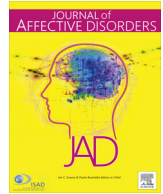




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Research paper

Childhood maltreatment, maladaptive personality types and level and course of psychological distress: A six-year longitudinal study



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ABSTRACT

Background: Childhood maltreatment and maladaptive personality are both cross-sectionally associated with psychological distress. It is unknown whether childhood maltreatment affects the level and longitudinal course of psychological distress in adults and to what extent this effect is mediated by maladaptive personality.

Methods: A sample of 2947 adults aged 18–65, consisting of healthy controls, persons with a prior history or current episode of depressive and/or anxiety disorders according to the Composite Interview Diagnostic Instrument were assessed in six waves at baseline (T0) and 1 (T1), 2 (T2), 4 (T4) and 6 years (T6) later. At each wave psychological distress was measured with the Inventory of Depressive Symptomatology, Beck Anxiety Inventory, and Fear Questionnaire. At T0 childhood maltreatment types were measured with a semi-structured interview (Childhood Trauma Interview) and personality traits with the NEO-Five Factor Inventory.

Results: Using latent variable analyses, we found that severity of childhood maltreatment (emotional neglect and abuse in particular) predicted higher initial levels of psychological distress and that this effect was mediated by maladaptive personality types. Differences in trajectories of distress between persons with varying levels of childhood maltreatment remained significant and stable over time.

Limitations: Childhood maltreatment was assessed retrospectively and maladaptive personality types and level of psychological distress at study entry were assessed concurrently.

Conclusions: Routine assessment of maladaptive personality types and possible childhood emotional maltreatment in persons with severe and prolonged psychological distress seems warranted to identify persons who may need a different or more intensive treatment.

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1. Introduction

Results from animal and human studies show that the consequences of early life stress may be severe and enduring, affecting emotion, cognition, and behavior into adult life (Heim et al., 2010). The majority of available studies have identified childhood sexual abuse as an important risk factor in the development of emotional disorders (Kendall-Tackett et al., 1993), but paid less attention to the negative sequelae of more common maltreatment, such as emotional abuse and neglect. Recent literature reviews

demonstrate a substantial impact of non-sexual childhood maltreatment on a range of emotional disorders (Gilbert et al., 2009; Norman et al., 2012). Childhood maltreatment types may represent a common developmental origin to adult psychiatric disorders (Keyes et al., 2012).

Only a few studies investigated the association of childhood maltreatment with symptoms of emotional disorders irrespective of the presence of particular psychiatric disorders. Given that childhood maltreatment is a non-specific risk factor for psychopathology, a symptom approach is particularly well suited to study the impact of childhood maltreatment across emotional disorders. Both in epidemiological (e.g., Mullen et al., 1996), inpatient (e.g., Bryer et al., 1987; Figueroa et al., 1997) and outpatient samples (e.g., Callahan et al., 2003; Surrey et al., 1990; Swett et al., 1990) individuals with a history of childhood maltreatment consistently

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reported higher levels of general psychiatric symptoms. Psychological distress may fluctuate with full psychiatric disorders or with subclinical or residual disorders. However, a number of studies have shown that symptoms of anxiety and depression are quite stable over time (Duncan-Jones et al., 1990; Kendler and Gardner, 2011; Ormel and Schaufeli, 1991; Ormel and Wohlfarth, 1991), with trait-like characteristics representing an individual's relatively stable set point of psychological distress strongly related to personality.

The development of less flexible personality patterns during childhood and adolescence has been put forward as an underlying mechanism to explain the association of childhood maltreatment with subsequent psychopathology (Kim et al., 2009). The Five Factor Model (FFM) according to which individual differences in personality can be grouped along the five major dimensions of neuroticism, extraversion, openness, agreeableness, and conscientiousness presently constitutes one of the dominant models to study personality (dys)functioning in a comprehensive way (Kotov et al., 2010) and easily to implement short self-report scales for measuring the Big Five traits are available (such as the NEO-FFI; Costa and McCrae, 1992). Cross-sectional (Rogosch and Cicchetti, 2004; Brents et al., 2015) and longitudinal (Oshri et al., 2013) epidemiological studies in children have demonstrated an association of childhood maltreatment with psychopathology, which was mediated by FFM personality traits or personality organization. Epidemiological studies in adults also yield evidence for an association of childhood maltreatment with FFM personality traits, in particular neuroticism (Allen and Lauterbach, 2007; Collishaw et al., 2007; Kendler and Gardner, 2011; Moran et al., 2011; Robinson et al., 2014). Associations of childhood adversity with the other Big Five traits have been understudied. Some studies found a negative relationship with agreeableness (Moran et al., 2011; Robinson et al., 2014), while results regarding extraversion, conscientiousness and openness to experience are equivocal (Allen and Lauterbach, 2007; Moran et al., 2011; Robinson et al., 2014). In line, also the few available clinical studies show a relationship of childhood trauma with FFM traits, in particular with neuroticism (Fosse and Holen, 2007; Pickering et al., 2004; Roy, 2002).

To our knowledge the relationship of childhood maltreatment with types of personality organization in adults has not been studied. Most studies until now used a five-factor variable-centered approach focusing on differences between individuals but neglecting the clustering of traits within individuals. As already stressed by Allport (1937), this clustering of traits within the individual is key to understanding personality. Many studies have identified three types of personality organization in children, adolescents, and adults (Asendorpf et al., 2001; Caspi, 1998): Resilients (low scores for Neuroticism (N) and average scores for Extraversion (E), Conscientiousness (C), Agreeableness (A), and Openness to Experience (O)), Overcontrollers (higher scores for N, lower scores for E, and average scores for C, A and O), and Undercontrollers (lower scores for C and A and average scores for N, E and O), although some studies failed to replicate these personality types (e.g., McCrae et al., 2006). To make further progress in elucidating the relationship between childhood trauma and personality, it is important not only to focus on separate traits in a nomothetic way, but also to explore the clustering of various traits within the individual.

In addition, hardly any studies investigated whether FFM personality mediates the association of childhood maltreatment with level of psychiatric symptoms in adults, although neuroticism and other FFM traits have been found to be associated with psychological distress in numerous cross-sectional and prospective studies (Watson et al., 2005) and also with stable levels of psychological distress across time (Kendler and Gardner, 2011; Ormel and Wohlfarth, 1991). Only Collishaw (Collishaw et al., 2007) reported

that in sexually or physically abused adults higher neuroticism was concurrently associated with more adult psychopathology. As far as we know no longitudinal studies in adults have examined whether various types of childhood maltreatment predict level and course of psychological distress and whether these effects of childhood maltreatment are mediated by maladaptive personality types as defined by the FFM.

This study aims to elucidate to what extent personality types mediate the association of childhood maltreatment with psychological distress during a six-year follow-up period in a representative and large sample of persons with past or current anxiety and/or depressive disorders. We hypothesized that adults with a history of childhood maltreatment will report more psychological distress and show a less favorable symptomatic course and that both these effects will be mediated by maladaptive personality types. More exploratively, we analysed the independent effect of individual childhood maltreatment types on personality types and psychological distress controlling for the effect of other childhood maltreatment types.

2. Methods

2.1. Sample

The Netherlands Study of Depression and Anxiety (Penninx et al., 2008) is an ongoing cohort study designed to investigate the determinants, course and consequences of depressive and anxiety disorders. A sample of 2981 persons aged 18 through 65 years was included, consisting of healthy controls, persons with a prior history of depressive and anxiety disorders, and persons with a current depressive and/or anxiety disorder. Respondents were recruited through a screening procedure in the general population, in general practice, and at new enrollment in specialized mental health care, representing various health care settings and developmental stages of psychopathology. General exclusion criteria were a primary diagnosis of other psychiatric conditions such as psychotic, obsessive compulsive, bipolar or severe addiction disorder and not being fluent in Dutch.

2.2. Procedure

A detailed description of the NESDA design and sampling procedures has been given elsewhere (Penninx et al., 2008). The baseline measurement (T0) in 2981 participants included assessment of demographic and personal characteristics, a standardized diagnostic psychiatric interview and a medical assessment including blood samples. The study was approved by the Ethical Committees of participating universities and all respondents provided written informed consent prior to data collection. After two (T2), four (T4), and six years (T6) a face-to-face follow-up assessment was conducted with a response of 87.1% ($n=2596$) at T2, of 80.6% ($n=2402$) at T4 and 75.7% ($n=2256$) at T6. A 1-year follow-up assessment (T1), consisting of a written questionnaire, was completed by 2445 participants (82.0%). Complete measurements for psychological distress at T0 were available for 2947 persons (98.9% of the baseline sample), constituting the present study sample.

2.3. Measures

2.3.1. Psychiatric diagnosis

DSM-IV depressive (Major Depressive Disorder, Dysthymia) or anxiety (Panic Disorder with or without Agoraphobia, Social Anxiety Disorder, Generalized Anxiety Disorder, Agoraphobia without panic) disorders were established using the Composite Interview

Diagnostic Instrument (CIDI, version 2.1) at T0. The CIDI is a fully standardized and extensively validated interview, which classifies diagnoses according to DSM-IV criteria (APA, 1994, Wittchen, 1994).

2.3.2. Psychological distress

Psychological distress was measured at T0, T1, T2, T4 and T6 with the following three, highly correlated, self-report scales to measure the severity of depressive, anxiety and avoidance symptoms. Severity of depressive symptoms was measured with the 30-item Inventory of Depressive Symptomatology self-report version (IDS-SR; Rush et al., 1986). Severity of generalized anxiety and panic symptoms was measured using the extensively validated 21-item Beck Anxiety Inventory (BAI; Beck et al., 1988). Phobic avoidance was measured with the Fear Questionnaire (FQ), a 23-item self-report scale to measure fear (Marks and Mathews, 1979).

2.3.3. Childhood maltreatment

Childhood maltreatment was retrospectively assessed using the Childhood Trauma Interview (CTI; de Graaf et al., 2004) at T0. In this interview, participants were asked whether they had experienced one of the following types of trauma before the age of 16 years: emotional neglect, emotional, and physical and/or sexual abuse. After an affirmative answer, details on the frequency of these events and the perpetrators involved were asked for. Frequency is scaled as: 'never', 'once', 'sometimes', 'regularly', 'often', or 'very often'. Convergent validity of the CTI is satisfactory as scores for emotional neglect, emotional, physical and sexual abuse are moderately associated with corresponding scales of the Childhood Trauma Questionnaire: Short Form (CTI-SF; Bernstein et al., 2003) and these associations are not attenuated by disorder status (Spinhoven et al., 2014). The presence of abuse types was operationalized as a dichotomous variable: absent ('never' or 'once') versus present ('sometimes', 'regularly', 'often' or 'very often'). Severity of childhood maltreatment was operationalized as the number of childhood maltreatment types: no maltreatment, one, two, three or four maltreatment types.

2.3.4. Personality traits

Personality traits were measured with the NEO Five-Factor Inventory (NEO-FFI; Costa and McCrae, 1992) at T0. The NEO-FFI questionnaire measures five personality domains: Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness. Cronbach's alphas of the NEO-FFI subscales in NESDA were as follows: Neuroticism:.75; Extraversion:.78; Agreeableness:.83; Conscientiousness:.78; and Openness to experience:.72.

2.4. Statistical analysis

In three preliminary analyses we established a longitudinal measurement model for the repeated measurements of psychological distress using Confirmatory Factor Analysis (CFA), a model for initial level and rate of change of psychological distress using a Latent Growth Curve Model (LGCM) and a model of personality

classes based on the Five Factor Model measurements using Latent class analysis (LCA) (see the supplementary file alongside the electronic version of this article for technical details and outcomes of these preliminary analyses).

Next, we analyzed the predictive value of childhood maltreatment for initial severity and rate of change of psychological distress (path c), by fitting a conditional LGCM including childhood maltreatment variables as time-invariant covariates in the unconditional LGCM without covariates. To evaluate the predictive value of childhood maltreatment for maladaptive personality types (path a), we examined differences in childhood maltreatment between latent personality classes with several non-parametric analyses. We analyzed the predictive value of maladaptive personality types for initial severity and rate of change of psychological distress (path b), by fitting a conditional LGCM, including maladaptive personality types as a time-invariant covariate in the unconditional LGCM. Finally, to evaluate the indirect effect of childhood maltreatment on initial level and rate of change of psychological distress through maladaptive personality types (path c'), we fitted a conditional LGCM with severity of childhood maltreatment as predictor variable and maladaptive personality types as a putative mediator. Tests of mediation were conducted using the Sobel test.

Descriptive statistics and preliminary analyses were run using SPSS version 20 (IBM Corp., 2012) and CFA, LCA and LGCM using MPlus v. 7.1 (Muthén and Muthén, 1998–2012). A significance level of $p < .05$ was used for all analyses.

3. Results

3.1. Sample characteristics

Mean age of our final sample of 2947 participants at T0 was 41.2 years ($SD = 13.1$), mean number of years of education was 12.2 years ($SD = 3.3$) and 66.4% was female. Of the 2947 participants, at baseline 1679 (57.0%) had a depressive and/or anxiety disorder diagnosis during the last six months, 1139 (38.6%) a depressive disorder diagnosis, and 1287 (43.7%) an anxiety disorder diagnosis. Comorbidity was high: of the persons with a depressive disorder 747 (65.6%) had a comorbid anxiety disorder and of the persons with an anxiety disorder 58.0% had a comorbid depressive disorder.

Study dropouts between T0 and T6 did not differ from study completers regarding gender distribution and age. In comparison to completers, dropouts were significantly less educated, and had a higher prevalence of depressive and anxiety disorders and childhood maltreatment types. Moreover, they reported higher levels of symptom severity and neuroticisms and lower levels of extraversion, conscientiousness, agreeableness and openness. All effect sizes for the differences were negligible (Cramer's $\phi < .10$; Cohens' $d < .2$) or small ($\phi < .30$; $d < .5$). Table 1 gives an overview of the scores on the measurement scales administered at T0, T1, T2, T4 and T6. As can be derived from this Table after a decline in symptom severity from T0 to T2, symptom severity scores tend to

Table 1
Scores for depression, anxiety and avoidance severity across waves.

Variables	T0	(n=2946)	T1	(n=2440)	T2	(n=2504)	T4	(n=2315)	T6	(n=2146)
	M	SD	M	SD	M	SD	M	SD	M	SD
IDS	21.49	14.12	16.87	12.44	15.78	12.00	15.46	12.04	15.12	11.86
BAI	12.11	10.66	9.29	9.13	8.68	8.66	8.10	8.40	8.36	8.49
FQ	24.76	19.85	20.82	18.59	19.36	17.67	18.20	17.77	17.37	17.18

Note. IDS=Inventory of Depressive Symptomatology; BAI=Beck Anxiety Inventory; FQ=Fear Questionnaire.

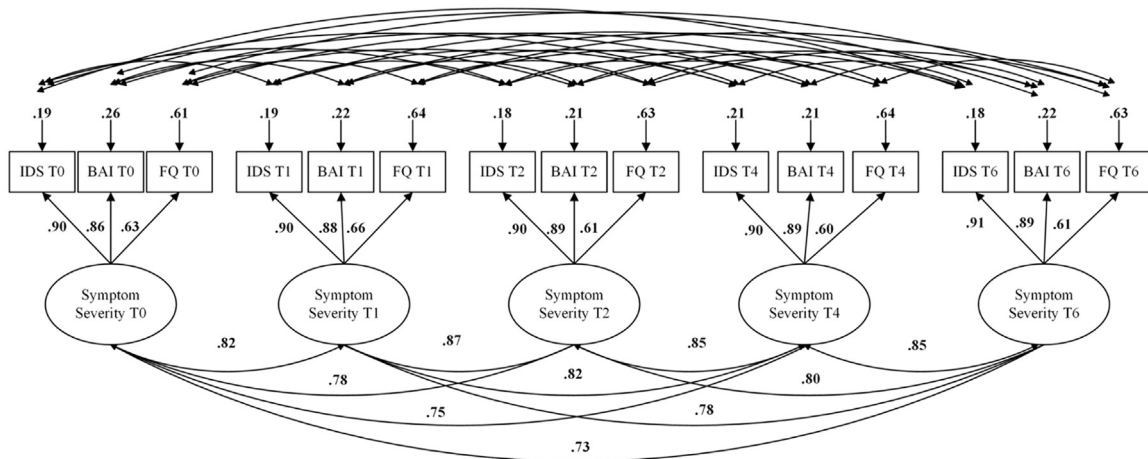


Fig. 1. Longitudinal measurement model of psychological distress. Completely standardized parameter estimates are provided. All corresponding unstandardized parameter estimates are statistically significant (all $p < .001$). Ovals represent latent variables. Single-headed arrow path coefficients represent standardized semi-partial regression coefficients. Two-headed arrows represent correlation coefficients. IDS=Inventory of Depressive Symptomatology; BAI=Beck Anxiety Inventory; FQ=Fear Questionnaire. T0=baseline; T1=1 yr FU; T2=2 yr FU; T4=4 yr FU; T6=6 yr FU. For presentational clarity, correlations between residual scores of the same variable assessed at different time points are not presented.

become more stable from T2 to T6.

3.2. Preliminary analyses

A longitudinal Confirmatory Factor Analysis (CFA) for the repeated measurements of psychological distress with IDS, BAI and FQ scores at T0, T1, T2, T4 and T6 as indicators yielded evidence for strong factorial measurement invariance, RMSEA=0.032 (90% CI=0.028–0.036), CFI=.991, TLI=0.986, SRMR=.054. All standardized loadings which can be interpreted as the estimated correlations between each indicator and the corresponding latent factor were significant at $p < .001$. Furthermore, estimated latent correlations indicated a high degree of stability of individual differences in psychological distress over time ($0.73 \leq r \leq 0.87$) (see Fig. 1).

An LGCM in which the first and final factor were fixed at 0 and 1 respectively and all others were freely estimated showed the most favorable fit statistics, RMSEA=0.035 (90% CI=0.031–0.039), CFI=.989, TLI=0.984, SRMR=.054. Estimated means for the latent variable of psychological distress as our continuous dependent variable were as follows: T0: $M=21.29$ ($SD=12.82$); T1: $M=17.56$ ($SD=11.48$); T2: $M=16.62$ ($SD=11.15$); T4: $M=16.09$ ($SD=10.92$); and T6: $M=16.20$ ($SD=11.06$). The reduction of psychological distress during the follow-up period had a medium effect size ($d=.58$; Cohen, 1988). Moreover, initial severity and rate of change were significantly and negatively correlated ($r=-.561$), indicating that symptom reduction over time was most pronounced in persons with higher levels of initial (T0) symptoms.

Finally, LCA using the Lo–Mendell–Rubin test (LMRT) showed that a five class model gave the best fitting solution. Fig. 2 depicts the profiles of the classes. Personality trait scores for each class in the five-class solution show gradually decreasing estimates for neuroticism and gradually increasing estimates for extraversion, agreeableness and conscientiousness. These results suggest that the latent classes are distinguished primarily by varying degrees of endorsement of personality traits, rather than by endorsement of specific personality traits. As high neuroticism in combination with low extraversion, agreeableness and conscientiousness is characteristic for a more maladaptive personality type (Kotov et al., 2010), we labelled the classes as highly maladaptive (class 1), moderately maladaptive (class 2), low maladaptive (class 3), moderately adaptive (class 4), and highly adaptive (class 5) and used the classes as categories of a newly formed ordinal variable defined as maladaptive personality types with higher scores

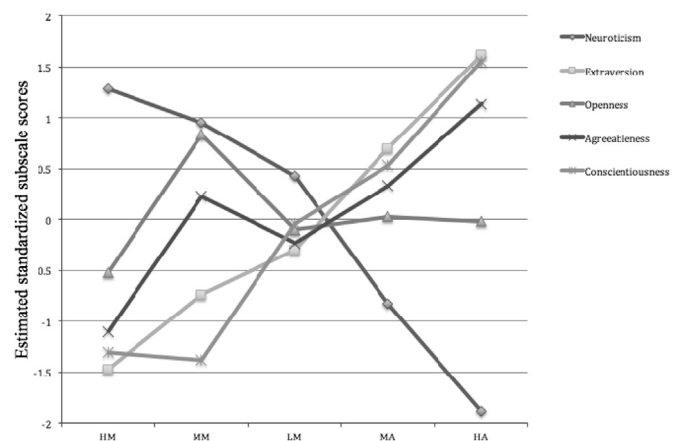


Fig. 2. Final five-class Latent Class Analysis (LCA) model of latent personality classes depicting estimated subscale scores. The Y-axis represents the estimated standardized subscale score; The X-axis the 5 latent classes. HM=Highly maladaptive; MM=Moderately maladaptive; LM=Low maladaptive; MA=Moderately adaptive; HA=Highly adaptive.

indicating more pronounced maladaptive personality types (Spinhoven et al., 2012).

3.3. Childhood maltreatment as a predictor of initial level and rate of change of psychological distress (path c)

We first fitted a LGCM in which rate of change was regressed on initial severity of psychological distress and both initial severity and rate of change were regressed on childhood maltreatment severity (i.e., number of childhood maltreatment types 0 to 4). The model showed a good fit to the data, RMSEA=0.034 (90% CI=0.031–0.038), CFI=.988, TLI=0.983, SRMR=.052. Childhood maltreatment severity had a significant path to initial psychological distress (.374, $p < .001$), indicating that this predictor was associated with higher initial levels of psychological distress. However, childhood maltreatment severity did not significantly predict rate of change during the follow-up period independent of initial severity of psychological distress (.035). Fig. 3 shows the model-implied trajectories of psychological distress as a function of level of childhood maltreatment. As can be derived from this figure notwithstanding the steep intercept-related decline in psychological distress during the first two years, levels of

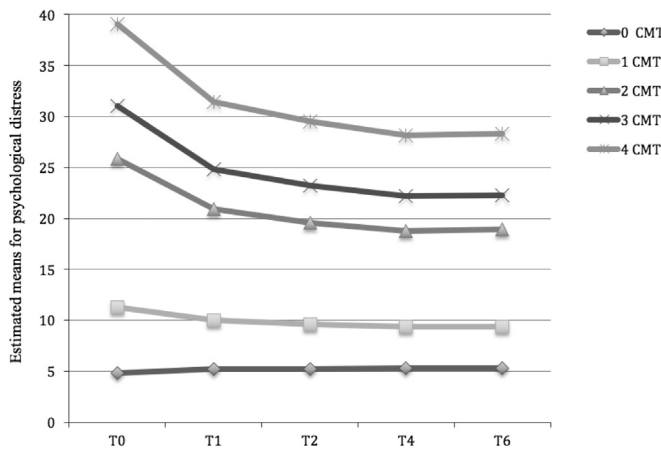


Fig. 3. Model-implied trajectories of psychological distress as a function of number of childhood maltreatment types. Estimated means for psychological distress are depicted on the Y-axis. CMT=Number of childhood maltreatment types. T0=baseline; T1=1 yr FU; T2=2 yr FU; T4=4 yr FU; T6=6 yr FU.

psychological distress remained rather stable across time and clearly related to the number of childhood maltreatment types.

Next, a LGCM in which initial severity and rate of change were regressed on emotional neglect, emotional abuse, physical abuse and sexual abuse as independent binary predictors showed that each of the childhood maltreatment types had a significant path to initial psychological distress (emotional neglect:.199; emotional abuse:.120; physical abuse:.093; and sexual abuse:.083) (all $p < .001$). However, none of the childhood maltreatment types predicted rate of change independent of initial level of psychological distress (emotional neglect: $-.01$; emotional abuse:.04; physical abuse:.04; and sexual abuse: $-.04$) (see the [Supplementary material](#) for more details).

3.4. Childhood maltreatment as a predictor of maladaptive personality types (path a)

Table 2 shows the degree of childhood maltreatment severity and the prevalence of individual childhood maltreatment types for persons with varying personality types. As indicated by a K–W test followed by pairwise M–W tests, childhood maltreatment severity became progressively higher in more maladaptive personality types (with no differences in severity between persons with a highly or moderately maladaptive personality type). Moreover, as

Table 2
Relationship of childhood maltreatment with maladaptive personality types.

Childhood maltreatment variables	Maladaptive personality types						χ^2 or M–W test
	Total group (n=2938)	Highly maladaptive (n=248)	Moderately maladaptive (n=275)	Low maladaptive (n=1256)	Moderately adaptive (n=1021)	Highly adaptive (n=138)	
Childhood maltreatment severity (M/SD)	.87 (1.16)	1.46 (1.25)	1.30 (1.23)	1.00 (1.21)	0.52 (0.93)	0.27 (0.70)	M–W Tests 1=2 > 3 > 4 > 5*
1 abuse type (n/%)	532 (18.1%)	58 (23.4%)	69 (25.1%)	239 (19.0%)	152 (14.9%)	14 (10.1%)	
2 abuse types (n/%)	412 (14.0%)	65 (26.2%)	55 (20.0%)	194 (15.4%)	93 (9.1%)	5 (3.6%)	
3 abuse types (n/%)	264 (9.0%)	32 (12.9%)	41 (14.9%)	144 (11.5%)	44 (4.3%)	3 (2.2%)	
4 abuse types (n/%)	98 (3.3%)	19 (7.7%)	14 (5.1%)	49 (3.9%)	15 (1.5%)	1 (0.7%)	
Emotional Neglect (n/%)	1127 (38.4%)	159 (64.1%)	167 (60.7%)	547 (43.6%)	237 (23.2%)	17 (12.3%)	χ^2 (4)=278.456*
Emotional Abuse (n/%)	725 (24.7%)	104 (41.9%)	94 (34.2%)	364 (29.0%)	151 (14.8%)	12 (8.7%)	χ^2 (4)=138.401*
Physical Abuse (n/%)	379 (12.9%)	60 (24.2%)	53 (19.3%)	194 (15.4%)	67 (6.6%)	5 (3.6%)	χ^2 (4)=93.020*
Sexual Abuse (n/%)	320 (10.9%)	38 (15.3%)	44 (16.0%)	157 (12.5%)	75 (7.3%)	6 (4.3%)	χ^2 (4)=35.120*
Any abuse (n/%)	1306 (44.5%)	174 (70.2%)	179 (65.1%)	626 (49.8%)	304 (29.8%)	23 (16.7%)	χ^2 (4)=259.641*

Note.

* = $p < .001$; M–W test=Mann–Whitney U test.

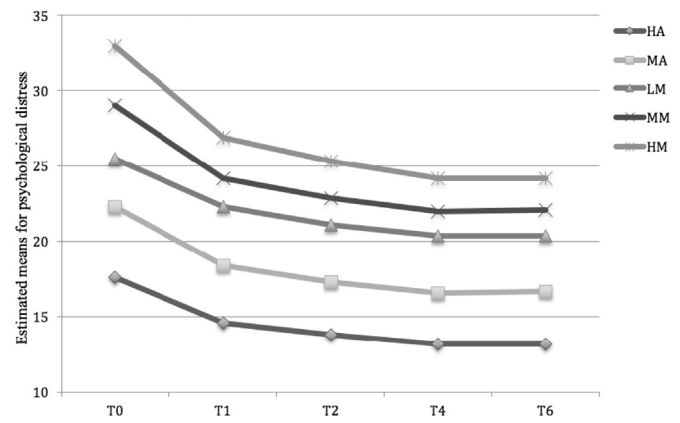


Fig. 4. Model-implied trajectories of psychological distress as a function of maladaptive personality types. Estimated means for psychological distress are depicted on the Y-axis. HA=Highly adaptive; MA=Moderately adaptive; LM=Low maladaptive; MA=Moderately maladaptive; HM=Highly maladaptive. T0=baseline; T1=1 yr FU; T2=2 yr FU; T4=4 yr FU; T6=6 yr FU.

indicated by Pearson χ^2 tests, prevalence rates of individual childhood maltreatment types were systematically higher at higher levels of maladaptive personality functioning.

3.5. Maladaptive personality types as a predictor of initial level and rate of change of psychological distress (path b)

An LGCM with maladaptive personality types included as covariate, fitted the data well, RMSEA=0.043 (90% CI=0.040–0.047), CFI=.981, TLI =0.974, SRMR=.059. Maladaptive personality types had a significant and large impact upon initial severity (.722, $p < .001$), indicating that persons with more maladaptive personality types showed higher initial levels of psychological distress. However, the path from maladaptive personality types to rate of change in psychological distress was not significant (.076), indicating that maladaptive personality types did not affect rate of symptom reduction independent of initial symptom severity. Fig. 4 shows the model-implied trajectories of psychological distress as a function of maladaptive personality types. As can be derived from this figure after a sharp intercept-related reduction in psychological distress during the first two years of the follow-up, levels of psychological distress remained rather stable across time within personality classes clearly differing in symptom severity.

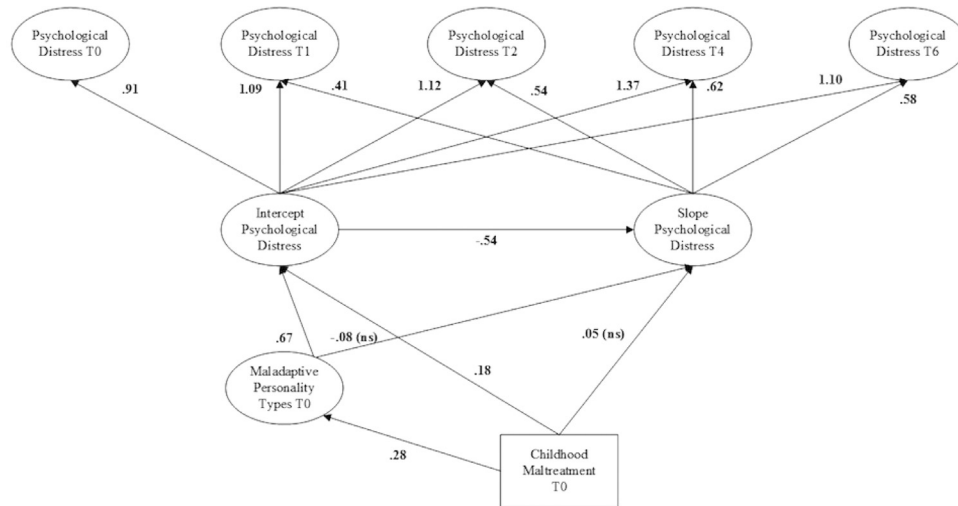


Fig. 5. Completely standardized parameter estimates for the mediational model of the effect of childhood maltreatment severity on initial level and rate of change of psychological distress through maladaptive personality types. All corresponding unstandardized parameter estimates are statistically significant (all $p < .001$) unless otherwise indicated. Ovals represent latent variables. Single-headed arrow path coefficients represent standardized partial regression coefficients. Two-headed arrows represent correlation coefficients. For presentational clarity, loadings of the latent factor of psychological distress on the IDS, BAI and FQ at each wave are not presented.

3.6. Maladaptive personality types as a mediator of the link of childhood maltreatment with initial level and rate of change of psychological distress (path c')

Finally, in order to examine our last research question concerning maladaptive personality types as a mediator of the link of childhood maltreatment with initial level and rate of change of psychological distress, we included maladaptive personality types as a mediator into the LGCM. In this model maladaptive personality types had direct paths to initial level and rate of change of psychological distress and as a putative mediating variable was also regressed on childhood maltreatment severity. The model showed a good fit to the data, RMSEA=0.041 (90% CI=0.038–0.044), CFI=.981, TLI=0.974, SRMR=.057. Fig. 5 shows that maladaptive personality types had a strong impact upon initial level (.67, $p < .001$) and childhood maltreatment severity had a significant path to maladaptive personality types (.28, $p < .001$). Moreover, childhood maltreatment severity still had a direct although attenuated effect upon psychological distress (.18, $p < .001$). A Sobel test indicated a significant and moderately strong indirect effect of childhood maltreatment severity on psychological distress (.19, $p < .001$, $k^2 = .22$; Preacher and Kelley, 2011) through maladaptive personality types.

Finally, we performed a mediational LGCM with different childhood maltreatment types as binary covariates. The Sobel test indicated that emotional neglect had a moderately strong indirect effect through maladaptive personality functioning of .177 ($p < .001$, $k^2 = .20$) on initial level of psychological distress. In addition, only physical abuse had a significant although small indirect effect on initial level of psychological distress (.037, $p < .05$, $k^2 = .04$) through maladaptive personality functioning (see the Supplementary material for more details).

3.7. Relationship of sociodemographic characteristics with level of psychological distress

Post-hoc analyses were conducted to examine to what extent the relationship of childhood maltreatment with level of psychological distress was dependent on: (a) gender; (b) level of education and (c) age. The interaction term of age with childhood maltreatment significantly predicted level of psychological distress ($\beta = -.163$, $p = .03$) over and above age and childhood

maltreatment. These results suggest that the association of childhood maltreatment with psychological distress may decline with age. In younger participants of 18–34 years ($n = 956$) the association was .39 and in persons of 50–65 years ($n = 1007$) .31. The interaction of gender ($\beta = -.022$, $p = .61$) as well as education ($\beta = .01$, $p = .95$) with childhood maltreatment was not predictive of level of psychological distress.

4. Discussion

Our results showed that persons who reported more severe childhood maltreatment (in particular emotional neglect and emotional abuse) manifested higher levels of initial psychological distress, while the rate of change in psychological distress was unrelated to childhood maltreatment severity, after accounting for the effect of initial symptom severity. These results concur with those of previous cross-sectional epidemiological (e.g., Mullen et al., 1996), inpatient (e.g., Bryer et al., 1987; Figueroa et al., 1997) and outpatient (e.g., Callahan et al., 2003; Surrey et al., 1990; Swett et al., 1990) studies, by showing that adults with a history of childhood maltreatment manifest more severe psychiatric symptoms. Strikingly, a similar dose-response relationship of childhood maltreatment severity with comorbidity of psychiatric disorders has been observed in previous studies (for reviews see: Gilbert et al., 2009; Kendall-Tackett et al., 1993; Norman et al., 2012), including NESDA (Hovens et al., 2010).

The present study extends these findings by showing that, controlling for initial symptom severity, there was no difference in the rate of change of psychological distress between persons with varying levels of childhood maltreatment. Moreover, differences in the level of psychological distress between persons with various degrees of childhood maltreatment remained remarkably stable over time. The moderately large and enduring differences in symptom levels between maltreatment groups correspond with the results of several prospective studies that have linked childhood maltreatment to an unfavorable course of persisting psychiatric disorders (Brown and Moran, 1994; Hovens et al., 2012; Rhebergen et al., 2011; Tanskanen et al., 2004; Zlotnick et al., 1995, 1997). Although symptom measures for depression, anxiety and avoidance, such as the IDS, BAI and FQ, have primarily been developed to assess short-term state fluctuations in psychopathology, our

results show that these measures may have remarkably stable trait-like components (Duncan-Jones et al., 1990; Kendler and Gardner, 2011; Ormel and Schaufeli, 1991; Ormel and Wohlfarth, 1991).

Moreover, by investigating different types of childhood trauma, we were able to show that the impact of childhood trauma on level of psychological distress seems mainly due to an effect of emotional maltreatment (i.e. emotional abuse and emotional neglect). These results are in line with the results of a recent meta-analysis showing that emotional maltreatment shows the strongest association with depression as compared to other kinds of childhood trauma (Mandelli et al., 2015).

A second aim of our study was to investigate Big Five personality types as a predictor of initial level and rate of change in psychological distress. Adapting a person-centered approach to personality description, we identified five latent personality classes, which primarily differed in the degree of endorsement of neuroticism, extraversion and to a lesser extent conscientiousness and agreeableness, while openness to experiences was not systematically related to personality class. As predicted persons who reported more severe childhood maltreatment showed the most maladaptive personality types. These results concur with previous studies using a variable-centered approach showing a consistent link of childhood maltreatment with neuroticism and agreeableness in particular (Allen and Lauterbach, 2007; Collishaw et al., 2007; Kendler and Gardner, 2011; Moran et al., 2011; Robinson et al., 2014). Given the rather inconsistent results of previous studies regards the other FFM personality traits (Allen and Lauterbach, 2007; Moran et al., 2011; Robinson et al., 2014), our results suggest that a person-centered approach by latent class analysis may be a suitable approach to study the effect of maltreatment on personality by taking the clustering of FFM traits within individuals into account.

In particular emotional neglect was associated with maladaptive personality types controlling for the effect of other abuse types. Emotional neglect has been found to be associated with an increased risk for personality disorders, anxiety, and depression when compared with other forms of maltreatment such as emotional, physical and sexual abuse (Johnson et al., 2000). It is tempting to speculate that, because responsive relationships between children and caregivers are developmentally expected and biologically essential, their absence will activate the body's stress response systems (Heim et al., 2010), impede brain development (Van Harmelen et al., 2010, 2013) and eventually will lead to a maladaptive personality development. However, alternative explanations about the causal mechanisms that might explain the association between childhood (emotional) maltreatment and maladaptive personality types are possible. First, childhood maltreatment often results from a 'nexus of adversity' (Mullen et al., 1996) and hence the association might be confounded by other childhood adversities, such as parental psychiatric disorders, divorce of parents, etc. Second, in children whose biological parents were the abusers, the association might reflect a genetic predisposition to personality abnormality. Third, childhood maltreatment is also a risk factor for common mental disorders such as anxiety and depression and the detected associations might reflect comorbidity of maladaptive personality types with higher psychological distress.

As expected, maladaptive personality types had a large impact on initial severity of psychological distress and differences in the level of psychological distress between personality classes remained stable over time, after accounting for the effect of initial symptom severity. These results concur with a large body of literature indicating that high neuroticism, low extraversion, low agreeableness and low conscientiousness are associated with internalizing disorders (Kotov et al., 2010). Additionally, we found

evidence suggesting that the predictive value of childhood maltreatment severity and of emotional neglect for level of distress was mediated by maladaptive personality types. These findings are in line with those of longitudinal studies in children indicating that personality types may differentially mediate the link between childhood maltreatment and the development of adolescent psychopathology with overcontrollers being more likely to develop internalizing problems (Oshri et al., 2013). They also concur with a recent study from NESDA, showing that neuroticism and extraversion mediated the relationship of childhood maltreatment with 4-year remission of depressive and anxiety disorders (Hovens et al., 2015).

Maladaptive personality types in adults may constitute an important and in principle modifiable risk factor for prolonged and severe psychological distress. Studies of adults with a history of early life abuse (Craighead and Nemeroff, 2005) show stronger treatment effects when the treatment is individualized and tailored to a specific presenting problem, when a person seeks treatment for the distress caused by the trauma, and when the treatment program systematically and concurrently addresses several dimensions of the problem. A clinical suggestion consistent with the present study results is to individualize the treatment for individuals with stable and high levels of psychological distress with an emphasis on ameliorating emotion regulation problems as typically associated with maladaptive personality types and anxiety and depressive disorders (Nemeroff et al., 2003)

A major limitation of the present study is that childhood maltreatment types were retrospectively assessed, leaving the possibility that the clinical patients may over-report their history of childhood maltreatment as a function of their psychiatric state. However, it has been shown that maltreatment history is in fact more likely to be under than over-reported, and recall of CT does not seem to be critically affected by current mood state (Brewin et al., 1993; Spinhoven et al., 2010, 2014). Moreover, the present sample varied greatly in sociodemographic characteristics and these characteristics may affect the relationship of childhood maltreatment with distress. We indeed found that the association of childhood maltreatment with distress was dependent on age, although the association remained moderate in size across age groups. We found no evidence, however, that gender or education moderated the relation of childhood maltreatment with distress. A second major limitation is that at study entry personality and psychological distress were measured concurrently precluding any inferences on the direction of causality for the association between both variables. However, as previously reported for depressive and anxiety disorders (Karsten et al., 2012; Spinhoven et al., 2013), in the NESDA sample the state effects of disorder on neuroticism, extraversion and conscientiousness were small, and on agreeableness and openness to experiences negligible. Third, in this large epidemiological study we measured personality traits with a short self-report questionnaire only. Future studies are advised to measure personality traits and personality organization using more extensive questionnaires preferably in combination with structured interviews. Finally, study drop-outs showed more severe anxiety and depression, personality maladjustment and childhood maltreatment than study completers, but the differences were small. Although participants with missing follow-up data were retained in the analyses using Full Information Maximum Likelihood (FIML) estimation for missing data, selective attrition may restrict generalizability of our findings and may have resulted in biased estimates of associations among study variables: most likely an underestimation of the size of the associations because of restriction of the range in distress scores.

5. Conclusion

Expanding previous research related to psychiatric disorders, we showed that childhood maltreatment is also associated with high and stable levels of *psychiatric symptoms*. Importantly, we were able to show that these effects are mediated by maladaptive personality types. Further studies of cognitive, emotion regulation and neurobiological aspects of maladaptive personality aspects are needed to elucidate its central role in explaining prolonged and severe symptom levels (Dvir et al., 2014). In clinical practice, routine assessment of personality problems and possible childhood maltreatment seems warranted not only in persons with persistent emotional disorders but also in persons with prolonged and severe anxiety and depressive symptoms, as these individuals may need a different or more intensive treatment (Nanni, 2012).

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Conflict of interest

All authors declare that they have no conflicts of interest.

Contributors

Authors Spinhoven, Elzinga, van Hemert and Penninx were involved in the design of NESDA. Spinhoven and de Rooij contributed to the analysis plan. Author Spinhoven conducted the analyses and wrote the first draft of the manuscript. All authors reviewed several drafts of the manuscript. All authors contributed to and have approved the final manuscript.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jad.2015.11.036>.

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