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PERSONALITY COMPENSATES FOR IMPAIRED QUALITY OF LIFE AND SOCIAL FUNCTIONING IN PATIENTS WITH PSYCHOTIC DISORDERS WHO EXPERIENCED TRAUMATIC EVENTS

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ABSTRACT

Background

Patients with psychotic disorders who experienced childhood trauma show more social dysfunction than patients without traumatic experiences. However, this may not hold for all patients with traumatic experiences. Little is known about the potential compensating role of Five-Factor Model (FFM) personality traits within this group, despite their strong predictive value for social functioning and well-being in the general population.

Methods

Our sample consisted of 195 patients with psychotic disorders (74% diagnosed with schizophrenia) and 132 controls. Cluster analyses were conducted to identify and validate distinct personality profiles. GLM analyses were conducted to examine whether patients with different profiles differed in social functioning and quality of life (QoL), while controlling for possible confounders. Mediation models were tested to assess potential causal links.

Results

In general, patients with higher levels of self-reported traumatic experiences (PT+) showed lower QoL and more social withdrawal compared to patients with lower traumatic experiences (PT-). Two clusters reflecting personality profiles were identified. PT+ with the first profile (lower Neuroticism and higher Extraversion, Openness, Agreeableness and Conscientiousness) presented higher levels of QoL and better social functioning in several areas, including less withdrawal, compared to both PT+ and PT- with the second profile. PT+ and PT- with the first personality profile did not differ in QoL and social functioning. Mediation analyses suggested that personality traits mediate the relation between traumatic experiences and QoL and social withdrawal.

Conclusions

Our findings indicate that personality may 'buffer' the impact of childhood traumatic experiences on functional outcome in patients with psychotic disorders.

1. INTRODUCTION

A substantial proportion of patients with psychotic disorders have experienced traumatic events during childhood. In their meta-analysis, Varese et al. (2012) found that patients with psychotic disorders were 2.7 times more likely to experience childhood trauma compared to individuals from the general population.

In addition to potential impairment due to psychotic illness, childhood trauma may affect patients' ability to function socially. Earlier studies indicate that patients with psychotic disorders and a history of trauma show more social dysfunction compared to patients without exposure to trauma (Lysaker et al., 2001;2004;2005; Spence et al., 2006; Rosenberg et al., 2007; Davidson et al., 2009). Impaired social functioning may hinder patients in their ability to form meaningful relationships and achieve successful community maintenance.

Apart from (often clinician rated) measures of functioning, patients' own perspective on their quality of life (QoL) has received growing interest during the last decades, in both research and clinical care (Eklund et al., 2003). Both subjective ratings of QoL and more objective measures of social functioning provide distinct types of information regarding patients' well-being (Lehman, 1983). To our knowledge, no previous studies investigated relations between childhood trauma and subjective QoL in patients with psychotic disorders.

While earlier studies indicate that childhood trauma is related to worse psychosocial functioning, this may not hold for all patients with psychotic disorders with a trauma history. Based on systematic reviews, several authors have stated that the relations between normal personality traits and outcome in patients with psychotic disorders merit greater attention (Dinzeo and Docherty, 2007; Andersen and Bienvenu, 2011). One of the best validated models of normal personality is the Five-Factor Model (FFM), consisting of the personality traits Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (Digman, 1990; McCrae, 1992). In the general population, FFM personality traits are known strong predictors of social functioning (Ozer and Benet-Martinez, 2006) and subjective QoL (Costa, Jr. and McCrae, 1980; Ozer and Benet-Martinez, 2006; DeNeve and Cooper, 1998). Previous research indicates that FFM personality traits also contribute to social functioning and subjective QoL in patients with psychotic disorders. Lower levels of Neuroticism and higher Extraversion, Agreeableness (Kentros et al., 1997b; Lysaker and Davis, 2004), Openness and Conscientiousness (Lysaker and Davis, 2004) have been found to be

related to better social functioning in patients with psychotic disorders, and lower levels of Neuroticism (Couture et al., 2007; Kentros et al., 1997b; Masthoff et al., 2007) and higher Extraversion and Agreeableness (Kentros et al., 1997b) were found to be related to higher subjective QoL.

To our knowledge, only one study to date examined FFM personality traits (limited to Neuroticism and Extraversion) in patients with psychotic disorders with a history of childhood trauma. In this study, Lysaker et al. (2001) found that patients who reported sexual abuse (N = 19) generally showed higher levels of Neuroticism and poorer social functioning compared to patients who did not report sexual abuse (N = 35). Limitations of this study were no assessment of other types of trauma and no correction for factors that may have affected both personality scores and social functioning, such as psychotic symptom levels. No analyses were conducted to examine whether the patients with a history of abuse and lower Neuroticism levels scored more favourably on social functioning, possibly due to the limited sample size.

In order to examine whether the effect of childhood trauma on social functioning and subjective QoL would differ depending on FFM personality traits, we aimed to 1) examine whether both subjective QoL and social functioning is generally lower in patients with psychotic disorders who report higher levels of childhood traumatic events compared to patients with lower levels of self-reported traumatic experiences, 2) to identify distinct personality profiles within the group of patients with higher levels of traumatic events and to validate these personality profiles in patients with lower traumatic experiences and in healthy controls, and 3) to examine whether subgroups of patients with different levels of traumatic experiences with different personality profiles differ in subjective QoL and social functioning, when possible confounders, such as psychotic symptoms, are controlled for. Finally, in order to clarify the nature of the relationship between childhood trauma, personality and functional outcome, mediation was tested.

2. METHOD

2.1 Participants and procedures

GROUP (Genetic Risk and Outcome of Psychosis) is an ongoing Dutch longitudinal multicenter cohort study that was designed to study vulnerability and resilience factors for variation in expression and course of non-affective psychotic disorders. Details of

the GROUP study have been described elsewhere (Korver et al., 2012). Patients and controls from the Amsterdam and Utrecht regions, who participated in FFM personality trait and trauma assessment, were included in the current study. Data from the second measurement (database version 3.2, data collected between 2008 and 2011) was used for analyses. Eligible patients fulfilled the following criteria: (1) age between 18 and 50, (2) meeting DSM-IV criteria (American Psychiatric Association, 2000) for a non-affective psychotic disorder; schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder or psychotic disorder NOS, (3) maximum duration of illness of 10 years, and (4) fluent in Dutch. Control subjects were between 18 and 50 years old and had no lifetime diagnosis of psychosis or a first-degree family member with a lifetime diagnosis of psychosis.

2.2 Instruments

DSM diagnoses relating to psychosis were based on the Comprehensive Assessment of Symptoms and History (CASH) (Andreasen et al., 1992). The CASH is a widely-used semi-structured interview designed for research of psychotic disorders.

Childhood trauma was measured in patients and controls with the Dutch version of the Childhood Trauma Questionnaire (CTQ-SF) (Bernstein et al., 2003). The CTQ-SF is a 25-item self-report questionnaire, which rates the occurrence of traumatic experiences (physical abuse and neglect, emotional abuse and neglect and sexual abuse) before the age of 17. The mean score of all 25 items was used as a total score. The CTQ-SF has demonstrated good internal consistency and validity in the general population (Thombs et al., 2007; Bernstein et al., 2003).

The Dutch version of the NEO-FFI (Hoekstra et al., 1996) was used to assess the FFM personality traits (Digman, 1990; McCrae, 1992). The NEO-FFI is a 60-item self-report questionnaire, which has demonstrated satisfactory to excellent construct validity and moderate to good internal reliability in general population samples, with slightly lower Chronbach alpha's for Openness and Agreeableness (Hoekstra et al., 1996; Costa and McCrae, 1992). The factor structure and reliability of the FFM scales in patients with schizophrenia were found to be highly similar to a normative sample (Bagby et al., 1999).

The World Health Organization Quality of Life-Bref (WHOQOL-BREF) (WHO, 1995) was used to rate four domains of subjective QoL, over the past two weeks: the physical domain, the psychological domain, the social domain and the environmental domain. This 26-item self-report questionnaire has shown to be a reliable and valid measure,

in both individuals with and without severe mental disorders (Skevington et al., 2004). Higher scores on the WHOQOL-BREF indicate higher levels of subjective QoL.

The Social Functioning Scale (SFS) (Birchwood et al., 1990) was used to assess social functioning over the past three months. The SFS has been widely used to measure areas of functioning essential for successful community maintenance, as reflected by its seven subscales: withdrawal, interpersonal behavior, pro-social activities, recreation, independence-performance, independence-competence and employment / occupation. The SFS has shown to be a reliable and valid measure in both patients with psychotic disorders and the general population (Birchwood et al., 1990). Higher scores on the SFS indicate higher levels of social functioning.

Symptom levels in patients with psychotic disorders were assessed with the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). The PANSS is a widely used interview to assess levels of psychotic symptoms in the previous week. The five factor model by Van der Gaag et al. (2006a) was used for analyses. This model has good validity compared to earlier models (van der Gaag et al., 2006b).

2.3 Analyses

SPSS 19 was used for all analyses. In concurrence with Heins et al. (2011), a dichotomized scale representing higher levels of self-reported traumatic experiences (PT+) vs. lower levels of self-reported traumatic experiences (PT-) was constructed, using the 80th percentile of the CTQ-SF total score in controls (1.52) as cut-off. Chi-square tests and ANOVA's were performed to examine group differences in socio-demographic and clinical characteristics between PT+, PT- and controls. MANOVA's were performed to examine differences in subjective QoL and in social functioning between PT+ and PT-.

To identify subgroups of individuals with similar FFM personality traits, a hierarchical cluster analysis was performed within the PT+ group. Choice of number of clusters was based on the dendogram and the number of subjects within each cluster. Clusters with profiles that contained less than 10 individuals were not considered optimal. Differences in FFM traits between the profiles were assessed with independent sample T-tests. To examine whether the profiles found in the PT+ group could be replicated in other groups, cluster analyses with a forced number of clusters were conducted in the PT- group, and repeated in the subgroup of healthy controls with lower levels of traumatic experiences (CT-). Separate cluster analysis in controls with higher levels of traumatic events (CT+) was not feasible because of insufficient sample size (N = 24).

Chi-square tests were conducted to examine whether PT+ and PT-, and PT- and CT-, differed regarding personality profile divisions.

Subsequently, within the PT+ group, Chi-square tests and T-tests were conducted to examine possible group differences in socio-demographic and clinical characteristic between patients based on cluster membership, and Mann-Whitney U tests were conducted to examine differences regarding severity of trauma and psychotic symptoms. Variables that differed between personality profiles were entered as covariates in MANCOVA. To further explore the potential compensating role of FFM personality traits, analyses were repeated for subgroups of patients with and without trauma and with different personality profiles.

Finally, mediation analyses were performed a posteriori to explore whether FFM traits mediate the relationship between traumatic experiences and 1) overall QoL, 2) overall social functioning, and 3) SFS withdrawal. A total score of the WHOQOL-BREF (maximum range: 4 to 20) was used as an overall measure of QoL. A total score of the SFS (maximum range: 59.7 to 134.9) was used as an overall measure of social functioning. The five original, continuous FFM traits were entered as potential mediators. The dichotomous scale for traumatic experiences was entered as dependent variable. The Indirect file developed by Preacher and Hayes (2008) for testing multiple mediator models was used for analyses.

3. RESULTS

3.1 Sample characteristics

The total sample (N = 327) consisted of 195 (59.7%) patients with psychotic disorders and 132 (40.3%) controls. Using the aforementioned dichotomization procedure for traumatic experiences, higher levels of self-reported traumatic experiences were present in 112 patients (57.2%; PT+ group) and absent in 83 patients (42.8%; PT-). The socio-demographic and clinical characteristics of the PT+ and PT- groups and controls are provided in **Table 1**. PT+ and PT- did not differ in terms of socio-demographic of clinical characteristics. Controls were more likely to be female (χ^2 = 25.42, p < 0.001) and had higher IQ scores than both patient groups (F = 25.05, p < 0.001, Tukey HSD tests: p < 0.001).

Table 1. Socio-demographic and clinical characteristics in patient groups and controls[1]

	PT+	PT-	C
Age (M, SD)	31.2 (7.9)	(6.3)	29.9 (9.2)
Gender (% male)	79.5	83.1	55.3*
Ethnicity (% Caucasian)	81.3	81.9	84.1
IQ[2] (M, SD)	99.2 (18.1)	99.3 (14.6)	113.3* (16.7)
DSM diagnosis (%)			
Schizophrenia	73.9	74.4	n/a
Schizophreniform disorder	0.9	2.4	
Schizoaffective disorder	11.6	12.0	
Delusional disorder	0.0	1.2	
Psychotic disorder NOS	13.6	10.0	
Age of onset first psychosis (M, SD)	23.3 (7.7)	22.0 (5.6)	
Duration of illness (M, SD)	7.5 (5.1)	7.0 (3.8)	
Current antipsychotic treatment (%)			
Using	76.8	80.7	
Not using	8.0	8.4	
Unknown	15.2	10.9	

[1] PT+: patients who experienced higher levels of traumatic events ($N = 112$), PT-: patients with no or minimal traumatic experiences ($N = 83$), C: all controls ($N = 132$)

[2] IQ was assessed with four subtests of the WAIS-III.

* $p < 0.001$ compared to both patient groups

3.2 Differences in QoL and social functioning between PT+ and PT-

MANOVA showed that patients in the PT+ and PT- groups differed in terms of QoL ($F = 3.42$, $p = 0.010$, Wilks' Lambda = 0.93, $\eta\rho^2 = 0.07$); differences were found for all individual scales: the physical ($F = 9.13$, $p = 0.003$, $\eta\rho^2 = 0.05$), psychological ($F = 9.66$, $p = 0.002$, $\eta\rho^2 = 0.05$), social ($F = 9.73$, $p = 0.002$, $\eta\rho^2 = 0.05$) and environmental ($F = 7.31$, $p = 0.007$, $\eta\rho^2 = 0.04$) domain. PT+ reported lower subjective QoL compared to PT-. Regarding social functioning, the difference between PT+ en PT- reached trend level significance ($F = 3.14$, $p = 0.078$, $\eta\rho^2 = 0.02$). The only individual SFS scale to reach statistical significance was withdrawal ($F = 4.65$, $p = 0.032$, $\eta\rho^2 = 0.03$). PT+ reported more withdrawal compared to PT-. See **Table 2** for the WHOQOL-BREF and SFS scores of PT+, PT- and controls.

Table 2. WHOQOL-BREF and SFS scores in patient groups and controls[1]

Scale	Group	Mean	SD	Median	Min.-Max.
WHOQOL-BREF					
Physical	PT+	3.51	0.62	3.4	2.29 - 4.86
	PT-	3.79**	0.68	3.8	1.89 - 5.00
	C	4.30**	0.45	4.3	2.43 - 5.00
Psychological	PT+	3.38	0.54	3.3	2.00 - 4.83
	PT-	3.64**	0.63	3.7	1.83 - 4.83
	C	4.01**	0.41	4.0	2.17 - 5.00
Social	PT+	3.07	0.87	3.0	1.00 - 5.00
	PT-	3.45**	0.74	3.7	1.67 - 5.00
	C	4.06**	0.65	4.0	2.00 - 5.00
Environmental	PT+	3.63	0.54	3.6	2.14 - 5.00
	PT-	3.86**	0.60	3.8	2.71 - 5.00
	C	4.23**	0.43	4.1	3.00 - 5.00
SFS					
Withdrawal	PT+	101.5	11.4	100.0	70.5 - 124.5
	PT-	105.3*	12.2	104.5	80.0 - 133.0
	C	119.7**	10.5	116.5	87.5 - 133.0
Interpersonal behavior	PT+	120.7	19.9	124.0	55.0 - 145.0
	PT-	125.2	20.8	124.0	78.0 - 145.0
	C	142.1**	8.25	145.0	105.0 - 145.0
Pro-social activities	PT+	112.5	13.5	114.5	65.0 - 136.0
	PT-	115.6	15.2	117.5	83.0 - 145.0
	C	125.1**	9.5	128.0	98.0 - 145.0
Recreation	PT+	112.9	15.3	113.0	77.0 - 144.0
	PT-	116.0	16.3	116.5	74.5 - 145.0
	C	123.4**	11.9	124.5	86.5 - 145.0
Independence-performance	PT+	110.2	10.7	109.0	84.5 - 131.0
	PT-	112.5	11.2	112.5	83.0 - 131.0
	C	119.0**	8.4	118.5	94.0 - 131.0
Independence-competence	PT+	112.8	10.4	114.0	61.0 - 123.0
	PT-	114.5	8.7	114.0	94.5 - 123.0
	C	121.7**	4.1	123.0	96.5 - 123.0
Employment / occupation	PT+	107.1	11.4	111.0	81.5 - 122.5
	PT-	106.7	12.5	112.5	81.5 - 122.5
	C	118.4**	6.6	122.5	97.5 - 122.5

[1] PT+: patients who experienced higher levels of traumatic events (*N* = 112), PT-: patients with no or minimal traumatic experiences (*N* = 83), C: all controls (*N* = 132)
* *p* < 0.05, ** *p* < 0.01, compared to PT+ group.

3.3 Personality profiles

Results of hierarchical cluster analysis suggested two different personality profiles within PT+. Profile 1 represented 33% ($N = 37$) and profile 2 represented 67% ($N = 75$) of the PT+ participants. Profile 1 had lower Neuroticism ($t = -6.27$, $p < 0.001$, $\eta^2 = 0.26$), higher Extraversion ($t = 7.24$, $p < 0.001$, $\eta^2 = 0.32$), higher Openness ($t = 4.90$, $p < 0.001$, $\eta^2 = 0.18$), higher Agreeableness ($t = 3.02$, $p = 0.003$, $\eta^2 = 0.08$) and higher Conscientiousness levels ($t = 6.80$, $p < 0.001$, $\eta^2 = 0.29$) than profile 2.

Cluster analysis with a forced two cluster solution was then conducted within PT-. Profile 1 represented 55.4% ($N = 46$) and profile 2 represented 44.6% ($N = 37$) of PT-. Profile 1 had lower Neuroticism ($t = -11.23$, $p < 0.001$, $\eta^2 = 0.61$), higher Extraversion ($t = 7.07$, $p < 0.001$, $\eta^2 = 0.38$), higher Agreeableness ($t = 2.48$, $p = 0.015$, $\eta^2 = 0.07$) and higher Conscientiousness levels ($t = 6.95$, $p < 0.001$, $\eta^2 = 0.37$) than profile 2. There were no differences in Openness levels.

The procedure was repeated in controls with lower traumatic experiences (CT-, $N = 108$). Profile 1 now represented 69.4% ($N = 75$) and profile 2 represented 30.6% ($N = 33$) of CT-. Profile 1 had lower Neuroticism ($t = -5.18$, $p < 0.001$, $\eta^2 = 0.20$), higher Extraversion ($t = 9.62$, $p < 0.001$, $\eta^2 = 0.46$), higher Openness ($t = 5.25$, $p < 0.001$, $\eta^2 = 0.21$), higher Agreeableness ($t = 4.13$, $p < 0.001$, $\eta^2 = 0.14$) and higher Conscientiousness levels ($t = 4.67$, $p < 0.001$, $\eta^2 = 0.17$) than profile 2.

Chi-square tests showed that PT+ were less likely to be allocated to personality profile 1 than PT- ($\chi^2 = 8.79$, $p = 0.003$, $\phi = -0.22$). There was a trend difference in personality profile divisions between PT- and CT- ($\chi^2 = 3.39$, $p = 0.065$, $\phi = -0.14$). Concluding, although similar clusters are found in all three groups, the proportion of participants allocated to the personality profiles differ between groups.

3.4 Characteristics of profiles in PT+

There were no differences in socio-demographic and clinical characteristics between PT+ with profile 1 (PT+/1) compared to PT+ with profile 2 (PT+/2). Also, personality profiles did not differ from each other in terms of severity of traumatic events, as measured by the original or total CTQ-SF scales. However, there were differences in psychotic symptom levels: the PT+/1 subgroup had lower levels of negative symptoms ($Z = 3.72$, $p < 0.001$, $r = 0.36$), excitement ($Z = 2.62$, $p = 0.009$, $r = 0.25$) and emotional distress ($Z = 2.91$, $p = 0.004$, $r = 0.28$). The NEO-FFI, JTV and PANSS scores of PT+ with profile 1 and 2 are provided in **Table 3**.

Table 3. NEO-FFI, JTV and PANSS scores in PT+ patients with profile 1 or 2[1]

Scale	Group	Mean	SD	Median	Min.-Max.
NEO-FFI					
Neuroticism	*PT+/1*	30.46	6.53	30	12 - 47
	PT+/2	38.85***	6.50	40	20 - 54
Extraversion	*PT+/1*	42.00	4.55	41	35 - 56
	PT+/2	33.93***	5.76	34	19 - 48
Openness	*PT+/1*	42.43	6.43	42	28 - 58
	PT+/2	36.63***	5.60	36	30 - 51
Agreeableness	*PT+/1*	44.19	5.31	44	33 - 56
	PT+/2	40.99**	4.71	41	30 - 51
Conscientiousness	*PT+/1*	45.35	5.73	45	35 - 60
	PT+/2	38.19***	4.73	38	23 - 50
JTV					
Emotional abuse	*PT+/1*	2.32	0.87	2.4	1.00 - 4.40
	PT+/2	2.09	0.81	2.0	1.00 - 4.80
Physical abuse	*PT+/1*	1.37	0.57	1.0	1.00 - 2.80
	PT+/2	1.26	0.49	1.0	1.00 - 3.00
Sexual abuse	*PT+/1*	1.64	1.01	1.0	1.00 - 5.00
	PT+/2	1.43	0.85	1.0	1.00 - 5.00
Emotional neglect	*PT+/1*	2.72	0.79	2.6	1.00 - 5.00
	PT+/2	2.69	0.89	2.6	1.00 - 5.00
Physical neglect	*PT+/1*	1.66	0.54	1.6	1.00 - 3.00
	PT+/2	1.61	0.51	1.6	1.00 - 3.00
PANSS					
Positive symptoms	*PT+/1*	11.00	4.66	10.0	4 - 22
	PT+/2	12.70	5.13	12.0	4 - 28
Negative symptoms	*PT+/1*	10.50	6.05	8.0	6 - 38
	PT+/2	13.67***	5.98	12.0	4 - 33
Disorganization	*PT+/1*	15.56	6.87	13.0	10 - 38
	PT+/2	16.01	4.65	15.0	10 - 28
Excitement	*PT+/1*	10.44	3.60	9.0	8 - 25
	PT+/2	11.69**	3.44	11.0	8 - 24
Emotional distress	*PT+/1*	12.20	3.95	11.0	8 - 25
	PT+/2	14.83**	4.64	14.0	8 - 28

[1] PT+: patients who experienced higher levels of traumatic events, personality profile 1: *N* = 37, profile 2: *N* = 75

** *p* < 0.01, *** *p* < 0.001, compared to personality profile 1.

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3.5 Differences in QoL and social functioning between profiles in PT+

Table 4 presents the WHOQOL-BREF and SFS scores of PT+ with personality profile 1 and 2. MANCOVA showed that PT+ with different personality profiles differed in QoL, when symptom levels were controlled for ($F = 11.08$, $p < 0.001$, Wilks' Lambda = 0.68, $\eta\rho^2 = 0.32$). This was the case for all domains: the physical ($F = 23.45$, $p < 0.001$, $\eta\rho^2 = 0.19$), psychological ($F = 35.24$, $p < 0.001$, $\eta\rho^2 = 0.27$), social ($F = 14.99$, $p < 0.001$, $\eta\rho^2 = 0.13$) and environmental ($F = 4.90$, $p = 0.029$, $\eta\rho^2 = 0.05$) domain of QoL. PT+ with personality profile 1 reported higher QoL compared to PT+ with profile 2.

MANCOVA was repeated for social functioning. PT+ with different personality profiles differed on social functioning, when symptom levels were controlled for ($F = 3.63$, $p = 0.002$, Wilks' Lambda = 0.76, $\eta\rho^2 = 0.24$). Differences were significant for withdrawal ($F = 12.42$, $p = 0.001$, $\eta\rho^2 = 0.12$), interpersonal behavior ($F = 18.85$, $p < 0.001$, $\eta\rho^2 = 0.17$), pro-social activities ($F = 7.54$, $p = 0.007$, $\eta\rho^2 = 0.08$), independence-performance ($F = 8.28$, $p = 0.005$, $\eta\rho^2 = 0.09$) and recreation ($F = 4.56$, $p = 0.035$, $\eta\rho^2 = 0.05$), with better social functioning in PT+ with personality profile 1.

3.6 Comparison of different levels of traumatic experiences and different personality profiles

Comparing PT+ with profile 1 to PT- with profile 2, MANCOVA revealed significant differences in QoL ($F = 7.60$, $p < 0.001$, Wilks' Lambda = 0.67, $\eta\rho^2 = 0.33$), when controlling for symptom levels (negative symptoms: $Z = 3.60$, $p < 0.001$, medians resp. 8 and 12). All but the environmental domain of QoL reached statistical significance: the physical ($F = 22.72$, $p < 0.001$, $\eta\rho^2 = 0.26$), psychological ($F = 19.73$, $p < 0.001$, $\eta\rho^2 = 0.23$) and social domain ($F = 7.44$, $p = 0.008$, $\eta\rho^2 = 0.10$). PT+ with personality profile 1 reported higher QoL. MANCOVA also showed a statistical significant result for social functioning ($F = 2.47$, $p = 0.028$, Wilks' Lambda = 0.76, $\eta\rho^2 = 0.24$). Individual scales to reach statistical significance were withdrawal ($F = 12.04$, $p = 0.001$, $\eta\rho^2 = 0.16$), interpersonal behavior ($F = 11.33$, $p = 0.001$, $\eta\rho^2 = 0.15$), pro-social activities ($F = 7.99$, $p = 0.006$, $\eta\rho^2 = 0.11$), independence-performance ($F = 8.48$, $p = 0.005$, $\eta\rho^2 = 0.12$), independence-competence ($F = 5.21$, $p = 0.026$, $\eta\rho^2 = 0.08$) and recreation ($F = 4.04$, $p = 0.049$, $\eta\rho^2 = 0.06$), with better social functioning in PT+ with profile 1 compared to PT- with profile 2.

MANCOVA showed no statistical significant differences in QoL and social functioning levels between PT+ and PT- with profile 1, when controlling for symptom levels (disorganization: $Z = 2.13$, $p = 0.033$, medians resp. 13 and 11; emotional distress: $Z = 2.04$, $p = 0.041$, medians resp. 11 and 10).

Table 4. WHOQOL-BREF and SFS scores in PT+ patients with profile 1 or 2[a]

Scale	Group	Mean	SD	Median	Min.-Max.	Adj. Mean[1]
WHOQOL-BREF						
Physical	PT+/1	3.92	0.59	4.0	2.43 - 4.86	3.92
	PT+/2	3.31***	0.54	3.3	2.29 - 4.43	3.34***
Psychological	PT+/1	3.81	0.42	3.8	2.67 - 4.83	3.75
	PT+/2	3.18***	0.80	2.6	1.00 - 4.67	3.20***
Social	PT+/1	3.61	0.75	3.6	2.00 - 5.00	3.55
	PT+/2	2.82***	0.80	2.6	1.00 - 4.67	2.88***
Environmental	PT+/1	3.87	0.51	3.8	3.14 - 5.00	3.82
	PT+/2	3.51**	0.51	3.5	2.14 - 4.57	3.57*
SFS						
Withdrawal	PT+/1	109.1	9.8	110.0	87.5 - 124.5	106.7
	PT+/2	97.8***	10.2	96.5	70.5 - 124.5	98.6**
Interpersonal behavior	PT+/1	133.9	17.1	145.0	86.0 - 145.0	132.0
	PT+/2	114.3***	18.0	111.0	55.0 - 145.0	116.4***
Pro-social activities	PT+/1	119.2	10.8	121.0	91.0 - 136.0	117.6
	PT+/2	109.3***	13.5	110.0	65.0 - 131.0	110.0**
Recreation	PT+/1	118.5	15.5	123.0	77.0 - 142.0	117.4
	PT+/2	110.0**	14.5	108.5	80.0 - 144.0	110.2*
Independence-performance	PT+/1	114.4	10.3	114.5	91.0 - 131.0	115.0
	PT+/2	108.1**	10.4	108.0	84.5 - 131.0	108.3**
Independence-competence	PT+/1	114.9	9.5	117.5	93.0 - 123.0	114.8
	PT+/2	111.8	10.7	114.0	61.0 - 123.0	112.8
Employment / occupation	PT+/1	109.1	10.0	112.5	89.5 - 122.5	109.1
	PT+/2	106.2	12.0	107.0	81.5 - 122.5	106.7

[a] Profile 1 patients (*N* = 37) had lower Neuroticism and higher Extraversion, Openness, Agreeableness and Conscientiousness than profile 2 (*N* = 75) patients.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, compared to personality profile 1.
[1] Means adjusted for negative symptoms, excitement and emotional distress.

3.7 A posteriori analyses: mediation

Figure 1 corresponds to the mediation hypothesis for total QoL. Statistically significant results of both the 'a' en 'b' paths indicate unique indirect effects on the relationship between traumatic experiences and overall QoL for all FFM traits but Openness. These results were confirmed after bootstrapping (bias corrected 95% CI total: -1.14 to -0.23, Neuroticism: -0.624 to -0.227, Extraversion: -0.399 to -0.024, Agreeableness: -0.308 to
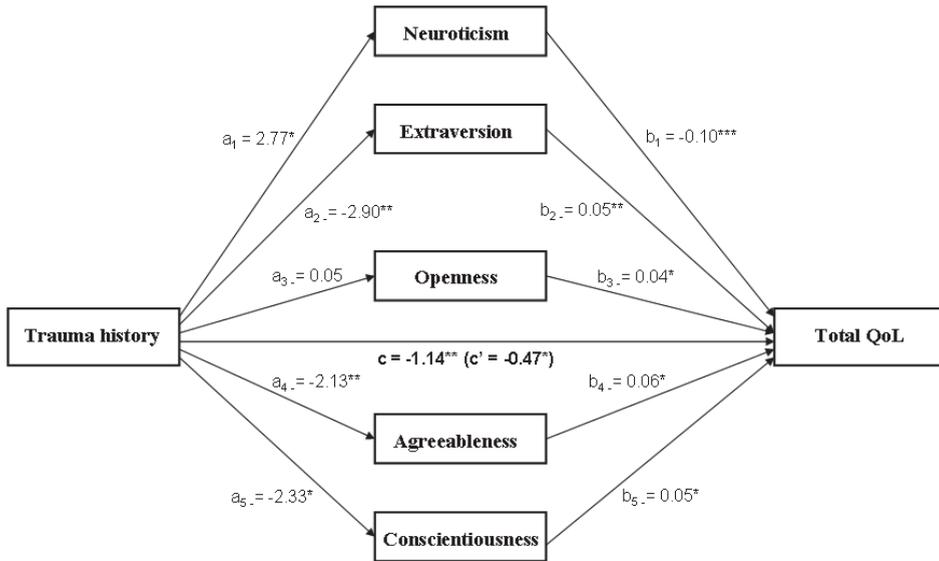
Figure 1. Mediation between trauma and QoL by FFM traits (N = 191)[1]
[1] All path coefficients are unstandardized.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

-0.018, Conscientiousness: -0.334 to -0.014). The full model accounted for approximately 54% of the variance in total QoL (R^2 = 53.99, F = 35.98, $p < 0.001$).

Figure 2 corresponds to the mediation hypothesis for total social functioning. Statistically significant a and b paths indicate a unique indirect effect on the relationship between traumatic experiences and overall social functioning for Extraversion and Conscientiousness, which was confirmed after bootstrapping (bias corrected 95% CI total -4.20 to -0.58, Extraversion: -3.14 to -0.476, Conscientiousness: -1.445 to -0.076). The full model accounted for approximately 42% of the variance in total social functioning (R^2 = 41.98, F = 22.43, $p < 0.001$). The mediation model for withdrawal is presented in **Appendix 1**. Only Extraversion showed unique indirect effect (bias corrected 95% CI total -5.22 to -0.87, Extraversion: -4.678 to -0.686). The full model accounted for approximately 34% of the variance in withdrawal (R^2 = 34.22, F = 16.13, $p < 0.001$).
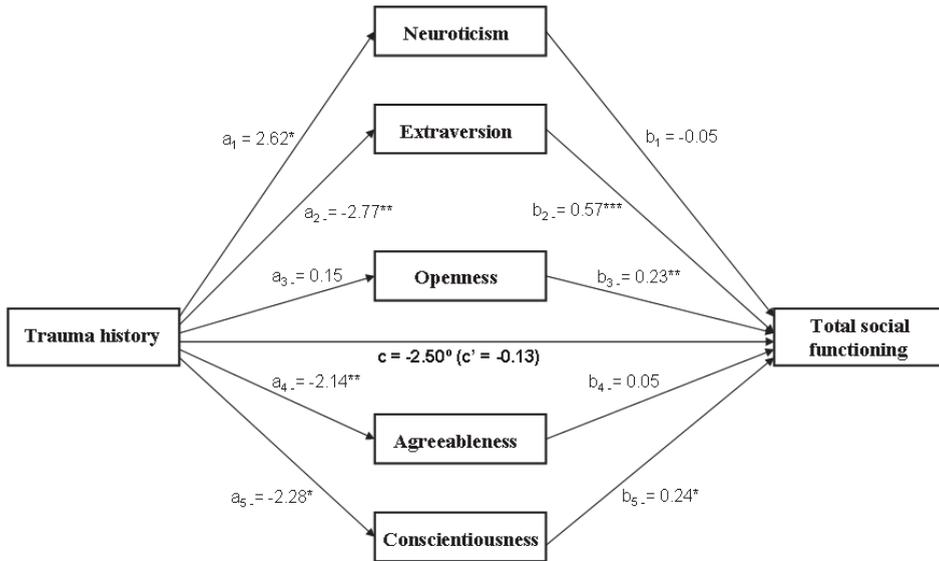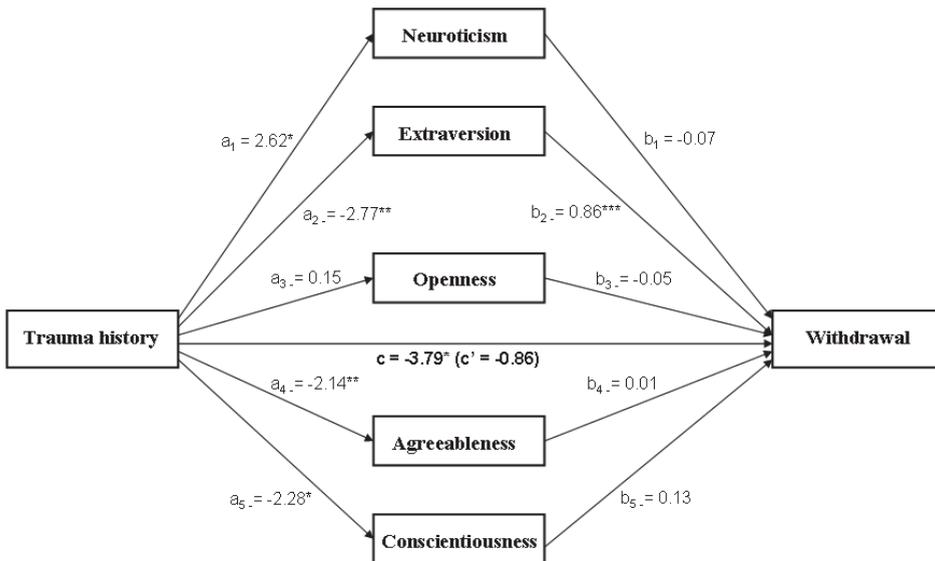
Figure 2. Mediation between trauma and social functioning by FFM traits (N = 193)[1]
[1] All path coefficients are unstandardized.
° $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix 1. Mediation between trauma and withdrawal by Extraversion (N = 193)[1]
[1] All path coefficients are unstandardized.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4. DISCUSSION

The results of the present study demonstrate that patients with psychotic disorders with higher levels of childhood traumatic experiences generally report lower subjective QoL and show more social withdrawal than patients with lower self-reported traumatic experiences. Within the group of patients with higher levels of traumatic experiences, two distinct personality profiles were identified, which for the largest part could be validated in patients and controls with lower traumatic experiences. The first profile represented an at face-value favorable personality profile, namely lower Neuroticism and higher Extraversion, Openness, Agreeableness and Conscientiousness. After correcting for psychotic symptom levels, the patients allocated to the first personality profile reported more favorably in terms of all domains of subjective QoL and several areas of social functioning, including withdrawal, compared to patients with higher levels of traumatic experiences and the second personality profile. Results were highly similar when comparisons were made with patients with the second profile with lower traumatic experiences. Patients with higher levels of traumatic experiences and the first personality profile did not differ in terms of QoL or social functioning from patients with the first personality profile and lower traumatic experiences. These findings are in line with our hypothesis that the effect of childhood trauma on QoL and social functioning would differ depending on FFM personality traits, and with relations between FFM traits and subjective QoL and social functioning reported in earlier studies (Couture et al., 2007; Kentros et al., 1997b; Masthoff et al., 2007).

FFM personality traits generally only become stable until individuals reach their early thirties (Costa and McCrae, 1994). The results of the current study showed between-group differences in division of personality profiles in patients with different levels of traumatic experiences (PT+ were less likely to be allocated to personality profile 1 compared to PT-). Mediation analyses corroborated that higher levels of traumatic experiences are generally related to higher Neuroticism and lower Extraversion, Agreeableness and Conscientiousness in patients with psychotic disorders. These traits were found to partially mediate the relationship between traumatic experiences and subjective QoL. Particularly Extraversion was found to mediate the relationship between traumatic experiences and withdrawal.

In sum, the results of the current study suggest that, although higher levels of traumatic experiences are generally indicative of personality traits associated with more impairment in subjective QoL and social functioning, for a subgroup of patients,

the impact of traumatic experiences may be 'buffered' by alternate personality traits. Since the findings of the current study showed that socio-demographic characteristics, clinical characteristics nor severity of traumatic experiences could account for allocation to a personality profile, the question arises what other factors are associated with variation in personality development. Secure attachment and one's genetic disposition towards stress-sensitivity and positive emotionality, as precursors of later personality traits, seem likely candidates. These factors have also been identified as 'psychological building blocks' of resilience (Rutten et al., 2013).

Another factor which may have influenced personality development is the manifestation of psychotic illness itself. Although there is indication for short-time stability of the FFM traits in patients with psychotic disorders irrespective of fluctuations in positive symptoms (Kentros et al., 1997a; Beauchamp et al., 2006), and long-term stability in the general population (Soldz and Vaillant, 1999), long-term stability of FFM traits in psychosis requires more attention in future research. Especially the possible impact of negative symptoms, which are also more 'trait-like' in nature (Arndt et al., 1995), would need more detailed examination. Although, in the present study, patients with different personality profiles were found to differ in terms of levels of negative symptoms, excitement and emotional distress, these were corrected for in the analyses. Also, we aimed to diminish the possible impact of psychotic illness on personality trait assessment by using representative patient comparison groups.

A first limitation of the present study is that our patients, who were able and willing to give informed consent and collaborate with study procedures, may not representative for the group of patients with psychotic disorders as a whole. Indeed, most patients in this study showed lower levels of psychotic symptoms. Also, most participants reported lower levels of traumatic experiences, although very few patients (1%; *N* = 2) or controls (9.1%; *N* = 12) reported no maltreatment at all (more detailed information on reported levels of traumatic experiences is provided in **Appendix 2**). Consequently, the dichotomization procedure used in the current study resulted in a fairly low cut-off for traumatic experiences. There is something to be said for low cut-off values for traumatic experiences (since 'sometimes' experiencing abuse or neglect may have serious consequences indeed), but our low cut-off may have inferred generalization to other studies which upheld more stringent definitions of trauma. This may also explain the modest relation between traumatic experiences and social functioning found in the current study. Although the current cut-off procedure for traumatic experiences

Appendix 2. Self-reported traumatic experiences in patients and controls[1]

JTV	Score[1]	Patients (N = 195)		Controls (N = 132)	
		%	N	%	N
Emotional abuse	1	17.4	34	37.9	50
	2	49.3	96	50.7	67
	3	23.0	45	8.4	11
	4	7.7	14	3.0	4
	5	2.6	6	0	0
Physical abuse	1	75.4	147	87.1	115
	2	16.4	32	9.1	12
	3	7.2	14	3.8	5
	4	1.0	2	0	0
	5	0	0	0	0
Sexual abuse	1	75.4	147	91.7	121
	2	12.8	25	7.5	10
	3	5.1	10	0.8	1
	4	4.6	9	0	0
	5	1.0	2	0	0
Emotional neglect	1	5.1	10	15.9	21
	2	31.8	62	50.8	67
	3	41.6	81	27.2	36
	4	17.4	34	4.5	6
	5	4.1	8	1.6	2
Physical neglect	1	35.4	69	61.4	81
	2	50.2	98	33.3	44
	3	13.4	26	5.3	7
	4	1.0	2	0	0
	5	0	0	0	0

[1] Average scale score: 1: 'never', 2: 'never' to 'seldom', 3: 'seldom' to 'sometimes', 4 'sometimes' to 'often', 5: 'often' to 'very often'

in patients with psychotic disorders has been used before (Heins et al., 2011), further research on its validity is required.

A further limitation is that we have scarce information on the nature of the reported traumatic experiences. For example, we have no information on who the inflictor was (for instance a stranger or a caretaker), which may have affected the impact of traumatic experiences.

Also, all administered questionnaires were self-report measures, which are liable to self-report bias. For example, florid delusions may have influenced the self-report ratings for some patients. In this regard, the relatively low levels of symptoms in our present sample may be considered an advantage.

Finally, the broad dimensions of the FFM make the NEO-FFI less suitable for potential future studies of underlying causal mechanisms. Psychobiological models of normal personality, such as conceptualized in the Temperament and Character Inventory (TCI) (Cloninger et al., 1994), may be more suitable in this regard. In general, the cross-sectional, non-experimental design of the present study entails that caution should be applied regarding conclusions of causality.

The message conveyed in this study is meant to be a positive one. By examining normal personality traits, we identified a group of patients with psychotic disorders who, despite their experience of both childhood adversity and psychosis, are more content and engage more with others than might be first expected. Our findings indicate that trauma is not inevitably related to negative outcome in patients with psychotic disorders and that further study of underlying mechanisms is warranted.

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REFERENCE LIST

1. American Psychiatric Association, 2000. Diagnostic and statistical manual of mental disorders (4th ed., revised) American Psychiatric Press, Washington, DC.

2. Andersen,A.M. and Bienvenu,O.J., 2011. Personality and psychopathology. Int Rev Psychiatry. 23, 234-247.

3. Andreasen,N.C., Flaum,M. and Arndt,S., 1992. The Comprehensive Assessment of Symptoms and History (CASH). An instrument for assessing diagnosis and psychopathology. Arch Gen Psychiatry. 49, 615-623.

4. Arndt,S., Andreasen,N.C., Flaum,M., Miller,D. and Nopoulos,P., 1995. A longitudinal study of symptom dimensions in schizophrenia. Prediction and patterns of change. Arch Gen Psychiatry. 52, 352-360.

5. Bagby,R.M., Costa,J., McCrae,R.R., Livesley,W.J., Kennedy,S.H., Levitan,R.D., Levitt,A.J., Joffe,R.T. and Young,L.T., 1999. Replicating the five factor model of personality in a psychiatric sample. Pers Indiv Diff. 27, 1135-1139.

6. Beauchamp,M.C., Lecomte,T., Lecomte,C., Leclerc,C. and Corbiere,M., 2006. Do people

with a first episode of psychosis differ in personality profiles? Schizophr Res. 85, 162-167.

7. Bernstein,D.P., Stein,J.A., Newcomb,M.D., Walker,E., Pogge,D., Ahluvalia,T., Stokes,J., Handelsman,L., Medrano,M., Desmond,D. and Zule,W., 2003. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. Child Abuse Negl. 27, 169-190.

8. Birchwood,M., Smith,J., Cochrane,R., Wetton,S. and Copestake,S., 1990. The Social Functioning Scale. The development and validation of a new scale of social adjustment for use in family intervention programmes with schizophrenic patients. Br J Psychiatry. 157, 853-859.

9. Cloninger CR, Przybeck TR, Syrakic DM and Wetzel RD, 1994. *The Temperament and Character Inventory (TCI): A guide to its development and use.* Center for Psychobiology of Personality, Washington University, St Louis, MO.

10. Costa,J. and McCrae,R.R., 1994. Stability and change in personality from adolescence through adulthood Lawrence Erlbaum Associates, Hillsdale, NJ, England, pp. 139-150.

11. Costa,P.T., Jr. and McCrae,R.R., 1980. Influence of extraversion and neuroticism on subjective well-being: happy and unhappy people. J Pers Soc Psychol. 38, 668-678.

12. Costa,P.T. and McCrae,R.R., 1992. NEO-PI-R professional manual: Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Psychological Assessment Resources, Odessa, FL.

13. Couture,S., Lecomte,T. and Leclerc,C., 2007. Personality characteristics and attachment in first episode psychosis: impact on social functioning. J Nerv Ment Dis. 195, 631-639.

14. Davidson,G., Shannon,C., Mulholland,C. and Campbell,J., 2009. A longitudinal study of the effects of childhood trauma on symptoms and functioning of people with severe mental health problems. J Trauma Dissociation. 10, 57-68.

15. DeNeve,K.M. and Cooper,H., 1998. The happy personality: a meta-analysis of 137 personality traits and subjective well-being. Psychol Bull. 124, 197-229.

16. Digman,J.M., 1990. Personality structure: emergence of the five-factor model. Annu Rev Psychol. 116-123.

17. Dinzeo,T.J. and Docherty,N.M., 2007. Normal personality characteristics in schizophrenia: a review of the literature involving the FFM. J Nerv Ment Dis. 195, 421-429.

18. Eklund,M., Backstrom,M. and Hansson,L., 2003. Personality and self-variables: important determinants of subjective quality of life in schizophrenia out-patients. Acta Psychiatr Scand. 108, 134-143.

19. Heins,M., Simons,C., Lataster,T., Pfeifer,S., Versmissen,D., Lardinois,M., Marcelis,M., Delespaul,P., Krabbendam,L., van Os,J. and Myin-Germeys,I., 2011. Childhood trauma and psychosis: a case-control and case-sibling comparison across different levels of genetic liability, psychopathology, and type of trauma. Am J Psychiatry. 168, 1286-1294.

20. Hoekstra,H.A., Ormel,J. and De Fruyt,F., 1996. NEO Personality questionnaires NEO-PI-R, NEO-FFI (in Dutch) Lisse, The Netherlands.

21. Kay,S.R., Fiszbein,A. and Opler,L.A., 1987. The positive and negative syndrome scale (PANSS) for schizophrenia. Schizophr Bull. 261-270.

22. Kentros,M., Smith,T.E., Hull,J., McKee,M., Terkelsen,K. and Capalbo,C., 1997a. Stability of personality traits in schizophrenia and

schizoaffective disorder: a pilot project. J Nerv Ment Dis. 185, 549-555.

23. Kentros,M.K., Terkelsen,K., Hull,J., Smith,T.E. and Goodman,M., 1997b. The relationship between personality and quality of life in persons with schizoaffective disorder and schizophrenia. Qual Life Res. 6, 118-122.

24. Korver,N., Quee,P.J., Boos,H.B., Simons,C.J. and de Haan,L., 2012. Genetic Risk and Outcome of Psychosis (GROUP), a multi site longitudinal cohort study focused on gene-environment interaction: objectives, sample characteristics, recruitment and assessment methods. Int J Methods Psychiatr Res. 21,205-221.

25. Lehman,A.F., 1983. The well-being of chronic mental patients. Arch Gen Psychiatry. 40, 369-373.

26. Lysaker,P.H., Beattie,N.L., Strasburger,A.M. and Davis,L.W., 2005. Reported history of child sexual abuse in schizophrenia: associations with heightened symptom levels and poorer participation over four months in vocational rehabilitation. J Nerv Ment Dis. 193, 790-795.

27. Lysaker,P.H. and Davis,L.W., 2004. Social function in schizophrenia and schizoaffective disorder: associations with personality, symptoms and neurocognition. Health Qual Life Outcomes. 2, 15.

28. Lysaker,P.H., Meyer,P.S., Evans,J.D., Clements,C.A. and Marks,K.A., 2001. Childhood sexual trauma and psychosocial functioning in adults with schizophrenia. Psychiatr Serv. 52, 1485-1488.

29. Lysaker,P.H., Nees,M.A., Lancaster,R.S. and Davis,L.W., 2004. Vocational function among persons with schizophrenia with and without history of childhood sexual trauma. J Trauma Stress. 17, 435-438.

30. Masthoff,E.D., Trompenaars,F.J., Van Heck,G.L., Hodiamont,P.P. and de Vries,J.,

2007. The relationship between dimensional personality models and quality of life in psychiatric outpatients. Psychiatry Res. 149, 81-88.

31. McCrae,R.R., 1992. The five-factor model: issues and applications. J Pers. 60, 175-532.

32. Ozer,D.J. and Benet-Martinez,V., 2006. Personality and the prediction of consequential outcomes. Annu Rev Psychol. 57, 401-421.

33. Preacher,K.J. and Hayes,A.F., 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behav Res Methods. 40, 879-891.

34. Rosenberg,S.D., Lu,W., Mueser,K.T., Jankowski,M.K. and Cournos,F., 2007. Correlates of adverse childhood events among adults with schizophrenia spectrum disorders. Psychiatr Serv. 58, 245-253.

35. Rutten,B.P., Hammels,C., Geschwind,N., Menne-Lothmann,C., Pishva,E., Schruers,K., van den Hove,D., Kenis,G., van Os,.J. and Wichers,M., 2013. Resilience in mental health: linking psychological and neurobiological perspectives. Acta Psychiatr Scand. 128, 3-20.

36. Skevington,S.M., Lotfy,M. and O'Connell,K.A., 2004. The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. Qual Life Res. 13, 299-310.

37. Soldz,S. and Vaillant,G.E., 1999. The Big Five Personality Traits and the Life Course: A 45-Year Longitudinal Study. J Res Person. 33, 208-232.

38. Spence,W., Mulholland,C., Lynch,G., McHugh,S., Dempster,M. and Shannon,C., 2006. Rates of childhood trauma in a sample

of patients with schizophrenia as compared with a sample of patients with non-psychotic psychiatric diagnoses. J Trauma Dissociation. 7, 7-22.

39. Thombs,B.D., Lewis,C., Bernstein,D.P., Medrano,M.A. and Hatch,J.P., 2007. An evaluation of the measurement equivalence of the Childhood Trauma Questionnaire--Short Form across gender and race in a sample of drug-abusing adults. J Psychosom Res. 63, 391-398.

40. van der Gaag,M., Cuijpers,A., Hoffman,T., Remijsen,M., Hijman,R., de Haan,L., van Meijel,B., van Harten,P.N., Valmaggia,L., de Hert,M. and Wiersma,D., 2006a. The five-factor model of the Positive and Negative Syndrome Scale I: confirmatory factor analysis fails to confirm 25 published five-factor solutions. Schizophr Res. 85, 273-279.

41. van der Gaag,M., Hoffman,T., Remijsen,M., Hijman,R., de Haan,L., van Meijel,B., van Harten,P.N., Valmaggia,L., de Hert,M., Cuijpers,A. and Wiersma,D., 2006b. The five-factor model of the Positive and Negative Syndrome Scale II: a ten-fold cross-validation of a revised model. Schizophr Res. 85, 280-287.

42. Varese,F., Smeets,F., Drukker,M., Lieverse,R., Lataster,T., Viechtbauer,W., Read,J., van Os,.J. and Bentall,R.P., 2012. Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. Schizophr Bull. 38, 661-671.

43. WHO, 1995. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization. Soc Sci Med. 41, 1403-1409.