of abuse and aggression. We limited our analysis of traumatic experiences as an example of physical and sexual abuse but other traumatic events (not included

in this study) may have also influenced the development of RF and aggression. Furthermore, abuse was coded as having been present or absent but not coded from the severity or frequency of the event. Due to the restriction to a community sample, only 18% of the adolescents reported abusive experiences. The inclusion of a clinical sample would have increased the statistical power.

Furthermore, we cannot rule out that insecure/disorganized attachment may account for the mediation effect as some authors have suggested. In subsequent work, attachment and RF should be tested for their predictive value in explaining aggression.

In sum, the findings of the present study require replication and application to larger scale longitudinal designs of the community and clinical populations including male and female participants to test for the robustness and generalizability of these preliminary results. Mentalizing capacities should be taken into account in designs of future twin and adoption studies.

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