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Research article

Childhood trauma and coping in patients with psychotic disorders and obsessive-compulsive symptoms and in un-affected siblings

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ABSTRACT

Background: Research on environmental and individual risk-factors in patients with a psychotic disorder and co-occurring obsessive-compulsive symptoms (OCS) is limited.

Objective: This study aimed to examine the role of childhood trauma and coping on the occurrence of OCS in patients with a psychotic disorder and on a subclinical level in siblings.

Participants and setting: 626 patients and 638 siblings from the Genetic Risk and Outcome of Psychosis (GROUP) study were included in the current study.

Methods: Differences between patients and siblings with and without OCS were analyzed with between-group comparisons. Mediation analyses investigated the effect of coping on the association between trauma and OCS severity.

Results: Patients and siblings with OCS reported more childhood traumatic events, particularly sexual (OR = 1.62 / 3.26) and emotional (OR = 1.47 / 2.04) abuse compared to those without

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OCS. Both patients ($d = 0.69$) and siblings ($d = 0.49$) with co-occurring OCS showed a higher tendency for dysfunctional passive coping strategies compared to the group without OCS. The tendency for passive coping mediated the association between sexual and emotional abuse and OCS severity in patients.

Conclusions: Results imply that childhood trauma is associated with the presence of co-occurring OCS. Enhancing active coping strategies might have a beneficial effect in the prevention and treatment of co-occurring OCS in patients with psychotic disorders.

1. Introduction

Patients with psychotic disorders (PD) often experience co-occurring obsessive-compulsive symptoms (OCS). Meta-analyses show that the prevalence rate of OCS in patients with a PD is 30.3% and that about 13% meet the criteria for an obsessive-compulsive disorder (OCD) (Achim et al., 2011; Swets et al., 2014). It has been reported that co-occurrence of OCS and PD increases the risk of developing a more persistent form of psychosis (Van Dael et al., 2011). Moreover, the comorbidity is associated with more severe positive, negative and affective symptoms (Cunill, Castells, & Simeon, 2009; Schirmbeck, Konijn, Hoetjes, Zink, & de Haan, 2018), increased suicidality (Sevincok, Akoglu, & Kokcu, 2007; Szmulewicz, Smith, & Valerio, 2015), more social dysfunction (de Haan, Sterk, & van der Valk, 2013; Hunter & Lysaker, 2015), a lower socioeconomic status, and significantly earlier onset of schizophrenia compared with patients without comorbid OCS (Owashi, Ota, Otsubo, Susa, & Kamijima, 2010).

Research investigating possible underlying mechanisms suggests shared individual and environmental risk factors for PD and OCD/OCS. However, these risk factors have mainly been investigated for primary OCD and PD separately. Childhood trauma has been described as a risk factor for psychosis, and psychotic-like experiences (Morgan & Gayer-Anderson, 2016; Varese et al., 2012). Trauelsen et al. (2015) reported that with each additional adversity, the chance of developing a psychosis increases by two and a half (Trauelsen et al., 2015). Additionally, childhood trauma has been associated with OCD (Briggs & Price, 2009; Mathews, Kaur, & Stein, 2008). A recent meta-analysis including 24 studies found an association between four types of trauma (e.g. emotional and sexual abuse) and OCS severity (Miller & Brock, 2017). The relationship between childhood adversities and comorbid OCS in patients with a PD remains relatively unknown. To our knowledge, only two recent studies investigated this association and revealed a modest effect of childhood trauma on comorbid OCS severity (Schreuder, Schirmbeck, Meijer, & de Haan, 2017). Lindgren et al. (2017) recently reported that the severity of childhood adversity was associated with increased anxiety and OCS in young adults with a first-episode psychosis (Lindgren et al., 2017).

Another factor that seems to play a role in the development and maintenance of OCD and psychotic disorders is the use of dysfunctional coping strategies (Moritz et al., 2016). To the best of our knowledge, only one study has investigated the association between coping and OCS in patients with a PD (Lysaker, Whitney, & Davis, 2006). This study revealed that patients with schizophrenia and OCS showed a higher preference for avoidant coping strategies in comparison to those without OCS (Lysaker et al., 2006). Furthermore, dysfunctional coping and experiential avoidance have been reported to function as a mediator in the relationship between traumatic life events, perceived stress and psychotic-like experiences (Ered, Gibson, Maxwell, Cooper, & Ellman, 2017), and in the relation between trauma and OCS (Kroska, Miller, Roche, Kroska, & O'Hara, 2018).

Taken together, findings suggest that childhood trauma and dysfunctional coping strategies play a role in the development and maintenance of both OCD and PD and may also influence their co-occurrence. So far, the association between different types of childhood traumatic experiences and co-occurring OCS in patients with PD and a possible mediating effect of coping on these associations has not been investigated.

Previous research reported an increased risk for first-degree relatives of patients with a PD and co-occurring OCS to also develop psychotic and obsessive-compulsive symptoms (Poyurovsky et al., 2005). By including a sample of unaffected siblings in the current study, more can be learned about potential associations between childhood trauma, coping strategies and a dimensional liability for the co-occurrence of OCS and psychosis.

1.1. Aims of the study

The aim of the current study was to investigate the association between experienced childhood trauma, coping preferences and the occurrence of OCS in patients with a PD and in unaffected siblings. We expect that participants with OCS have experienced more childhood trauma, and use more dysfunctional coping strategies (e.g. avoidance) than those without OCS. We further hypothesize that dysfunctional coping strategies mediate the association between (different types of) childhood trauma and OCS.

2. Material and methods

2.1. Study design and participants

For this study, data was obtained from the multicenter Genetic Risk and Outcome of Psychosis (GROUP) study (Korver, Quee, Boos, Simons, & de Haan, 2012). This is a naturalistic longitudinal cohort study with baseline, three- and six-year follow-up assessments. Assessment was done by trained clinicians consisting of psychologists, research assistants, psychiatrists, nurses and PhD

students who received training and supervision for all measures. For a detailed description of procedures of recruitment, we refer to Korver et al. (2012). In short, inclusion criteria for this study for patients and siblings were (1) age ranging from 16 to 50 years and (2) a good command of the Dutch language. Patients had to meet the criteria of a non-affective psychotic disorder according to DSM-IV (Association, A. P., 2013), which was assessed with the Comprehensive Assessment of Symptoms and History (CASH; (Andreasen & Flaum, 1992)) or the Schedules for Clinical Assessment for Neuropsychiatry version 2.1 (SCAN; (Wing, Babor, & Brugha, 1990)), whereas siblings were included when they did not meet these criteria. The present study has a cross-sectional design, only using data from the 6-year follow-up assessment, except for childhood trauma, which was retrospectively assessed at the 3-year follow-up assessment. In the 6-year follow-up assessment 677 patients and 699 siblings participated. In the present study data of 626 patients and 638 siblings were included, who provided data on co-occurring OCS from GROUP data release 7.0. Most but not all of the siblings were related to included patients. In several cases patients did not have their sibling included and in other cases siblings took part in the study although their affected brother or sister did not participate. In some cases multiple siblings and/or patients took part from the same family. Of note, coping preferences were only investigated in subsamples of 333 patients and 351 siblings. All participants received verbal and written information about the study and informed consent was obtained before the start of the first assessment. The study was approved by the Ethical Review Board of the University Medical Centre of Utrecht.

2.2. Measures

Sociodemographic information was assessed through self-reports of participants. Antipsychotic use during the last 3 years was also mainly recorded through self-report of the patient. If unknown, the professional caregiver was contacted.

The severity of obsessions and compulsions was measured with the Dutch version of the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; (Goodman, Price, Rasmussen, & Mazure, 1989)). This instrument has been reported as reliable when assessed in patients with schizophrenia (Boyette, Swets, Meijer, Wouters, & GROUP Investigators, 2011). The interview assesses the distress and time associated with the obsessions and/or compulsions individuals experienced during the prior week up until the interview on a 5-point Likert scale (0–4). Total scores range from 0 to 40. To measure the presence of childhood trauma, the Dutch version of the Childhood Trauma Questionnaire (CTQ; (Bernstein et al., 1994)) was administered. This self-report version consists of 25 items that measure childhood abuse (emotional, physical or sexual) and neglect (emotional and physical) in 5 subscales on a 5-point Likert scale (1–5). The validity and reliability of the CTQ is supported within both the general population (Bernstein et al., 1994) and patients diagnosed with schizophrenia (Kim, Lindenmayer, & Hwang, 2013). Because scores on trauma were highly skewed, this variable was dichotomized into high and low scores. In previous literature the cutoff was defined at the 80th percentile of the subscale scores in healthy controls (Heins et al., 2011). Because this cut-off score led to an insufficient distinction of dichotomous groups in the current patient sample, the cutoff score was changed to the 90th percentile of the scores of healthy controls per subscale. See Supplement Table 1 for an overview of the cut-offs at both percentiles. The Utrechtse Coping List (UCL; (Schreurs, van de Willige, Brosschot, Tellegen, & Graus, 1993)) is a Dutch self-report questionnaire examining different coping strategies generally preferred by the participant in different situations. The survey consists of 47 items measuring seven independent coping styles: proactive action, palliative reaction, avoidance, seeking social support, passive reaction, expression of emotions, and calming thoughts. Examples for items describing different coping preferences are: “see problems as a challenge”, “avoiding difficult situations as much as you can”, “share your concerns with someone else” or “await what will happen”). Each item is scored on a 4-point Likert scale from rarely or never (1) to very often (4). (1–4). Schreurs et al. (1993) found that Cronbach's alphas of the subscales vary from $\alpha = .45$ to $\alpha = .85$ (Schreurs et al., 1993). Cronbach's alphas for the subscales in present study varied from $\alpha = .77$ to $\alpha = .88$.

To measure the severity of psychotic symptoms of patients, the Positive and Negative Syndrome Scale (PANSS; (Kay, Fiszbein, & Opler, 1987)) was administered. The scale consists of 30 items measuring the severity of positive and negative symptoms and general psychopathology rated on a scale ranging from 1 (absent) to 7 (extreme). Only the estimates of positive and negative symptoms will be examined. Index scores vary from 7 to 49 for both subscales. The PANSS is identified to have a good validity and reliability (Kay et al., 1987). Calculations in our sample show Cronbach's alphas of $\alpha = .76$ for the positive symptom scale and $\alpha = .80$ for the negative symptom scale.

The presence of subclinical symptoms in siblings was assessed with the Community Assessment of Psychic Experiences (CAPE; (Konings, Bak, Hanssen, Van Os, & Krabbendam, 2006)). The CAPE is a self-report questionnaire, developed to measure the prevalence of subclinical positive, negative, and depressive symptoms in the general population. The current study will only use the frequency scales of the positive and negative symptom scales, ranging from 0.00 - 0.85 for positive symptoms and from 0.00 to 2.36 for negative symptoms. Items of the CAPE are rated on a scale from 0 (absent) to 3 (severe). A mean total score was calculated for the subscales positive and negative symptoms respectively, if at least 70% of the item-scores were available. The CAPE has been recognized to be a reliable and valid instrument for the measurement of psychotic experiences in the general population (Konings et al., 2006). Analysis of reliability in this study shows Cronbach's alphas of $\alpha = .92$ for the positive symptom scale and $\alpha = .91$ for the negative symptom scale.

2.3. Statistical analysis

In order to evaluate differences between participants with and without OCS regarding sociodemographic characteristics independent t-tests were performed for continuous variables, whereas chi-square tests were used for dichotomous variables. For group-comparisons patients and siblings with a score of zero on the Y-BOCS were assigned to the OCS- group (Y-BOCS = 0), whereas all other subjects were included in the OCS + group (Y-BOCS > 0). This categorization, which includes subclinical OCS severity in a

OCS + group has been applied in other relevant studies on this subject (Meijer et al., 2013; Ntouros et al., 2014; Tonna et al., 2015). Furthermore, it accounts for a dimensional perspective were e.g. the exposure to a traumatic event has already been associated with an increased risk to endorse at least one obsessive-compulsive symptom (Barzilay et al., 2019).

To account for the nested data structure where some patients and siblings were coming from the same family, we analyzed between group differences for all outcome variables using mixed effect models including random intercepts for family level. Linear mixed effect models were analyzed for continuous outcomes and binominal logit link-functions for the dichotomous outcomes of trauma subtypes. Models with continuous outcome variables were fitted with restricted maximum likelihood (REML) under the assumption of data missing at random, which we tried to make tenable by comparing individuals with missing data to those providing complete data sets.

In addition, effect sizes were calculated according to Cohens *d* (1988) for continuous variables and odds ratio for categorical data. Subsequently, to examine a possible mediating role of coping on the association between trauma and OCS severity as measured with the YBOCS total score, maximum likelihood regression mediation analyses were conducted using PROCESS version 2.0 (Preacher & Hayes, 2008). PROCESS is a tool for moderation and mediation analysis using path based analysis, and generates coefficients of the effects and confidence intervals estimates based on bootstrapping (Preacher & Hayes, 2008). With regard to the calculated path-ways: the a-path represents the path from the predictor variable to the mediator and the b-path from the mediator to the outcome variable, the c'-path represents the direct pathway between the predictor and the outcome variable. For the indirect effects of trauma on co-occurring OCS severity through coping (ab-path), a bootstrapping approach was used, taking the mean of 10.000 estimates of ab and the 95% confidence interval. The presented path coefficients are unstandardized. To account for the possible confounding effect of between-group differences, covariates were added to the model. For all analyses a two-tailed significance level of $p = < .05$ was applied. All analyses were performed using Statistical Package for the Social Sciences (IBM SPSS Statistics 24).

3. Results

Between-group comparisons on sociodemographic characteristics and relevant outcome variables in patients are shown in Table 1. Both groups did not differ in age, gender, IQ or DSM diagnosis. We additionally analyzed whether the OCS + group was more likely treated with olanzapine or clozapine, as antipsychotic medication with strong antiserotonergic properties have been proposed to induce or aggravate OCS (Schirmbeck & Zink, 2015) and found significant group differences. In addition, illness duration

Table 1

Sample characteristics and differences between patients with and without co-occurring obsessive-compulsive symptoms.

Variable	OCS- (N = 471)	OCS+ (N = 155)	Test Statistic	p-value	OR	Cohen's d
Age in years, mean (SD)	33.52 (7.40)	33.90 (9.90)	$t = -.568$	.570		
Gender, male n (%)	359 (76.22%)	114 (73.54%)	$\chi^2 = .251$	.617		
Illness duration in years, mean (SD)	11.31 (4.46)	12.19 (4.63)	$t = -1.992$	.047		
IQ, mean (SD)	101.16 (17.94)	100.94 (18.07)	$t = .132$	.895		
Years of education, mean (SD)	15.48 (4.00)	15.73 (4.00)	$t = .065$	.513		
Antipsychotic medication	85 (61.15%)	202 (50.12%)	$\chi^2 = 5.044$	.025		
Clozapine/Olanzapine, n (%)						
DSM-IV diagnosis, n (%)			$\chi^2 = 4.601$	.102		
Schizophrenia	319 (67.72%)	118 (76.13%)				
Schizoaffective disorder	99 (21.01%)	27 (17.42%)				
Unspecified psychotic disorder	53 (11.25%)	10 (6.45%)				
PANSS, mean (SD)						
Positive symptoms	11.36 (6.12)	14.69 (6.80)	$t = -5.405$	< .001		
Negative symptoms	12.22 (5.87)	12.89 (5.30)	$t = -1.336$	.182		
CTQ, high/low ^a						
emotional abuse	109/310	43/83	$t = 1.738$	.083	1.47	
physical abuse	122/297	46/80	$t = 1.558$	.120	1.40	
sexual abuse	88/331	38/88	$t = 2.075$	.038	1.62	
emotional neglect	99/319	27/99	$t = -0.517$	.605	0.88	
physical neglect	99/310	23/103	$t = -1.266$	.206	0.72	
UCL, M (SD) ^b						
proactive action	2.53 (0.51)	2.38 (0.48)	$t = 1.738$	.018		.30
palliative reaction	2.23 (0.45)	2.33 (0.44)	$t = -1.885$	.060		.22
avoidance	2.16 (0.41)	2.28 (0.40)	$t = -2.435$	.015		.30
seeking social support	2.27 (0.50)	2.26 (0.60)	$t = 0.330$	.742		.02
passive reaction	1.89 (0.54)	2.26 (0.54)	$t = -5.760$	< .001		.69
expression of emotion	1.94 (0.50)	1.95 (0.55)	$t = -0.191$	.849		.02
calming thoughts	2.38 (0.51)	2.41 (0.55)	$t = -0.553$	.580		.06

Abbreviation: OCS- = patients without comorbid obsessive-compulsive symptoms; OCS+ = patients with comorbid obsessive-compulsive symptoms; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders 4th edition; PANSS = Positive and Negative Syndrome Scale; CTQ = Childhood Trauma Questionnaire; OR = Odds Ratio; UCL = Utrechtse Coping List.

^a Subsample: OCS- = 419 OCS+ = 126.

^b Subsample: OCS- = 245 OCS+ = 88.

and means of PANSS positive symptoms were significantly higher in the OCS + group and were therefore also considered as potential confounders. Table 2 represents an overview of characteristics of the siblings. The OCS- and OCS + groups in the sibling sample did not significantly differ in age, gender and IQ, but the OCS + group showed higher means on the CAPE positive and negative subscale.

We compared patients and siblings with complete data to those showing missing values on the JTV or UCL. Neither patient nor sibling groups significantly differed in age, gender, estimated IQ, years of education or antipsychotic medication. Patients with missing data regarding trauma showed significantly shorter illness duration ($t = -3.976$, $t = < .001$, $d = .52$), whereas those with missing data regarding coping showed significantly longer illness duration ($t = 2.411$, $p = .016$, $d = .20$), respectively.

3.1. Between-group differences in childhood trauma and coping strategies

Association between OCS status and outcome variables were first assessed by fitting logit link and linear mixed models for all participants with participant-status (patient / sibling) as fixed effect and accounting for familiar clustering by including an extra random intercept for family level. Significant differences between patients and siblings emerged for all outcome variables, except for UCL calming thoughts. For this reason and to be able to compare findings in patients and siblings, we subsequently reported analyses fitted for each group separately. Again, mixed effect models were applied including random intercept for family level to account for the fact that some patients and siblings were coming from the same family. Patients in the OCS + group reported a significant higher level of experienced sexual abuse when compared to patients in the OCS- group (OR: 1.62) (see Table 1). In the sibling sample, similar and more substantial group-differences were found. Siblings in the OCS + group were 3.26 times more likely to have experienced sexual abuse and in addition also reported an increased risk for emotional abuse (OR: 2.04). Regarding differences in coping strategies, patients in the OCS + group scored significantly higher on the UCL subscales avoidance and passive reaction and lower on the subscale proactive action (see Table 1). Accordingly, In siblings, the OCS + group showed more passive reaction and a tendency for less proactive action compared to the OCS- group (see Table 2).

3.2. The mediating effect of coping

To explore the potential mediating effect of coping on the relationship between trauma and OCS severity, subsequent analyses were conducted with the dichotomous variables high/low sexual and emotional abuse as independent variables and the YBOCS total score as the dependent variable. Based on significant between-group differences, proactive action, avoidance and passive reaction were included as potential mediators in patients. In siblings, the same coping strategies were kept in the model to enable comparability with the patient sample. Table 3 shows the result of the mediation analyses performed in patients and siblings.

The associations between emotional and sexual abuse and OCS severity in patients were mediated by passive reaction as shown in significant a- and b-paths. These indirect effects were also tested using bootstrapping procedures with confidence intervals (95% CI). Both upper and lower estimates of the effect of passive reaction in the model of sexual abuse, CI [0.20, 1.31], and emotional abuse, CI [0.22, 1.26], were larger than 0, indicating significance (Table 3). To account for potential confounding effects, positive symptoms

Table 2
Sample characteristics and differences between siblings with and without subclinical obsessive-compulsive symptoms.

Variable	OCS- (N = 582)	OCS+ (N = 56)	Test Statistic	p	OR	Cohen's d
Age in years, mean (SD)	34.21 (8.16)	33.31 (7.68)	$t = .809$	.419		
Gender, male n (%)	262 (45.02)	24 (51.78)	$\chi^2 = 0.771$	.380		
IQ, mean (SD)	112.04 (17.43)	112.18 (19.31)	$t = -.056$	.956		
CAPE						
Positive, mean (SD)	0.08 (0.11)	.14 (0.15)	$t = -3.404$	.001		
Negative, mean (SD)	0.45 (0.40)	.78 (0.50)	$t = -4.598$	< .001		
CTQ, high/low ^a						
emotional abuse	74/477	13/41	$t = 2.001$	.046	2.04	
physical abuse	124/427	19/35	$t = 1.874$	.061	1.87	
sexual abuse	68/483	17/37	$t = 3.687$	< .001	3.26	
emotional neglect	98/453	10/44	$t = 0.180$	.857	1.05	
physical neglect	76/475	9/45	$t = 0.558$	.558	1.25	
UCL, M (SD) ^b						
proactive action	2.76 (0.46)	2.60 (0.52)	$t = 1.841$	.067		0.33
palliative reaction	2.13 (0.44)	2.20 (0.31)	$t = -1.389$	.166		0.18
avoidance	1.98 (0.37)	2.06 (0.48)	$t = -1.051$	.294		0.18
seeking social support	2.39 (0.57)	2.28 (0.55)	$t = 1.119$	.264		0.20
passive reaction	1.55 (0.45)	1.81 (0.61)	$t = -2.507$	.013		0.49
expression of emotion	2.08 (0.50)	2.07 (0.54)	$t = 0.045$	.964		0.02
calming thoughts	2.39 (0.48)	2.35 (0.36)	$t = 0.610$	.542		0.09

Abbreviation: OCS- = siblings without obsessive-compulsive symptoms; OCS+ = siblings with obsessive-compulsive symptoms; CAPE = Community Assessment of Psychic Experiences; UCL = Utrechtse Coping List.

^a Subsample: OCS- = 551, OCS+ = 54.

^b Subsample: OCS- = 312, OCS+ = 39.

Table 3

Mediating effect of dysfunctional and proactive coping on the association between sexual/emotional abuse and OCS severity in patients (n = 261) and siblings (n = 298).

	X CTQ	M UCL	Y	X to M a	M to Y b	Direct effect c' (95%CI)	Indirect effect ab (95% CI)
Patients	sexual abuse	proactive action	OCS	0.07	-0.10	-0.36 (-2.01-1.30)	-0.01 (-0.22-0.11)
		avoidance		0.11	0.04		-0.05 (-0.24-0.27)
		passive reaction		0.26**	2.34***		0.61 (0.20-1.31)*
	emotional abuse	proactive action		0.05	-0.22	1.21 (-0.31-2.72)	-0.01 (-0.22-0.07)
		avoidance		0.19**	-0.08		-0.02 (-0.47-0.32)
		passive reaction		0.30***	2.08**		0.62 (0.22-1.26)*
Siblings	sexual abuse	proactive action	OCS	-0.11	-0.41	0.78 (-0.19-1.77)	0.05 (-0.03-0.27)
		passive reaction		0.27***	0.72*		0.20 (-0.01-0.68)
		avoidance		0.17**	-0.33		-0.06 (-0.28-0.10)
	emotional abuse	proactive action		-0.08	-0.42	0.65 (-0.39-1.69)	0.04 (-0.03-0.29)
		passive reaction		0.24**	0.76*		0.20 (0.01-0.63)*
		avoidance		0.16*	-0.32		-0.05 (-0.27-0.08)

Abbreviation: CTQ = Childhood Trauma Questionnaire; UCL = Utrechtse Coping List; OCS = obsessive-compulsive symptoms.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

were added to the models as covariates, considering they were significantly associated with predictor and outcome variables, unlike illness duration and antipsychotic treatment with clozapine or olanzapine. The mediating effect of passive reaction on the association between sexual abuse and OCS severity, as well as the mediating effect on the association between emotional abuse and OCS remained significant (see Supplement Table 2). Mediation analyses in siblings also revealed significant effects of passive reaction on both the relation between sexual and emotional abuse and OCS severity (Table 3). After accounting for subclinical positive and negative symptoms, the mediating effects on the association between sexual and emotional abuse and OCS severity lost significance (Supplement Table 2).

4. Discussion

This study aimed to examine the association between childhood trauma and the occurrence of OCS and possible mediating effects of coping strategies in patients with a PD and on a subclinical level in unaffected siblings. Results show that patients with comorbid OCS experienced more sexual abuse than patients who reported no OCS. Accordingly, the OCS + group in siblings also reported more sexual and emotional abuse. No differences were found regarding the occurrence of childhood neglect in both groups. With regard to coping we found that patients in the OCS + group showed a higher preference for avoidance and passive coping and less proactive action in comparison to patients in the OCS- group. The sibling group with OCS again was more likely to apply dysfunctional passive coping. Subsequent analysis revealed mediating effects of passive coping on the relation between sexual and emotional abuse and OCS severity in patients and siblings, which remained significant in patients when controlling for positive symptom severity, but lost significance in siblings.

So far, studies investigating the association between individual and environmental risk-factors and co-occurring OCS in patients with a PD have been scarce. The present study adds to previous findings (Schreuder et al., 2017) by investigating different types of traumatic experiences and expanding the focus to a sample of unaffected siblings. Results showed that particularly higher levels of sexual abuse were related to the presence of OCS in patients and siblings, whereas no differences were found with regard to childhood neglect. These findings stand in line with reported associations between childhood adversities and OCS in the general population (Mathews et al., 2008) and primary OCD (Miller & Brock, 2017). Meta-analytic findings in primary OCD patients also showed a moderately stronger association between childhood sexual and emotional abuse and OCS severity than between neglect and OCS severity (Miller & Brock, 2017). Comparable results have been reported in the association between childhood abuse/neglect and psychotic symptoms (van Dam et al., 2015).

Regarding differences in coping preferences, in line with previous findings of Lysaker et al. (Lysaker et al., 2006), patients with PD and OCS showed a preference for dysfunctional passive and avoidant coping compared to patients without OCS (Lysaker et al., 2006). This tendency to withdraw when being confronted with stressors and the belief of being unable to do something about the situation (Schreurs et al., 1993) has been found associated with several psychopathological syndromes, including primary OCD (Moritz et al., 2016). Moreover, dysfunctional coping has been described to function as a mediator in the relation between trauma and OCS (Briggs & Price, 2009; Kroska et al., 2018), but also between traumatic experiences and psychotic symptoms (Ered et al., 2017). This suggests an interplay between childhood trauma, dysfunctional coping strategies and co-occurring symptoms of psychosis and OCS. Remaining mediating effects of passive coping on OCS severity in patients when controlling for severity of psychotic symptoms however suggest that early traumatic experiences add to the explanation of variance in co-occurring OCS. Recent findings on the prospective course and interaction of OCS and symptoms of psychosis showed persistent associations between severity of symptom domains on the between-subject level but also significant variation in symptom severity on the within-subject level, suggesting shared underlying

vulnerability factors, but also time-varying maintenance factors (Schirmbeck et al., 2018). Traumatic experiences could represent such a shared vulnerability factor increasing the risk to develop both symptom clusters.

In line with previous findings (Abdelghaffar, Ouali, Jomli, Zgueb, & Nacef, 2016; Hassija, Luterek, Naragon-Gainey, Moore, & Simpson, 2012) our results suggest that the experience of early childhood adversity (particularly emotional and sexual abuse) is related to the preference of avoidant and passive coping strategies. In turn, these maladaptive coping strategies in everyday life situations might lead to a more severe experience of stress and distress and increase the risk to aggravate or maintain both psychotic symptoms and comorbid OCS. Prospective studies are needed to investigate these proposed causal associations.

Our findings might have implications for the prevention and treatment of co-occurring OCS and psychotic symptoms. Increased diagnostic attention should focus on the exploration of early adverse experiences and strategies to cope with stressful events. Cognitive-behavioural interventions aiming to increase the ability to use more adaptive strategies in managing stressful situations might show beneficial effect on the course of co-occurring symptoms.

4.1. Strengths and limitations

This is the first study investigating the role of coping in the relation between trauma and OCS in patients with a PD in a relatively large sample of the representative cohort GROUP study (Korver et al., 2012). By including a sample of unaffected siblings, we were able to investigate similar associations in participants with an increased liability for psychosis and OCS without illness related confounding effects of for instance medication. Several limitations of the current study should be noted. This study has a cross-sectional design; therefore no causal conclusions can be drawn and bi-directional associations should be considered. For instance the presence of OCS might also have an effect on coping preferences and the recollection or judgement of childhood trauma. However, prospective studies support the assumption that childhood experiences and life events significantly predict subsequent psychopathology and found more consistent relations for coping as a mediator of the link from stress to symptoms than from symptoms to stress (Evans et al., 2015; Kim, Neuendorf, Bianco, & Evans, 2016). Participants who took part in the GROUP study may differ from individuals who declined participation or those who dropped out during the course of the study. As a result, generalizability of our findings is limited to a relatively high functioning group of patients with a PD and could potentially underestimate associations in more severely ill patients. Furthermore, some participants had missing data on the JTV and particularly UCL questionnaire. Non-significant comparisons between completers and non-completers supported the assumption that data were mainly missing at random. However, differences emerged with regard to illness duration. We tried to account for these differences by including illness duration as a potential confounder. Nevertheless, missing data resulted in smaller subsample of participants to examine differences and possible mediating effects of coping, with less power to detect effects. Finally, the decision to group participants according to a YBOCS total score > 0, acknowledging a dimensional perspective on OCS severity, might have led to underestimations of group differences. Future studies should investigate findings by dividing participants according to no versus more severe, clinically relevant OCS.

Ethical standards

All participants provided written informed consent prior to their inclusion in the current study. The study was approved by the accredited Medical Ethics Review Committee (METC) and has therefore been performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

Declaration of Competing Interest

All authors declare no conflict of interest regarding the present study.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.chiabu.2019.104243>.

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