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## **THE RELATION BETWEEN DIMENSIONS OF NORMAL AND PATHOLOGICAL PERSONALITY AND CHILDHOOD MALTREATMENT IN INCARCERATED BOYS**

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The relation between subtypes of maltreatment and dimensions of personality and personality pathology was investigated in a representative sample of 142 incarcerated Dutch male juveniles. Normal personality dimensions were assessed with the Big Five Inventory, the Dimensional Assessment of Personality Pathology—Basic Questionnaire for Adolescents was used to measure pathological personality dimensions, and the Childhood Trauma Questionnaire was used to assess childhood maltreatment. The five maltreatment subtypes were found to be differentially and uniquely related to the normal and pathological personality dimensions in juvenile delinquents. The association between the abusive subtypes and Emotional Dysregulation depended on the co-occurrence of neglect. It was concluded that subtypes of maltreatment are distinctively related to dimensions of personality and personality pathology, possibly due to specific gene-environment interactions. Further research on this interplay is needed to be able to recognize genetic vulnerability. Early identification of children at risk could aid to limit the long-term consequences of maltreatment.

A history of childhood maltreatment has long been associated with a substantial range of severe and detrimental consequences, including Axis-I and personality disorders and delinquency (e.g., Battle et al., 2004; Bierer et al., 2003; Lansford et al., 2007; MacMillan et al., 2001; Smith & Thornberry, 1995; Spataro, Mullen, Burgess, Wells, & Moss, 2004; Widom, 1989). More recently, research has emerged suggesting that maltreatment may not only influence the development of psychopathology, but also may affect personality organization. By interfering with a consistent, secure, and supporting environment, maltreatment influences the genetic liability

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to certain personality features (Jang, Dick, Wolf, Livesley, & Paris, 2005; Goodman, New, & Siever, 2004; Steiger et al., 2007). Preliminary findings have indicated a history of childhood maltreatment to be related with dimensions of both normal and pathological personality (e.g., Rogosch & Cicchetti, 2004; Roy, 2001; Wonderlich et al., 2001). Moreover, there is now increasing evidence suggesting that personality dimensions in turn predict the development of psychopathology and hence may mediate the relation between maltreatment and its detrimental consequences (e.g., Collishaw et al., 2007; Van der Ham, Nederlof, Dingemans, & Oei, 2010; Steiger et al., 2007). However, studies on the relationship between childhood maltreatment and personality organization are still scarce and have generally failed to differentiate between the five subtypes of maltreatment that are currently distinguished: physical abuse, sexual abuse, emotional abuse, and physical and emotional neglect (Bernstein et al., 1997). Research on the damaging correlates of maltreatment has mainly focused on the effects of sexual and physical abuse and has commonly disregarded the role of the neglect subtypes, a phenomenon often referred to as “the neglect of neglect” (Wolock & Horowitz, 1984). It has, however, recently been suggested that the five subtypes may each have distinct effects (English et al., 2005). Improved understanding of the specific relations between the maltreatment subtypes and the personality dimensions could aid the identification of children at risk of developing personality pathology or dysfunctional personality profiles and could provide targets for early intervention measures. The present study therefore aimed to elucidate the associations between the five subtypes of childhood maltreatment and dimensions of normal personality and personality pathology. Since both histories of maltreatment and personality pathology are associated with delinquency, we investigated these specific relations in a sample of male juvenile delinquents.

At first, we aimed to explore the relation between the maltreatment subtypes and normal personality. Regarding the five-factor model of normal personality, especially Neuroticism, Agreeableness, and Conscientiousness have been demonstrated to be differentially related to the personality organization of delinquent juveniles when compared to those of the normal population (Heaven, 1996). Rogosch and Cicchetti (2004) have found general maltreatment to be related to low scores on Agreeableness and Conscientiousness, and high scores on Neuroticism. A solitary study of the specific role of the five maltreatment subtypes revealed that emotional neglect was negatively related to Conscientiousness and positively to Neuroticism (Klensmeden Fosse & Holen, 2007). Based on the findings of Rogosch and Cicchetti (2004) and Klensmeden Fosse and Holen (2007), we expect specific maltreatment subtypes to be related to Neuroticism, Agreeableness, and Conscientiousness in our sample of juvenile delinquents (*Hypothesis 1*).

Regarding more pathological personality dimensions, general maltreatment has been found to be associated with hostility and antisocial person-

ality traits (Bernstein, Stein, & Handelsman, 1998; Reti et al., 2002; Roy, 2001). Concerning the development of personality pathology, there are preliminary findings suggesting that neglect may be of exceptional importance. A supporting, secure, and understanding home-environment is one of the factors that may prevent traumatic experiences from evolving into detrimental consequences (Bierer et al., 2003; English et al., 2005). Opposed to the abusive types of maltreatment, which are incident-specific, neglect is continuous and ubiquitous and is therefore considered to interfere most strongly with a supporting environment. It is hence presumed that while the abusive maltreatment subtypes might predispose individuals to pathological outcomes, their actual development may be affected by the presence of neglect. In other words, neglect is now believed to be a moderator of the development of the negative consequences of emotional, physical, and sexual abuse (Bierer et al., 2003; English et al., 2005; Rogosch & Cicchetti, 2004).

In the research on maltreatment and personality pathology, Wonderlich et al. (2001) were the first to use the Dimensional Assessment of Personality Pathology—Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2002), a questionnaire designed for the dimensional assessment of personality pathology that distinguishes four higher order dimensions: Emotional Dysregulation, Dissocial Behavior, Inhibitedness, and Compulsivity. They demonstrated a link between sexual abuse and lower-order personality dimensions related to Emotional Dysregulation (Wonderlich et al., 2001). In the current study, the presence of personality pathology was assessed with a preliminary version of the DAPP-BQ-A (Tromp & Koot, 2008; Koot & Tromp, personal communication, March, 2004), the adolescent version of the DAPP-BQ. Due to the lack of extensive earlier research on the subject, exploratory analyses were performed on the relationship between both dimensions of personality pathology on the one hand and the subtypes of maltreatment and the possible interactions between the abuse and neglect subtypes on the other. Particularly Emotional Dysregulation and Dissocial Behavior were presumed to be highly prevalent in the sample of juvenile delinquents. Based on the findings of Wonderlich et al. (2001) and English et al. (2005), we expected an interaction effect of neglect and sexual abuse on Emotional Dysregulation (*Hypothesis 2*). We hypothesized both sexual and physical abuse to be positively related to Dissocial Behavior, based on previous studies that have reported these subtypes to be associated with antisocial behavior and antisocial personality disorder, which bear some resemblance to the pathological personality dimensions of Dissocial Behavior (Battle et al., 2004; Bierer et al., 2003) (*Hypothesis 3*).

## **METHOD**

### **PARTICIPANTS**

Hypotheses were tested in a sample of juvenile delinquents residing in a Dutch youth detention center. Ethical approval for this study was received

from this center and the Commissie Medisch Onderzoek (CMO; Medical Research Committee); an independent Dutch ethics committee. All males between the age of 12 and 21 who were remanded in custody or were sentenced to detention without compulsory treatment were eligible for inclusion in the study. Exclusion criteria were: a poor command of the Dutch language, the presence of brain trauma, autism, and a current psychotic episode. Juveniles received a €15 gift coupon for their participation. Two times a week, the two juveniles who had most recently arrived at the detention center were selected to partake. Their supervisor and attending psychologist or psychiatrist were consulted to assess whether they met any exclusion criteria. Altogether, 168 male juveniles were asked to participate in the study. Information regarding the purpose and the procedure of the study was provided to them and it was explained that participation was voluntary and anonymous and that consent could be withdrawn anytime. They were given an informed consent form which they had to sign. The parents or caretakers of participants under the age of 18 were sent an information form, a copy of the juvenile's signed consent form, and an objection form with which they could declare dissent and discontinue the juvenile's participation immediately. Seventeen juveniles refused to partake initially and for nine minor juveniles no parental consent was obtained. The total sample of juvenile delinquents thus consisted of 142 boys, resulting in a response rate of 84.5 percent. However, not all measures were obtained from every participant. Several juveniles were transferred to another detention center or were released from custody during their participation and hence could not finish the study. In addition, a number of participants refused to complete the investigation for various reasons: it was too difficult, too long in duration, they were discouraged by their fellow delinquents, etc. For 108 juveniles, complete data were available. However, all data obtained were used. Statistical analyses were performed to investigate whether there were differences between the participants who did ( $N = 108$ ) and did not complete ( $N = 34$ ) the study on any of the measures and whether there were any differences between the total sample of juvenile delinquents ( $N = 142$ ) and the juveniles who refused to participate or for whom no parental consent was obtained ( $N = 26$ ) in terms of age, country of birth, and offense severity. No significant differences were demonstrated. Hence, there was no indication that drop-out or refusal factors might have biased the results.

In sum, 142 juvenile delinquents participated in the study and complete data were available for 108 of them. Mean age of the sample was 16.46 years ( $SD = 1.52$ ; range 13–20). Table 1 presents data pertaining to participants' country of birth and the offenses they were charged with. In line with findings in the total population of Dutch male incarcerated juveniles, ethnic minorities were overrepresented and participants were convicted of violent and property offenses most commonly (Centraal Bureau voor de Statistiek, 2003; Dienst Justitiële Inrichtingen, 2008).

**TABLE 1. Participants' Country of Birth and Criminal Charge**

<b>Measure</b>	<b>Frequency (%)</b>
Country of birth	
The Netherlands	72.6
The Netherlands Antilles	9.6
Morocco	5.2
Turkey	1.5
Surinam	1.5
Other Non-Western country	9.6
Criminal charge	
Rape	4.5
Statutory rape	2.2
Homicide	9.7
Murder	0.7
Assault	8.9
Assault inflicting actual bodily harm	2.2
Arson	2.2
Battery	6.7
Aggravated battery	4.5
Extortion	10.4
Robbery	27.6
Burglary	6.7
Connivance	1.5
Theft	11.9
Possession and dealing of illegal drugs	0.7

## MEASURES

The normal Big Five personality dimensions—Agreeableness, Extraversion, Neuroticism, Openness to Experience, and Conscientiousness—were assessed with the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; Dutch translation: Koot & Tromp, personal communication, March, 2004). A preliminary version of the adolescent version of the Dimensional Assessment of Personality Pathology—Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2002; Dutch translation: Tromp & Koot, 2008; preliminary version: Koot & Tromp, personal communication, March, 2004) was used to measure the higher-order dimensions of personality pathology Emotional Dysregulation and Dissocial Behavior and their respective lower-order dimensions. The preliminary version that was used was identical to the final adolescent version for which good psychometric properties were demonstrated in 2008 (Tromp & Koot, 2008) and was approved by John Livesley, the original author of the DAPP-BQ. The five subtypes of childhood maltreatment were assessed with a Dutch version of the short form Childhood Trauma Questionnaire (CTQ-SF; Bernstein et al., 1994; Bernstein & Fink, 1998; Dutch translation: Koot & Tromp, personal communication, March, 2004). However, in this translation, two items were omitted from the scoring. An alternative scoring was therefore developed, using algorithmic analyses of reliability that examined the possible contribution of each of the items to the five maltreatment subscales. A high degree of internal consistency was observed for each subscale. Physical abuse was measured with six items ( $\alpha = .90$ ), sexual abuse with five items ( $\alpha = .61$ ),

emotional abuse with five items ( $\alpha = .84$ ), physical neglect with six items ( $\alpha = .65$ ), and emotional neglect with nine items ( $\alpha = .88$ ). To be able to exclude the possibility that Axis-I disorders in the juvenile delinquents biased the results, the presence of these disorders was assessed with the patient edition of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I/P; First, Spitzer, Gibbon, & Williams, 1996; Dutch translation: Van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1999) and the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version (K-SADS-PL; Kaufman, Birmaher, Brent, Rao, & Ryan, 1996; Dutch translation: Reichart, Wals, & Hilligers, 1999). Data on participants' country of birth and date of birth and the charges for which they were currently detained were derived from TULP-Youth, the official judicial registration system used in all youth detention centers in the Netherlands. For 36 juveniles, charges were missing from TULP-Youth and were obtained from the Judicial Documentation System of the Dutch Ministry of Justice.

## PROCEDURE

When participants' consent was obtained, the K-SADS and SCID-I interviews were administered by the researcher. They were then handed the CTQ-SF, BFI, and DAPP-BQ, which they were allowed to fill out either individually or in the presence of the researcher. Once they had completed the investigation, participants were thanked and given the €15 gift coupon. Afterwards, participants' country and date of birth and criminal charges were derived from TULP-youth.

## STATISTICAL ANALYSES

At first, descriptive statistics were used to check for any violations of the assumptions underlying the statistical techniques that would be used. When warranted, missing values on the BFI, DAPP-BQ, and CTQ-SF measures were then imputed by means of the regression method provided by the statistical program used (SPSS; Statistical Program for the Social Sciences). This method applies multiple regression in order to estimate one's missing value on the basis of his or her present values, using the correlation matrix derived from the sample's complete data. To ascertain that statistical tests were justified, a negative or positive error component was added to each regression estimate thus obtained. These error terms were chosen randomly from the observed residuals of complete cases.

The relationship between the normal personality dimensions and the maltreatment subtypes and the relationship between the pathological personality dimensions and the maltreatment subtypes were investigated using Pearson product-moment correlation coefficients. To test our specific hypotheses, pertaining to which maltreatment subtypes would be uniquely related to which personality dimensions and whether there would be any

interactions between the maltreatment subtypes, several multiple regression analyses were performed. The normal and pathological personality dimensions were used as dependent variables; the five maltreatment subtype measures and their interactions were used as independent variables. Significant interaction effects were probed using a procedure developed by Aiken & West (1991). A two-sided alpha-level of 0.05 was accepted as a nominal level of significance.

## RESULTS

### PARTICIPANTS INCLUDED IN THE ANALYSES

Seven participants were excluded from all analyses because of outlying scores on the maltreatment measures. Since not all juvenile delinquents who were included in the study completed all measures, the number of participants differs per analysis. The analyses pertaining to the first hypothesis, involving the CTQ-SF and the BFI, involve 102 participants. Data of 109 juvenile delinquents are included in the analyses pertaining to the second and third hypotheses, involving the CTQ-SF and the DAPP-BQ measures.

### PREVALENCE OF AXIS-I DISORDERS

Axis-I disorders were highly prevalent in the sample of juvenile delinquents; 52.1 percent met criteria for at least one Axis-I diagnosis and approximately half of them qualified for more than one DSM-IV-TR disorder. Prevalence rates are presented in Table 2.

The prevalence rates found in the present study are in line with those reported in various previous international and Dutch investigations (Kroll et al., 2002; Ruchkin, Kuposov, Vermeiren, & Schwab-Stone, 2003; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002; Vermeiren, 2003), which have generally found externalizing disorders to be highly present in juvenile delinquent samples, while internalizing disorders are relatively scarce. As one reviewer noted, certain personality traits may be amplified in the presence of an Axis-I disorder, especially mood and anxiety disorders (e.g., Peselow, Sanfilipo, Fieve, & Gulbenkian, 1994). The joint structure of per-

**TABLE 2. Presence of Current Axis-I Diagnoses  
(*N* = 142 for disruptive behavior disorders, *N* = 135  
for other diagnoses)**

<b>Disorder</b>	<b>Prevalence (%)</b>
Anxiety disorder	3.5
Psychotic symptom(s)	14.8
Mood disorder	4.9
Conduct disorder	32.4
Oppositional defiant disorder	8.5
ADHD	4.2
Substance use disorder	18.3



sonality and psychopathology was a key focus of our research project and is elaborated on in another paper (Van der Ham et al., 2010). For now, since the prevalence of anxiety and mood disorders was low, we do not believe that their presence has biased the results to a considerable extent.

### CTQ-SF MEASURES

Descriptive statistics of the maltreatment subtype measures are presented in Table 3. Although the mean scores on the maltreatment subtypes seem rather low, a score of 6 on the sexual abuse measure and a score of 7 on the physical abuse measure are regularly considered as cut-off scores, indicating these maltreatment subtypes to be fairly present (e.g., Bernstein & Fink, 1998; Thompson, Kaslow, Lane, & Kingree, 2000; Walker et al., 1999). In addition, all maltreatment subtype scores of the present sample were demonstrated to be significantly higher than those of an equivalent comparison group consisting of 139 Dutch non-delinquent juveniles.<sup>1</sup> The high emotional neglect score is in accordance with previous findings (e.g., Bernstein & Fink, 1998; Thompson et al., 2000).

### HYPOTHESIS 1: CHILDHOOD MALTREATMENT AND BFI NORMAL PERSONALITY DIMENSIONS

Our first hypothesis pertained to the relation between the five maltreatment subtype measures and the five BFI dimensions of normal personality. Due to the lack of research on this subject, no explicit hypotheses on the specific relations were formulated. However, based on previous general findings, we expected particularly Neuroticism, Agreeableness, and Conscientiousness to be related to the maltreatment subtypes. At first, Pearson correlations were computed. Results are presented in Table 4.

In line with our expectations, significant relations with maltreatment subtypes were demonstrated for Neuroticism, Agreeableness, and Conscientiousness predominantly. Neuroticism and Agreeableness were most strongly related to physical and emotional abuse. In contrast, Conscientiousness was related to emotional and physical neglect most strongly. To

**TABLE 3. Descriptive Statistics of the Childhood Maltreatment Subtypes (N = 139)**

<b>Maltreatment Subtype</b>	<b>M</b>	<b>SD</b>
Physical abuse	6.94	3.52
Sexual abuse	6.37	2.38
Emotional abuse	7.14	3.49
Emotional neglect	9.74	4.21
Physical neglect	6.82	2.60

1. A description of the comparison group and the results of the analyses are presented in Van der Ham, J. M. (2008).

**TABLE 4. Correlations Between Normal Personality Dimensions and Subtypes of Maltreatment ( $N = 109$ )**

	Physical Abuse	Sexual Abuse	Emotional Abuse	Emotional Neglect	Physical Neglect
Neuroticism	.26**	.14	.39**	.15	.19*
Extraversion	-.16	-.14	-.07	-.07	-.23*
Openness to Experience	.15	.05	.13	-.21*	-.06
Agreeableness	-.39**	-.08	-.26**	-.13	-.18
Conscientiousness	-.07	.18	.14	-.27**	-.26**

\*Correlation is significant at the .05 level (two-tailed)

\*\*Correlation is significant at the .01 level (two-tailed)

investigate the presence of unique associations of these normal personality dimensions with the individual maltreatment subtypes, while controlling for the influence of the other maltreatment subtypes, three analogous multiple regression analyses were performed with respectively Neuroticism, Agreeableness, and Conscientiousness as dependent variables. The five maltreatment subtype measures were used as independent variables. These measures were standardized before including them in the analyses. For Neuroticism, a significant positive relation was demonstrated with emotional abuse,  $b = .42$ ,  $SE = .14$ ,  $F(5,108) = 8.99$ ,  $p = .003$ ,  $R^2 = .164$ . For Agreeableness, a negative association with physical abuse was found,  $b = -.27$ ,  $SE = .08$ ,  $F(5,108) = 10.37$ ,  $p = .002$ ,  $R^2 = .160$ . Conscientiousness was negatively related with emotional neglect at the trend level, ( $b = -.12$ ,  $SE = .08$ ,  $F(5,108) = 3.08$ ,  $p = .08$ ,  $R^2 = .109$ ). The results pertaining to our first hypothesis thus seem to indicate that the maltreatment subtypes are indeed and differentially related to normal personality dimensions in juvenile delinquents.

#### HYPOTHESIS 2: CHILDHOOD MALTREATMENT AND THE DIMENSION OF EMOTIONAL DYSREGULATION

We first computed the Pearson correlations between the DAPP-BQ pathological personality dimensions and the maltreatment subtype measures. Results are presented in Table 5.

Positive correlations were found between Emotional Dysregulation and physical, sexual, and emotional abuse and physical neglect. Our second hypothesis, however, was essentially concerned with the assumption that

**TABLE 5. Correlations Between Pathological Personality Dimensions and Subtypes of Maltreatment ( $N = 102$ )**

	Physical Abuse	Sexual Abuse	Emotional Abuse	Emotional Neglect	Physical Neglect
Emotional Dysregulation	.30**	.29**	.34**	.12	.25*
Dissocial Behavior	.32**	.24*	.17	.01	.19

\*Correlation is significant at the .05 level (two-tailed)

\*\*Correlation is significant at the .01 level (two-tailed)

neglect may moderate the effect of emotional, physical, and sexual abuse. To investigate whether the relation between the abuse subtypes and Emotional Dysregulation was affected by the presence of the neglect subtypes of maltreatment, a multiple regression analysis was performed including interaction terms that represented these possible moderating relationships. The standardized emotional neglect measure and the physical neglect measure were multiplied with the standardized sexual abuse, physical abuse, and emotional abuse measures to create six two-way interaction terms, one for each possible combination of the neglect and the abuse subtypes of maltreatment: emotional neglect  $\times$  physical abuse, emotional neglect  $\times$  emotional abuse, emotional neglect  $\times$  sexual abuse, physical neglect  $\times$  physical abuse, physical neglect  $\times$  emotional abuse, and physical neglect  $\times$  sexual abuse. Emotional Dysregulation was used as the dependent variable. The five standardized maltreatment subtypes measures were entered as independent variables in the first step of the regression analysis, the interaction terms were entered in the second step. A positive main association was demonstrated with sexual abuse,  $b = 30.81$ ,  $SE = 11.42$ ,  $F(5,102) = 7.28$ ,  $p = .008$ ,  $R^2 = .197$ , suggesting that sexual abuse may be individually related to the development of the pathological personality dimension of Emotional Dysregulation. Interaction effects on this dimension were found between physical abuse and emotional neglect,  $b = 47.97$ ,  $SE = 21.74$ ,  $F(5,102) = 4.87$ ,  $p = .03$ ,  $R^2 = .304$ , and between emotional abuse and emotional neglect,  $b = -36.95$ ,  $SE = 16.29$ ,  $F(5,102) = 5.14$ ,  $p = .03$ ,  $R^2 = .304$ . To probe these interactions and examine the relation between physical and emotional abuse and Emotional Dysregulation separately for juveniles with and without a history of emotional neglect, a procedure developed by Aiken and West (1991) was used. The standardized emotional neglect measure was transformed into two new variables: one heightened neglect measure, reflecting the presence of emotional neglect, and one lowered neglect measure, reflecting the absence of emotional neglect. New two-way interaction terms were calculated using these adjusted values of the emotional neglect measure; both the lowered and the heightened measure were multiplied with the standardized sexual, physical, and emotional abuse measures. Two multiple regression analyses similar to the first one were performed; one with the heightened and one with the lowered values of the neglect measure and their respective interaction terms. Results demonstrated that in juveniles without a history of emotional neglect, physical abuse was not associated with the personality dimension of Emotional Dysregulation,  $b = -37.15$ ,  $SE = 26.69$ ,  $F(5,102) = 1.94$ ,  $p = .17$ . However, when neglect was present, physical abuse was related with Emotional Dysregulation at the trend level,  $b = 58.79$ ,  $SE = 32.52$ ,  $F(5,102) = 3.27$ ,  $p = .07$ . In contrast, emotional abuse appeared to be positively related to Emotional Dysregulation when emotional neglect was absent,  $b = 101.99$ ,  $SE = 33.04$ ,  $F(5,102) = 9.53$ ,  $p = .003$  while it was not associated with this dimension in juveniles with a

history of emotional neglect,  $b = 28.09$ ,  $SE = 20.16$ ,  $F(5,102) = 1.94$ ,  $p = .17$ . Regression analyses on the lower-order dimensions of Emotional Dysregulation also found positive relations with sexual abuse and demonstrated analogous interaction effects between emotional abuse and emotional neglect and physical abuse and emotional neglect. In sum, the results pertaining to our second hypothesis indicate that sexual, physical, and emotional abuse are positively related to Emotional Dysregulation. The associations with physical and emotional abuse, however, appear to depend on the co-occurrence of emotional neglect.

### HYPOTHESIS 3: CHILDHOOD MALTREATMENT AND THE DIMENSION OF DISSOCIAL BEHAVIOR

With regard to Dissocial Behavior, we expected particularly physical and sexual abuse to be of importance. The Pearson correlations presented in Table 5 are in line with this hypothesis. To investigate the presence of interactions between the abuse and neglect subtypes of maltreatment and their unique associations with Dissocial Behavior, a multiple regression analysis was performed with Dissocial Behavior as a dependent variable. The five standardized maltreatment subtypes measures were entered as independent variables in the first step of the regression analysis. Six two-way interaction terms similar to those described above were entered in the second step. In support of our third hypothesis, a positive main relation was demonstrated with sexual abuse,  $b = 11.84$ ,  $SE = 5.57$ ,  $F(5,102) = 4.53$ ,  $p = .04$ ,  $R^2 = .154$ . Physical abuse was positively related to Dissocial Behavior at the trend level,  $b = 15.22$ ,  $SE = 8.30$ ,  $F(5,102) = 3.36$ ,  $p = .07$ . No interaction effects were demonstrated.

### DISCUSSION

Childhood maltreatment is associated with a wide range of detrimental consequences, the development of which may be moderated by personality style (Collishaw et al., 2007; Van der Ham et al., 2010; Steiger et al., 2007). Although research is emerging suggesting maltreatment to be related to specific personality dimensions, studies on this subject are still scarce and have generally failed to differentiate between physical abuse, sexual abuse, emotional abuse, and physical and emotional neglect. The current article aimed to elucidate the associations between dimensions of normal and pathological personality and these maltreatment subtypes.

In line with our first hypothesis, specific correlations between various maltreatment subtypes and Neuroticism, Agreeableness, and Conscientiousness were demonstrated. Neuroticism was positively correlated with physical and emotional abuse and physical neglect. A multiple regression analysis demonstrated a significant positive association with emotional abuse only, suggesting that this is the maltreatment subtype that is most uniquely related to Neuroticism. Earlier studies have demonstrated that

environmental conditions may moderate the genetic influences that underlie personality dimensions (Jang et al., 2005). A possible explanation for the relation between emotional abuse and Neuroticism could be that emotional abuse makes an environment very unpredictable for a child and thereby has lasting effects on the anxiety system, which possibly influences the expression of Neuroticism. Despite the fact that Stein, Schork, and Gelernter (2008) did not find a relationship between Neuroticism and subtypes of maltreatment, they did demonstrate Anxiety Sensitivity to be moderated by child maltreatment, especially by emotional abuse. The phenotypic structure of Anxiety Sensitivity (to be more prone than others to respond with anxiety symptoms) has been noted to be moderately heritable (Battaglia et al., 2007), but environmental and additive genetic factors appear to influence the severity (Stein et al., 1999). Stein, Jang, & Livesley, (2008) tested the hypothesis that emotional maltreatment in childhood would moderate the effects of the genotype (5-HTTLPR) on Anxiety Sensitivity scores (seen as an intermediate phenotype for anxiety and depressive disorders) in young adults and their results provided evidence for a specific genetic influence on anxiety sensitivity. Our finding supports these findings and could be the missing link in that the dimension of Neuroticism is possibly indicative for or a related endophenotype of Anxiety Sensitivity.

Agreeableness was found to be negatively correlated with physical abuse and emotional abuse. A multiple regression analysis demonstrated only physical abuse to be significantly and negatively related to Agreeableness. Conscientiousness was negatively correlated with emotional and physical neglect. The neglect and abuse subtypes of maltreatment do thus appear to be differentially associated with personality: the abusive subtypes were related to Agreeableness and neglect was related to Conscientiousness. Caspi et al. (2002) have suggested that genotype can moderate children's sensitivity to environmental insults, so that maltreatment may result in the expression of certain personality dimensions. Abuse could make a person less agreeable and neglect could make a person less conscientious, depending on his or her genetic vulnerability.

Our second hypothesis concerned the relation between the maltreatment subtypes and Emotion Dysregulation. We explored the presence of interaction effects of the abusive subtypes with the neglect subtypes, since neglect has been suggested to moderate the development of personality pathology caused by childhood abuse. Positive correlations were found with physical, sexual, and emotional abuse and physical neglect. A multiple regression analysis with Emotional Dysregulation as a dependent variable demonstrated a positive main association with sexual abuse and interaction effects between physical abuse and emotional neglect and emotional abuse and emotional neglect. Probing of these interactions revealed that physical abuse was positively related to Emotional Dysregulation only when it co-occurred with emotional neglect, whereas emotional abuse was positively related to Emotional Dysregulation only when neglect

was absent. Regression analyses on the lower-order dimensions of Emotional Dysregulation demonstrated analogous interaction effects between emotional abuse and emotional neglect and physical abuse and emotional neglect. These results are in line with the suggestion that neglect could act as a moderator of the development of personality pathology due to the abusive subtypes of maltreatment (Bierer et al., 2003). However, differential interaction effects with emotional neglect were demonstrated for emotional abuse and physical abuse. When emotional neglect was present, suggesting the home-environment to be unsafe or nonsupporting, physical abuse was positively related to Emotional Dysregulation. This finding is in line with English et al.'s (2005) assumption that a supporting and caring environment may protect a child from developing pathological outcomes due to abuse. In contrast, emotional abuse was positively related to Emotional Dysregulation only when neglect was present. Acts of emotional abuse, such as humiliating, blaming, rejecting, and threatening the child thus seem to affect one's personality only when his or her home environment is safe and caring. We propose that emotional abuse may have less impact on children when they are also emotionally neglected, due to the fact that neglect decreases the likelihood of strong parental attachment. When a child is weakly attached to his or her parents, their rejection, verbal harassment, or yelling might be less influential.

In general, these findings support our predictions. Neglect seems to moderate the effects of abuse on the pathological personality dimension of Emotional Dysregulation. The positive relation between Emotional Dysregulation and sexual abuse, regardless of whether neglect co-occurred, is in line with previous findings (Wonderlich et al., 2001). Sexual abuse may affect the anxiety system in a specific way, expressing itself in personality pathology instead of normal personality development.

Our third hypothesis pertained to the pathological personality dimension of Dissocial Behavior. We expected mainly sexual abuse and physical abuse to be correlated with this dimension, based on previous findings that these two maltreatment subtypes are related to antisocial personality disorder, which shares many common features with Dissocial Behavior (Bierer et al., 2003). In support of our third hypothesis, both the correlational and the regression analyses demonstrated a positive relation of Dissocial Behavior with physical abuse and sexual abuse. No interaction effects were found. Sexual and physical abuse thus seem to be directly related to Dissocial Behavior, regardless of whether neglect is present.

Overall, we conclude that specific subtypes of maltreatment are related to specific dimensions of personality and personality pathology, probably due to specific gene-environment interactions. In addition, consistent with the proposition of English et al. (2005) and Bierer et al. (2003), neglect seems to be a determinant of the development of detrimental outcomes due to child abuse. However, this was only true for the more internalizing pathological personality dimension of Emotional Dysregulation. It is most likely that the experience of childhood maltreatment interacts with genetic

expression in causing the vulnerability to develop personality pathology (Goodman et al., 2004; Craig, 2005; Kim-Cohen et al., 2006). A recent meta-analysis demonstrated that maltreatment interacted with the monoamine oxidase A (MAOA) gene in developing antisocial behavior (Taylor & Kim-Cohen, 2007). However, the retrospective and correlational design of the current study prohibits causal inferences. While childhood maltreatment may cause certain personality profiles to develop, personality dimensions could in turn also elicit maltreatment. It is plausible, for example, that a juvenile who scores high on the personality dimension of dissocial behavior may provoke his parents into rage and beating him. In a similar fashion, being agreeable might protect one against being physically abused, instead of physical abuse causing one to be less agreeable. Longitudinal studies are needed to elucidate the nature of the associations between the maltreatment subtypes and personality dimensions. However, since it is well documented that personality forms under gene-environment interactions and that maltreatment is one of the environmental factors that affects the genetic liability to develop certain personality features (Goodman et al., 2004; Jang et al., 2005; Kim-Cohen et al., 2006; Krueger, South, Johnson, & Iacono, 2008), we believe that the maltreatment subtypes influence the development of dimensions of normal and pathological personality in the way that is portrayed. When personality dimensions then have formed, they may play an important sustaining role by provoking new acts of maltreatment.

In addition to its correlational and retrospective nature, there are some other limitations to this study. Firstly, the presence of a history of maltreatment was assessed using the Dutch translation of the CTQ-SF (Bernstein et al., 1994; Bernstein & Fink, 1998; Dutch translation: Koot & Tromp, personal communication, March, 2004), for which no psychometric properties were available. The translation was, though, approved by the original author and high internal consistency was demonstrated for each subscale. In addition, comparing analyses were performed. The CTQ-SF scores in the current sample were comparable to those reported in English-speaking samples of juvenile delinquents (e.g., Carrion & Steiner, 2000; NSW Department of Juvenile Justice, 2003) and all maltreatment subtype scores were demonstrated to be significantly higher than those of an equivalent comparison group consisting of 139 Dutch nondelinquent male juveniles. These findings provide some evidence that the properties of the Dutch translation of the CTQ-SF are analogous to those of the original version. Secondly, the questionnaires used are self-report measures, which have the disadvantage of allowing bias to occur. However, good psychometric properties have been demonstrated for the BFI, DAPP-BQ, and CTQ-SF and we therefore believe that our results will not be strongly biased by the fact that they are self-report questionnaires and give a first indication of the relation between maltreatment and personality (pathology). Nevertheless, replication and extension of the current findings using other measures is needed. Concerning the CTQ-SF, its authors have dem-

onstrated it to be a sensitive, reliable, and criterion-valid measure that is highly stable over time and shows high convergent and divergent validity with objective data and other measures of childhood maltreatment (Bernstein et al., 1994; Bernstein et al., 1997; Bernstein & Fink, 1998). In addition, the CTQ-SF is well applicable to the population of delinquent boys; the questionnaire has been effectively applied previously to juveniles with different socioeconomic status, from different racial groups, and to juvenile delinquents (e.g., Carrion & Steiner, 2000; NSW Department of Juvenile Justice, 2003). We therefore believe that, although research on its psychometric properties is needed, the Dutch translation of the CTQ-SF has at least provided us with an indication of the presence of the childhood maltreatment subtypes in our sample of Dutch male juvenile delinquents. These subtypes have appeared to be differentially related to certain dimensions of normal and pathological personality, thereby emphasizing the need to identify children at risk of abuse and neglect at an early stage in order to prevent the development of dysfunctional personality profiles and severe psychopathology.

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