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POSTER PRESENTATION

Mentalization moderates and mediates the link between psychopathy and aggressive behavior in male adolescents

Svenja Taubner, Department of Psychology, University of Kassel

Lars O. White, Department of Child and Adolescent Psychiatry, Psychotherapy, and Psychosomatics, University of Leipzig

Johannes Zimmermann, Department of Psychology, University of Kassel

Peter Fonagy, Research Department of Clinical, Educational and Health Psychology, University College London

Tobias Nolte, Research Department of Clinical, Educational and Health Psychology, University College London

Corresponding author:

Dr. Svenja Taubner
Research Assistant
Department of Psychology
Faculty of Human Sciences
University of Kassel
Arnold-Bode-Str. 10
34109 Kassel
Email: Svenja.taubner@uni-kassel.de
Phone: 0049 (0) 561-804-2973

ABSTRACT

Objective: To examine the role of mentalizing in the relationship between psychopathy and aggression in a sample of 75 male adolescents.

Method: The participants were drawn from two other studies comparing mentalizing abilities of offenders with healthy community samples. Data was collected on mentalization capacities using the Adult-Attachment-Interview. Psychopathic traits and aggressive behavior were measured via self-report.

Results: A mediator-analysis revealed that mentalization partially explains the relationship between psychopathic traits and proactive aggressive behavior. Furthermore, mentalization has a moderating effect indicating that only individuals low on mentalization behave aggressively when high on psychopathic traits.

Conclusions: Psychopathic traits alone do not explain aggressive behavior and therefore further research is needed to understand other mediating factors.

Keywords: Mentalization, Aggression, Adolescence, Psychopathy, Reflective Functioning

Introduction

Epidemiological studies indicate that early conduct problems frequently precede antisocial behavior in adulthood; 60% - 90% of individuals with Anti-Social Personality Disorder (ASPD) have a history of Conduct Disorder (CD; Kim-Cohen, et al., 2003; Loeber, Burke, & Lahey, 2002), and up to half of boys diagnosed with CD go on to develop ASPD in adulthood (Loeber, et al., 2002; Ridenour, et al., 2002; Robins, 1978). Psychopathy, the most severe form of ASPD, is characterized by shallow affect, egocentricity, lack of remorse, superficial charm, impulsivity and manipulativeness (Cleckly, 1941; Hare, 1990/91). It has been linked to chronic criminality and violent behavior recidivism in adults (Gretton, Hare, & Catchpole, 2004; Leistico, Salekin, DeCoster, & Rogers, 2008; Skeem, Miller, Mulvey, Tiemann, & Monahan, 2005).

Psychopathic personality traits may help distinguish children and adolescents at risk of life-long antisocial careers from those displaying transitory antisocial behavior (Frick, Barry, & Bodin, 2000; Frick & Marsee, 2006; Viding, Blair, Moffitt, & Plomin, 2005). However, evidence concerning the stability of psychopathic traits is inconclusive (Corrado, Vincent, Hart, & Cohen, 2004; Gretton, et al., 2004; Penney & Moretti, 2007; Reidy, Zeichner, Miller, & Martinez., 2007; Vitacco, Neumann, Caldwell, Leistico, & Van Rybroek, 2006; van Baardewijk, Vermeiren, Stegge, & Doreleijers, 2011). Other variables may determine the course of psychopathy or the relationship between psychopathic traits and aggressive behavior. For example, Barry et al. (2008) demonstrated that indices of social impairment mediates the persistence of psychopathic traits. Furthermore, Frick and colleagues (2003) showed that children's level of conduct problems, the socioeconomic status of the child's

family, and the quality of parenting the child received were predictors of the stability of psychopathic traits.

Mentalization may be one variable that serves as a protective factor against the consolidation of psychopathic traits and/or has an inhibiting influence on the relationship between psychopathy and aggression. Mentalizing is the capacity to view observable behavior of the self and others as the product of intentional mental states, while bearing in mind the necessarily inferential nature of this process (Fonagy, Gergely, & Target, 2007). It broadens the scope of Theory of Mind, the capacity to infer the inner psychological state of another (ToM), encompassing aspects such as emotional empathy, the capacity to affectively response to the emotional display of another (Blair, 2005; 2008). Research has demonstrated that individuals with psychopathic tendencies appear to have impairments in emotional empathy, but perform as well as or better than controls in tests of ToM (Blair, 1999; Griffin & Gross, 2004; Kosson, Suchy, Mayer, & Libby, 2002; Stevens, Charman, & Blair, 2001; Sutton, Reeves, & Keogh, 2000; Blair, et al., 1996; Richell, et al., 2003). They may therefore understand the emotions of their victims, but these emotions fail to resonate with them.

Mentalizing requires a self-reflective and an interpersonal stance simultaneously. As a result, one's own behavior and emotional experiences and those of others become more meaningful and predictable – especially in the context of close and intimate relationships (Bateman & Fonagy, 2004). Secure attachment of early child-caregiver relationships is thought to be a necessary precondition for mentalizing to emerge as a developmental, explicit and implicit ability for a full discussion please see….ADD REF (Fonagy, Gergely, Jurist, & Target, 2002; Fonagy, Gergely, & Target, 2008). It

is operationalized as reflective functioning (RF) (Fonagy, Target, Steele, & Steele, 1998).

Trained coders score RF from transcripts of Adult Attachment Interviews (AAI), assessing the degree to which the interviewee takes account of his/ her own mental states and those of others whilst narrating potentially negative, emotionally charged experiences (e. g. “Have you ever felt rejected by your parents as a child?”). Critically, this approach complements laboratory based studies of empathic responding by (a.) providing an indirect verbal assessment not subject to the biases characteristic of self-reports (which psychopathic individuals may learn to parrot), (b.) refraining from providing a set of response options and instead leaving the preferred mode of communication open to subjects, and (c.) assessing social cognition in an ecologically valid, interpersonal and affect-laden context of an interview situation about attachment figures.

Previous research indicates that early attachment relationships characterized by violence, abuse and neglect may entail an inhibition of mentalizing or only fragmentary use of attributions (Fonagy & Moran, 1991). Another dimension – the level of attachment-related distress of an individual at a given moment in time – has been proposed as a precondition to the development of cognitive processes that strongly overlap with empathy (e.g. intentionality, mentalization) (Fonagy, et al., 2007; Fonagy, Redfern, & Charman, 1997a; Fonagy, Steele, Steele, & Holder, 1997b). Crucially, access to these cognitive processes is thought to vary as a function of the concurrent attachment-related distress as well as the felt attachment-security of an individual (Fonagy & Target, 2005; Grienenberger, Kelly, & Slade, 2005; Hill, et al., 2007; Hill, Murray, Leidecker, & Sharp, 2008; (Fonagy & Target, 2005; Grienenberger, Kelly, & Slade, 2005; Hill, et al., 2007; Hill, Murray, Leidecker,

& Sharp, 2008, Luyten et al., submitted; Nolte et al., 2011). Recent evidence suggests that attachment-related stress has an adverse impact on activation patterns in brain areas underpinning mentalization (Nolte, et al., submitted). Accordingly, children's intentionality – portraying characters in attachment-related narratives as subjects whose behaviors are determined by mental states – was related to cognitive empathy (ToM) under "cold" conditions (low distress), but this association did not hold for "hot" conditions (high distress; Hill, et al., 2008). By contrast, low intentionality under high-distress ("hot") conditions predicted levels of conduct disorder (Hill, et al., 2007) and mediated the prospective link for at-risk children between insecure attachment in infancy and increased risk of externalizing symptoms at preschool age (Hill, et al., 2008). This lends further support to the relevance of attachment-related mentalization deficits to aggression although conclusive data for adolescence does not exist yet.

In adults, findings demonstrate that violent offenders fail to mentalize a victim's desperation (Blair, Jones, Clark, & Smith, 1997) and show reduced reflective functioning in comparison to non-violent offenders or individuals with respective personality disorders (Levinson & Fonagy, 2004). However, despite the conceptual parallels in relation to inhibited mentalization and psychopathy, no studies to date have attempted to integrate these concepts. In conjunction with Blair and colleagues' work on empathy (2005; 2008), paradigms are needed that measure emotional empathy under "hot" conditions. In an attempt to fill these gaps empirically and to expand our understanding of the degree compromised mentalizing of affect, the present study analysed RF, psychopathy and aggression in two male adolescent samples.

Hypothesis

We hypothesize that RF, aggressive behavior and psychopathic personality traits are strongly associated, in line with the assumed deficit in empathic responding of psychopathic individuals. Furthermore, we expect that RF plays both a mediating and moderating role in the relationship between psychopathy and aggressive behavior. The mediator hypothesis assumes that attachment-related mentalization deficits possibly represent one of the core etiological mechanism transmitting psychopathic tendencies into aggressive behavior. The moderator hypothesis is based on the assumption that RF has an inhibiting effect on the expression of psychopathic personality traits in terms of aggression. More specifically, adolescents with marked psychopathic tendencies should not engage in aggressive behavior in the presence of high reflective functioning.

Methods

Participants

The sample of this study consisted of a total of 75 adolescent males drawn from the combined samples of two other studies focusing on mentalization; participants in study 1 were adolescent offenders and a control group, participants in study 2 were recruited from the community.

In Study 1 (Taubner, Wiswede, Nolte, & Roth, 2010), participants were recruited via social street workers specialized in working with right wing violent groups of adolescents. Inclusion criteria were: a) age of 17-24 years, b) accusation for violence against another person, c) no imprisonment, d) sufficient language skills and e) no cognitive impairment. Study 1 also included a control group recruited from a local school. This group did not have a history of offending and was matched for sex, age

and education. All assessments took place at the University of Bremen. Study 1 was cross-sectional and entailed a electrophysiology paradigm to investigate neural correlates of laboratory-induced aggression that has been reported elsewhere (Wiswede, et al., 2011).

Study 2 has a longitudinal design and is still in progress. Over the course of three years, 100 adolescents from comprehensive schools are being tested on measures of social cognition, attachment and experiences of care and abuse in childhood. Inclusion criteria were a) male and female adolescents from 15 to 18 years with b) no neurological impairment, c) no acute substance abuse and d) sufficient language knowledge. All assessments took place at the University of Kassel. For the present investigation, all female participants from study 2 were excluded. Study 2 was approved by the ethics committee of the University of Kassel, Germany. Combining the samples of both studies allowed us to cover a broader age range and to account for higher variability in the variables of interest.

In both studies participants gave written and informed consent. If a study participant was aged below 18 years a parent or legal guardian gave an additional written and informed consent. All participants were paid for participation.

The following descriptions, analyses and results collapse the samples of the two studies.

Table 1: Sample summary

	Study 1	Study 2	Combined sample
Sample size	24	51	75

Age	20.3 (2.5)	16.2 (0.8)	17.4 (2.4)
Immigration Status (IS)[1]	0 (0%)	21 (45.7%)	21 (32.3%)
Education	Grade 11-12, all from vocational schools	Grade 10, all from comprehensive schools	
Diagnosis of conduct disorder	13 (54.2%)	10 (19.6%)	23 (35.4%)

The combined sample consisted of 75 male participants from age 15 to 24 years with a mean age of 17.4 years (*SD* = 2.4). Twenty-one participants (32.3%) were immigrants, mainly from Turkey or Arabic countries. Level of education varied with age in both studies. In study 1, all adolescents were visiting vocational schools, while in study 2 all participants were in grade 10 of four different comprehensive schools (see table 1). In Study 1 the diagnosis of conduct disorder was obtained by a free clinical interview conducted by an experienced clinician (ST), in study 2 diagnoses were obtained using the German Version of the Structured Clinical Interview (SCID) (Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1996).

The lifetime prevalence of CD for males has been found to be 12.0% (Nock, Kazdin, Hiripi, & Kessler, 2006). In study 1, 54.2% of the participants had a CD diagnosis, and in the study 2's community sample 19.6% had a CD diagnosis, so both these figures are higher than expected. Ten participants had to be excluded from data analyses because of incomplete data sets. Thus, the following results refer to included 65 study participants.

Measures

[1] Immigration status here means that a person is either first or second generation of immigrants without a German citizenship but with a permanent residency in Germany.

In both studies the capacity to mentalize was measured using the Adult-Attachment-Interview (AAI; George, Kaplan, & Main, 1984/1985/1996). Reflective functioning (RF) was coded according to the reflective-functioning-scale (Fonagy, et al., 1998) from the AAI. 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 supporting 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, and sick as children). They are also asked about memories of separation, loss, experiences of rejection, and times when they might have felt threatened, including, but not limited to, those involving physical and sexual abuse. 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 their personality. The reflective-functioning-scale assesses if 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 which probe for RF. The single question ratings contribute to a global score. The RF scale has been validated on the coherence scale of the AAI and shows a good inter-rater reliability after training (Fonagy et al. 1998). The authors describe two main areas: negative to low vs. average to high reflective-functioning, with the level of 4 as borderline. All interviews were administered by trained students, audiotaped, transcribed verbatim, and coded independently by two trained and

reliable assessors (ST and TN). Interrater reliability for 30% of the sample had an acceptable spearman correlation of r=.78.

Level of aggression was recorded via the Reactive-Proactive-Aggression-Questionnaire (RBQ) (Raine, et al., 2006), which consists of 23 items that load onto two scales: reactive and proactive aggression. The questionnaire assesses the frequency of aggressive behavior by asking if certain acts (e.g. “Had fights with others to show who was on top“ or “Damaged things because you felt mad“) occur “never”, “sometimes” or “often”. For the current analysis both subscales and the total aggression score were used.

Psychopathic tendencies were assessed with the German version of the Psychopathic Personality Inventory-Revised (PPI-R) (Alpers & Eisenbarth, 2008). The PPI-R is a 154 items questionnaire that yields 8 subscales on a two-factor structure: 1) “Fearless dominance” with the subscales fearlessness, stress immunity, social potency, and 2) “Impulsive Antisociality” with the subscales impulsive nonconformity, blame externalization, Machiavellian egocentricity, carefree nonplanfulness, and cold-heartedness. In contrast to the RPQ, the PPI-R focuses on psychopathic personality traits. Since the two factor structure of the PPI-R has recently been called into question (Uzieblo, Verschuere, Van den Bussche, & Crombez, 2010), we will use the composite score in the current analyses.

As externalizing behavioral problems correlate with general intelligence (IQ) (Hill 2002), we controlled for this variable in subsequent statistical analyses. IQ was assessed with the Cultural Fair Test (CFT-3) (Cattell & Weiß, 1971) which measures basic intelligence and yields results unaffected by verbal competence under time-controlled conditions.

Statistical analyses were performed using the Statistical Package for the Social Science (SPSS 17.0). Prior to hypothesis testing, we identified and corrected for outliers following the recommendations by Fidell and Tabachnick (2003). By this means, two data points in PPI-R and one data point in RBQ-Pro with absolute z-values > 2.5 were adjusted by hand. The data was then analyzed in the following three steps. First, we computed Pearson correlations between key variables including age and immigration background. Second, we tested two mediation models using psychopathic personality traits (PPI-R) as the independent variable, RF as the mediating variable, and reactive and proactive aggressive behavior (RBQ) as the dependent variable. Mediation was statistically assessed using the product-of-coefficients approach (MacKinnon, Fairchild, & Fritz, 2007). In contrast to the widely spread causal-steps approach (Baron & Kenny, 1986), the product-of-coefficients approach allows for the *direct* test of the mediated effect and has been shown to be superior in terms of power (Fritz & Mackinnon, 2007). More specifically, the product-of-coefficients approach requires (a) assessing the effect of PPI-R on RF, (b) assessing the effect of RF on respective RBQ scales controlling for PPI-R, and (c) testing the *product* of both regression coefficients for statistical significance. The regression coefficients were obtained from three hierarchical regression analyses, entering confounding variables (e.g., IQ) in the first step, and key predictors (e.g., PPI-R) in the second step. All continuous predictors were centered to their mean prior to regression analyses (Cohen, Cohen, West, & Aiken, 2003). Because the sampling distribution of the product of two regression coefficients deviates from a normal distribution, we used bias-corrected and accelerated (BCa) bootstrap confidence intervals for significance testing (Preacher & Hayes, 2008). Finally, we tested two moderation models using PPI-R as the independent variable, RF as the moderation variable, and RBQ scales as the dependent variable, respectively. To

that end, we generated a new variable by multiplying the (centered) PPI-R and RF scores, and added this variable into the abovementioned hierarchical regression analyses in the third step. We probed for significant interactions by depicting simple regression lines for adolescents with low (-1 *SD*), moderate (*M*), and high (+ 1 *SD*) reflective functioning (Hayes & Matthes, 2009).

Results

RF, reactive aggression, proactive aggression, psychopathy, IQ and age were all normally distributed (Kolmogorov-Smirnov Test). Internal consistency was very high in the composite PPI-R scale (Chronbach's Alpha ά=.90), the RPQ total aggression scale (Chronbach's Alpha ά=.87), as well as in the subscales of proactive (Chronbach's Alpha ά=.82) and reactive aggression (Chronbach's Alpha ά=.76).

Means and correlations

The mean RF of the whole sample was M=3.65 (SD=1.43) which is below an expected mean of 5 for non-clinical populations (Fonagy, et al., 1996). IQ ranged from 85 to 142 with an average of M=110 (SD=13.9) and can therefore be considered as in the normal range. Psychopathy or total score of the PPI-R ranged from 291 to 401 with a mean of M=351.0 (SD=27.9) which is above mean values for non-clinical German populations (Eisenbarth & Alpers, 2007). Proactive aggression measured by the RPQ ranged from zero to 14 with an average of M=4.29 (SD=3.49) whereas higher levels of reactive aggression were reported with a range from one to 17 with a mean of M=8.72 (SD=3.86). Only RF correlated with Immigration Status (IS), r=-.28 ($p<.05$). IS was operationalized as a binary variable thus IS has a negative effect on RF with a moderate effect size. All other key variables showed significant correlations except age (compare table 2). Correlations were in the

expected directions; there were negative correlations between RF and levels of psychopathy and aggression with moderate effect sizes. Whereas intelligence and RF had a positive correlation, levels of aggression and psychopathy correlated negatively with IQ. Psychopathy and proactive aggression correlated with a higher effect size than psychopathy and reactive aggression, $z = 2.73$, $p < .01$ (Steiger, 1980). At the same time both forms of aggression, proactive and reactive, correlated strongly.

Table 2: Descriptive statistics and raw correlations of key variables

	Descriptive			Correlations					
	Range	*M*	*SD*	Age	IS	RF	PPI-R	Pro	Re
Reflective functioning (RF)	1 – 7	3.65	1.43	-.10	-.28*				
Psychopathy (PPI-R)	291 – 401	351.0	27.9	-.02	-.10	-.29*			
Proactive aggression (RBQ-Pro)	0 – 14	4.29	3.49	.01	.05	-.41**	.53***		
Reactive aggression (RBQ-Re)	1 – 17	8.72	3.86	.03	-.05	-.26*	.25*	.59***	
Intelligence (CFT-3)	85 – 142	110.0	13.9	.23	-.10	.35**	-.25*	-.36**	-.27*

Note. $N = 65$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Mediator Analyses

Table 3: Hierarchical regression analyses predicting RF and RBQ scales

	RF	RBQ-Proactive	RBQ-Reactive

	B	*SE*	β	B	SE	β	B	SE	β
Step 1: Confounds									
Intercept	3.901	0.198		4.265	0.498		8.935	0.568	
Intelligence (CFT-3)	0.033	0.012	.32**	-0.091	0.030	-.36**	-0.078	0.034	-.28*
Immigration status	-0.766	0.350	-.25*	0.083	0.879	.01	-0.655	1.002	-.08
Step 2: Key predictors									
Psychopathy (PPI-R)	-0.013	0.006	-.26*	0.053	0.014	.43***	0.020	0.018	.15
Reflective functioning (RF)				-0.536	0.284	-.22#	-0.491	0.371	-.18
Step 3: Interaction term									
PPI-R * RF				-0.021	0.008	-.25*	-0.026	0.011	-.28*

Note. $N = 65$. # $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3 summarizes the results of the three hierarchical regression analyses. The first analysis revealed that psychopathic personality traits were significantly associated with RF, β = -.26, $p < .05$, even when controlling for general intelligence and immigration status, $F(3, 61) = 6.53$, $p = .001$, $R^2 = .24$. In the second analysis, it turned out that RF is marginally significant in predicting proactive aggressive behavior, β = -.22, $p = .06$, even when controlling for confounding variables in the first step and psychopathy in the second step, $F(4, 60) = 9.33$, $p < .001$, $R^2 = .38$.

Moreover, psychopathy was a significant predictor in the second step, too, β = .43, p < .001. In contrast, the third analysis revealed that both RF, β = -.18, p = .19, and psychopathy, β = .15, p = .27, were no longer predictive of reactive aggressive behavior when jointly entered into the regression model, $F(4, 60) = 2.42$, p = .06, R^2 = .14. Taken together, the results suggest an indirect effect of psychopathy via RF on proactive, but not reactive, aggression. To test both mediated effects directly, we computed 95% BCa bootstrap confidence intervals for the products of respective (non-standardized) regression coefficients using 5000 bootstrap resamples. For proactive aggression, the regression coefficients were -0.0131 and -0.5355, yielding a product of 0.0070 with a confidence interval ranging from 0.0001 to 0.0196. For reactive aggression, the regression coefficients were -0.0131 and -0.4910, yielding a product of 0.0064 with a confidence interval ranging from -0.0019 to 0.0222. As expected, only the confidence interval for the mediated effect on proactive aggression did not include zero, i.e., was statistically significant.

[Insert Figure 1 about here]

Figure 1 summarizes the paths of the mediation model for proactive aggression following the notational conventions established by MacKinnon et al. (2007). It shows that psychopathic personality traits are associated with deficits in reflective functioning, which in turn predict proactive aggressive behavior. However, because the direct effect of psychopathy on proactive aggression is still significant, RF only partially mediates their relationship.

The last row in Table 3 presents the results on the interaction term of PPI-R and RF in the third step of the hierarchical regression analyses. The interaction term was significant both in predicting proactive aggressive behavior, β = -.25, p < .05, ΔR^2 = .058, and reactive aggressive behavior, β = -.28, p < .05, ΔR^2 = .075. Figure 2

and 3 visualize the interactions by plotting simple regression lines for adolescents with low (RF = 2.22), average (RF = 3.65), and high (RF = 5.08) reflective functioning.

[Insert Figure 2 and 3 about here]

As hypothesized, the relationship between psychopathy and aggressive behavior was strongest when RF was low, with simple slopes of β = .66, $p < .001$ for proactive aggression, and β = .41, $p < .05$ for reactive aggression, respectively. Conversely, when RF was high, the relationship between psychopathy and aggressive behavior was non-significant, both for proactive aggression, β = .19, $p = .19$, and for reactive aggression, β = -.12, $p = .46$. Thus, high RF seems to have an inhibiting effect on the aggressive expression of psychopathic personality traits.

Discussion

This study is the first to attempt to empirically integrate the literature on the roles of psychopathy and mentalization in the development of aggressive behavior (Blair, 1995; Fonagy, Target, Steele, & Steele, 1997c). Despite conceptual links both accounts make somewhat distinct assumptions about aggressive psychopathology. In the case of psychopathy, numerous twin studies in childhood and adolescence now document that the overlap between psychopathic tendencies or callous unemotional (CU) traits and concurrent disruptive and antisocial behavior appears to be largely attributable to genetic influence (Larsson, Andershed, & Lichtenstein, 2006; Taylor, Loney, Bobadilla, Iacono, & McGue, 2003; Viding, et al., 2005; Viding, Frick, & Plomin, 2007; Viding, Jones, Frick, Moffitt, & Plomin, 2008). However, Viding and colleagues (Viding, et al., 2005; Viding, et al., 2007) stress that this overlap may also be accounted for by gene-environment interaction or gene-environment

correlations. For example, approximately 1/3 of the variance in psychopathic tendencies in childhood are attributable to non-shared environmental influences (Viding, et al., 2005). Mentalization therefore, with its ties to attachment (Fonagy, et al., 1997a; Fonagy, et al., 1997b; Hill, et al., 2008), which is thought to be largely mediated by shared and non-shared environmental factors (Fearon, et al., 2006; Roisman & Fraley, 2008), may add to the understanding of etiological factors.

A mediator-analysis confirmed our hypothesis that the relation between proactive aggressive behavior and psychopathy is partly mediated by the level of RF. RF is therefore a potential causal mechanism linking psychopathic traits and the engagement in proactive aggressive behavior. The results indicate that the expression of proactive aggressive behavior, in contrast to reactive aggressive behavior, in individuals with higher psychopathic traits relies on a deficit in reflective functioning, i.e. a pronounced deficit in understanding self and others in high affective situations. Furthermore, RF moderates the level of reactive and proactive aggression in individuals with psychopathic traits, even when controlling for general intelligence and immigration status. The results show that individuals with psychopathic traits to act aggressively when they have average or low levels of RF.

Bearing in mind the limitations of cross-sectional analyses, these findings extend previous evidence of deficits in empathic responding of individuals with psychopathic tendencies to an ecologically valid, affectively charged, narrative-based attachment context. Results show that psychopathic traits alone may not explain aggressive behavior, thereby challenging future diagnosis and prognosis. Our results also question single cause explanations of the relationship between aggressive behavior and psychopathy by demonstrating the mediating and moderating role of RF; a developmental capacity acquired in the context of attachment experiences.

Furthermore, the results of the present study may help challenge the assumption that psychopathy cannot be treated by psychotherapy. If a focus on improving RF, as is the case in Mentalization-Based-Treatments (Bateman & Fonagy, 2008; Bateman & Fonagy, 2011), will lead to less or no aggressive behavior this would be an important step in the prevention of further aggressive crime.

There are several limitations that need to be addressed. 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.

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Figure 1: RF partially mediates the relationship between psychopathy and proactive aggression

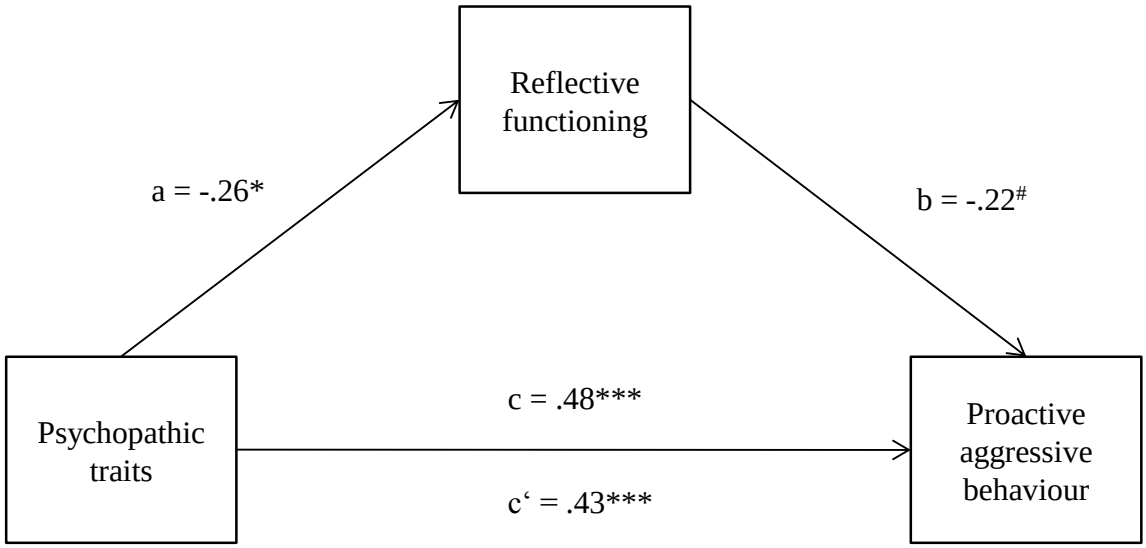


Figure 2: RF moderates the relationship between psychopathy and reactive aggression

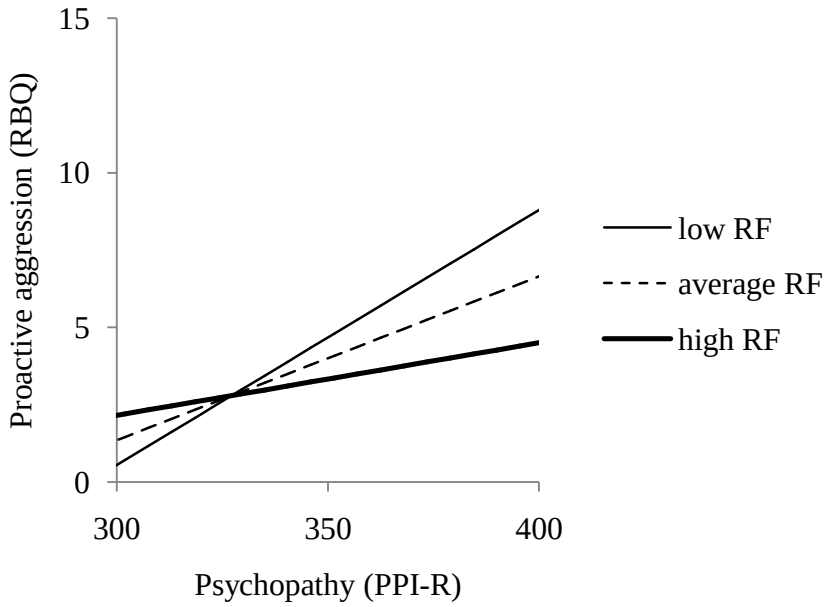
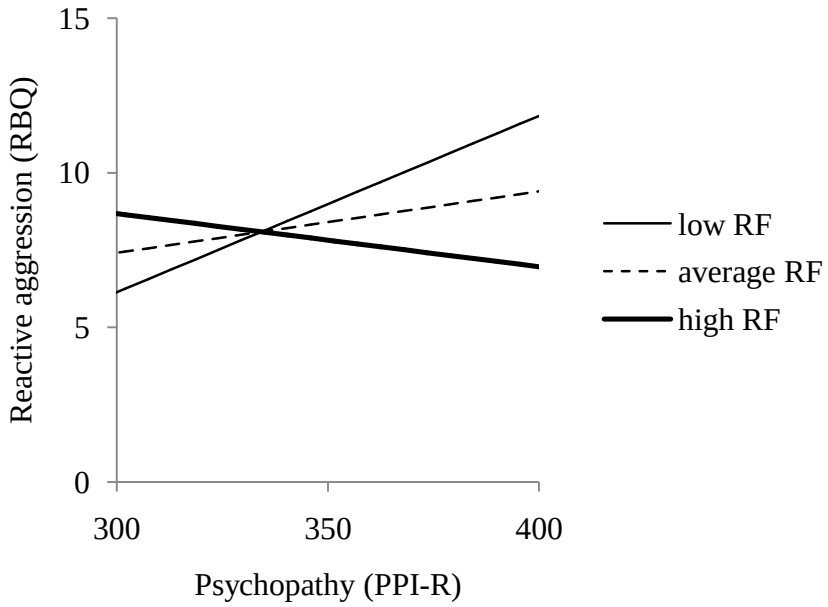


Figure 3: RF moderates the relationship between psychopathy and reactive aggression



RF thereby was obtained from an interview context that is understood to approximate characteristics of close and emotionally charged relationships.