The Influence of Types of Childhood Trauma on Psychosis in Bipolar I Patients

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Abstract

Background and objectives: Few studies have investigated the influence of childhood trauma (CT) and the different types of abuse on psychosis in bipolar I disorder (BDI). The first aim of this study was to compare control subjects and bipolar I patients on experiencing childhood trauma. The second aim of this study was to determine whether different types of childhood trauma have a different effect on psychosis in bipolar I patients.

Method: Bipolar I disorder and psychotic symptoms were assed using the SCID-I and childhood trauma was assed using the Childhood Trauma Questionnaire (CTQ). A total of 458 patients completed both questionnaires. 83 control subjects completed the CTQ.

Results: Results showed that bipolar I patients experienced more childhood trauma than control subjects. Almost half of the bipolar I patients had a history of childhood abuse. The different types of childhood trauma did not have an influence on psychosis in bipolar I patients.

Conclusions: Current data suggest that childhood trauma is highly present in bipolar I patients, but that it does not have a direct influence on the development of psychotic symptoms in this group.

Keywords: Bipolar, types of childhood trauma, abuse, neglect, psychosis.

The Influence of Types of Childhood Trauma on Psychosis in Bipolar I Patients.

Bipolar disorder (BD) is a pathological disturbance of mood that is characterized by episodes of (hypo)mania most commonly alternating with episodes of depression and has serious negative effects on patients suffering from this disorder (Barlow & Durand, 2009). A distinction can be made between bipolar I (BDI) and bipolar II (BDII) disorder. The former is characterized by the presence of at least one major manic episode. Such an episode is defined as a period in which a patient experiences elevated and/or irritable mood and is impaired in at least one area of functioning. This episode has to last at least one week (less if hospitalization is needed). For a diagnosis of BDII, the occurrence of at least one hypomanic episode and one major depressive episode is required. A hypomanic episode is a milder form of a manic episode and does not encompass impairment in functioning (American Psychiatry Association [DSM-IV-TR], 2000). BD has a prevalence of about 1 to 2 percent, usually commences in late adolescence to early adulthood and is as common in women as it is in men (Pini et al., 2005; Ten Have, Vollenbergh, Bijl & Nolen, 2002). Multiple episodes may reoccur throughout life.

BD may be linked to childhood trauma (CT). Research already established a high prevalence of CT in patients with severe mental disorder. Alvarez et al. (2011) found that 47.5 percent of people suffering from schizophrenia, BD or schizoaffective disorder may have a history of CT. This is strikingly different from the 19 to 33 percent of people in general, who experienced CT (Briere & Elliott, 2003; Brown, Cohen, Johnson & Salzinger; 1998). CT can be divided into five different groups, namely childhood physical abuse (CPA), childhood emotional abuse (CEA), childhood sexual abuse (CSA), childhood physical neglect (CPN), and childhood emotional neglect (CEN) (Bernstein, Fink, Handelsman, Foote, Lovejoy et al., 1994). Garno, Goldberg, Ramirez and Ritzler (2005) found that, of patients suffering

from BD only, 24 percent reported CPA, 37 percent CEA, 21 percent CSA, 12 percent CPN, and 24 percent reported CEN.

The prevalence of CT may contribute to a decrease in emotional functioning later in life. There is sufficient evidence to assume that CT has a chronic impact on emotional functioning, with effects persisting well into adulthood (Alloy, Abramson, Smith, Gibb & Neeren, 2006; Silverman, Reinherz & Giaconia, 1996; Springer, Sheridan, Kuo & Carnes, 2007). One of these effects may be an increase in psychotic symptoms. It is of great importance to research the relationship between CT and psychosis for two reasons. Firstly, psychosis may lead to unfortunate outcomes. Psychoses are linked to higher suicide rates (Tarrier, Khan, Carter & Picken, 2007) and to poorer outcomes on vocational rehabilitation programs (Lysaker, Beattie, Strasburger & Davis, 2005; Lysak, Meyer, Evans, Clements & Marks, 2001). Secondly, CT may intensify co-morbid psychotic symptoms already present in patients suffering from BD. Approximately 58 percent of BD patients reported they experienced at least one psychotic symptom during their illness (Goodwin & Jamison, 1990, 2007), compared to 5 percent of people in general who have had psychotic experiences (Van Os, Linscott, Myin-Germeys, Delespaul & Krabbendam, 2009). The psychotic symptoms BD patients report are most commonly delusions and/or hallucinations, showing a striking resemblance with schizophrenic patients, who often experience these positive psychotic symptoms (Bramon and Sham, 2001).

In addition to research done between BD and CT and BD and psychosis, several studies were done to investigate the link between CT and psychotic experiences. Research indicates that people who experienced psychotic symptoms may be more likely to experience CT as well (Bebbington et al., 2004; Jansen et al., 2004; Shevlin, 2007 & Spence et al., 2006). Research also indicates that psychosis may worsen as the severity of CT increases

(Jansen et al., 2004; Schenkel, Spaulding, Dilillo & Silverstein, 2005). Some associated CT and specific positive psychotic symptoms, like hallucinations (Jansen et al., 2004 & Ross, Anderson & Clark, 1994). In their review, Read, Van Os, Morrison and Ross (2005) also associated CT with hallucinations in adulthood. Jansen and colleagues (2004) were the first (and only) ones to find a relationship between CT and both hallucinations and delusions; earlier studies on the subject did not report this relationship for both hallucinations and delusions (for examples see Famaluro, Kinscherff & Fenton, 1990; Read, Agar, Argyle & Aderhold, 2003; Sansonnet-Hayden, Haley, Marriage & Fine, 1987 among others). A recent study conducted by Van Winkel, Van Nierop, Myin-Germeys and Van Os (2013) indicated a relationship between CT and psychosis, while controlling for the fact that there may be underlying genes for both CT and psychosis. This means that even if it can be assumed that genetic risk for psychosis may increase the chance of exposure to CT, the actual exposure itself further increases the risk for psychosis (Alemany et al., 2013). As to psychotic disorders, a relationship is found between CT and both schizotypical disorder and schizophrenia (Read et al., 2005; Schürhoff et al., 2009). Spence et al. (2006) found that patients with schizophrenia experienced more CT than patients with non-psychotic disorders. This indicates that CT does not only enhance the risk to experience psychotic symptoms, but may increase the risk to develop full blown psychotic disorders as well.

In contrast to all findings mentioned earlier, little is known about the impact of the different types of CT on psychotic symptoms. Most studies focus on childhood physical (CPA) and childhood sexual abuse (CSA), resulting in very little information on the other types of CT. Andrew, Gray and Snowden (2008) found that both psychotic and non-psychotic individuals experienced CT. Psychotic individuals, however, experienced significantly more CSA than non-psychotic individuals. Bebbington et al. (2004) found that patients who had a

history of CSA were 15 times more likely to experience psychosis compared to patients who had no history of CSA. In their study, Steel, Marzillier, Fearon & Ruddle (2009) found that there may be a relationship between childhood sexual and childhood physical abuse and paranoia, but none between sexual, physical abuse and magical thinking. Another study about the psychotic subtype of major depressive disorder indicated that patients suffering from this disorder seem more likely to have a history of childhood sexual and childhood physical abuse (Gaudiano & Zimmerman, 2010). A recent study indicated that both non-psychotic subjects and psychotic disorder patients, who experienced verbal auditory hallucinations, experienced both childhood sexual and childhood emotional abuse. This association was not found in the other types of trauma (Daalman et al., 2012). This is consistent with studies, suggesting that hearing (critical) voices is more strongly associated with childhood sexual abuse than any other type of CT (Hammersley et al., 2003), and that childhood physical, sexual and emotional abuse may all significantly heightened the risk of hallucinations later in life (Whitfield, Dube, Felitti and Anda, 2005). Hallucinations are frequently present in patients with BD (18 percent of all cases, Goodwin & Jamison, 1990), so it may be possible that psychosis in BD is related to a history of childhood emotional abuse as well. However, later research on the subject failed to prove this relationship. Romero et al. (2009) and Savitz et al. (2009) both suggest that CPA and CSA are strong predictors for psychosis in BD, but did not find this associations for the other types of CT. So far, these last two studies are the only ones who investigated the link between CT and psychosis in BD patients, making it that more important to conduct further research on the subject. In addition, no information is available on the effects of neglect (CPN and CEN) on psychotic symptoms. Two studies found a relationship between childhood neglect and schizophrenia (Vogel et al., 2009a; Sar et al., 2009) and one study (Gil and colleagues, 2009)

showed an association between CPN and CEN and functional impairment in patients with schizophrenia, but neither of these studies mentioned psychotic symptoms in particular.

There seems to be an apparent link between CT and psychosis, but Morgan and Fisher (2007) stated that the majority of studies about the subject have many shortcomings. Samples are often small, highly selected and heterogeneous and the definition and measures of abuse vary in different studies (e.g. asking one single question to measure abuse and not distinguishing childhood and adult exposure). In their opinion, the methodological limitations and inconsistency in findings of current studies on the subject should induce caution when interpreting these. This viewpoint is shared by Larsson and colleagues (2013), who found that CT is associated with severe BD, but reported no unidirectional relationship for psychosis. Bendall, Jackson and Hulbert (2010) mentioned that it is difficult to draw firm conclusions about the relationship between CT and psychosis due to the use of retrospective reports and again, varying definitions of CT. There are only a few studies that show methodological strength (for example Jansen et al., 2004) and more quality research is required before a clear relationship between CT and psychotic symptoms can be confirmed. According to Bendall, Jackson, Hulbert and McGorry (2008) one of the aspects that should be considered, is the use of covariates. A covariate that must not be overlooked when researching CT and psychosis is substance abuse. Although there are studies that already found an association between CT and psychosis, while controlling for substance abuse (Hammersley et al., 2003), a lot of research indicates there may be an association between substance abuse, psychosis and trauma. Houston, Murphy, Adamson, Stringer and Shevlin (2008) reported an association between CT, use of cannabis and adult psychosis. Degenthardt, Hall and Lynskey (2001) found that subjects who experienced psychosis were more likely to meet DSM-IV criteria for alcohol use disorder and cannabis use disorder. In a

recent study substance abuse was associated with psychotic experiences, with alcohol abuse being more strongly associated with these experiences than cannabis abuse (Galletly, Van Hooff & McFarlane, 2011).

Summarizing, research has been done considering CT and psychotic symptoms in non-psychotic subjects, psychotic subjects and patients suffering from a psychotic disorder. However, information about the impact of CT, and more specifically the different types of CT, on psychosis in BD is lacking.

In addition, previous research did not only include BDI patients (Garno et al., 2005; Hammersley et al., 2003; Larsson et al., 2013; Romero et al., 2009), did not have a control group (Romero et al., 2009) and often had a small sample size (Gaudiaco & Zimmerman, 2010; Savitz et al., 2009). Bendall (2008) stated that future research on CT and psychosis should concentrate on more than only CSA, to use the Childhood Trauma Questionnaire (CTQ) to measure CT, and to use covariates to make sure the findings are not the result of confounding factors. The current study will take these suggestions into account, distinguishing the different types of trauma and their impact on psychotic symptoms in a large sample of BDI patients. This will be done through three hypotheses:

H1: The presence of CT will be significantly higher in patients suffering from BDI than participants not suffering from BDI.

H2: The chance of experiencing psychosis will be significantly higher in BDI patients who have a history of CT than in BDI patients who do not have a history of CT.

H3a: The chance of experiencing psychosis will be significantly higher in BDI patients who have a history of CPA than in BDI patients who have a history in CEA, CPN and CEN

H3b: The chance of experiencing psychosis will be significantly higher in BDI patients who have a history of CSA than in BDI patients who have a history in CEA, CPN and CEN.

H3c: There will be no significant difference between a history of CPA and CSA in their effect on psychosis.

H3d: The chance of experiencing psychosis will be significantly higher in BDI patients who have a history of CEA than in BDI patients who have a history of CPN and CEN.

H3e: There will be no significant difference between a history of CPN and CEN in their effect on psychosis.

Method

Design

The current study is a part of a large ongoing case control study, *Bipolar Genetics*, which aims to identify genes associated with BDI. In order to do so they aim to include 2500 patients with BDI, 2500 first degree relatives and 400 control subjects.

Bipolar Genetics is conducted by the University Medical Center in Utrecht (UMCU), in association with the University of California, Los Angeles (UCLA) and is approved by the Medical Ethical Committee (MEC) UMCU.

Sample

Patients were mostly recruited via pharmacies (usage of lithium), psychiatric treatment centers and the VMDB (Dutch Association for the Manic Depressed and Concerned Parties). After an appointment was made via phone or e-mail, a letter of confirmation and some additional information was sent to the patient via mail. Patients were included if they (1) were diagnosed with BDI (DSM-IV), (2) at least had three grandparents of Dutch descent, (3) were over 18 years old, (4) had a premorbid IQ over 80, and (5) did not suffer from BDI due to a somatic illness.

The control participants were recruited via the website (www.bipolargenetics.nl) and advertisements. A great amount of control subjects previously participated in another study, where they gave consent to be approached for other scientific studies. These subjects all received information about the current study, and were subsequently asked to participate. After an appointment was made via phone or e-mail, a letter of confirmation and some additional information was sent to the subject by mail. Control participants were included if they (1) had no history of BD or any other psychotic disorder, (2) had no first degree relatives with a history of BD or any other psychotic disorder, (3) had at least three grandparents of Dutch descent, (4) were over 18 years old, and (5) had a premorbid IQ of over 80.

Of all 689 subjects, 579 were classified as patients and 110 were classified as control participants. 121 patients and 27 control subjects were excluded for not meeting the inclusion criteria (IQ <80 and serious physical illness) and missing values on the CTQ. A total of 458 patients and 82 control subjects remained. Table 1 shows the distribution of gender and age in total and in both groups separately. There was a significant difference in gender between the two groups. However, the effect size was small, χ^2 (1) = 4.91, p = .027, φ = .095. No significant effect was found for age, t (96.978) = 1.694, p = .094, d = .334. These two groups were used to test the first hypothesis.

Table 1

Distribution of Gender and Mean Age (SD) of All Participants

Variable	Control Subjects (*N* = 83)	BDI patients (*N* = 458)	Total (*N* = 541)
Men	27 (32.5%)	209 (45.6%)	236 (43.6%)
Women	56 (67.5%)	249 (54.4%)	305 (56.4%)
Age	45.43 (17.411)	48.81 (12.151)	48.29 (13.133)

For the second and third hypothesis only the BDI patients were included. Of all 458 BDI patients, nine were excluded due to the fact that it was not clear whether they had experienced psychotic symptoms or not. Mean age of the BDI patients is now 48.77 years (*SD* = 12.17). 53.9% of BDI patients were female. Table 2 shows the highest level of completed education of all patients on a 7 point Likert scale, ranging from 1 ("primary education or lower") to 7 ("university").

Table 2

Highest Level of Completed Education (N=449)

Education	Frequency	Percentage
(1) LO or lower	8	1.8
(2) VGLO	7	1.6
(3) MAVO/LBO	57	12.7
(4) HAVO/MBO	114	25.4
(5) VWO	29	6.5
(6) HBO	134	29.8
(7) WO	100	22.3

Measures

Structured Clinical Interview for DSM Disorders Axis I (SCID-I). The SCID-I is a semi-structured interview for making major DSM-IV Axis I diagnoses (SCID-I/P: First, Spitzer, Gibbon, & Williams, 2002) and was used to determine whether patients met the criteria for a BDI diagnosis. Psychosis was also measured using the SCID-I. All researchers have had SCID-training to adequately administer the questionnaire. Lobbestael, Leurgans and Arntz (2011) evaluated the inter-rate reliability of the SCID, and found Kappa values of the axis I disorders between 0.61 and 0.83, with a mean of 0.71. This can be considered a fair to excellent reliability. In the current study a Dutch version of the SCID-I was used (Van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1999).

Childhood Trauma Questionnaire (CTQ). The CTQ (Bernstein et al., 1994) is a 28 item self-report inventory that was used to determine whether a participant has

experienced childhood trauma. The CTQ distinguishes 5 types of childhood trauma; (1) physical abuse, (2) emotional abuse, (3) sexual abuse, (4) physical neglect and (5) emotional neglect. The questions are answered using a 5-point Likert scale, ranging from 1 (“never true) to 5 (“always true”). The cutoffscores are 10 or higher for CPA, 13 or higher for CEA, 8 or higher for CSA, 10 or higher for CPN and 15 or higher CEN. The internal consistency of the CTQ is good with a Cronbach's alpha of .91, ranging from .58 for physical neglect to .94 for sexual abuse. The reliability of the CTQ has been demonstrated in patients with BD (Etain et al., 2010). A sample question is: *"I thought that my parents wished I had never been born"*. Another sample question is: *"I got hit so hard by someone in my family that I had to see a doctor or go to the hospital"*. In the current study a Dutch version of the CTQ: the JTV (Jeugd Trauma Vragenlijst; Arnts & Wessel, 1996) was used**.**

Mini-International Neuropsychiatric Interview (M.I.N.I.). The M.I.N.I (Sheehan et al., 1998) is a structured clinical interview that was used to determine psychiatric disorders in control subjects. Since having a psychotic disorder and/or having experienced a manic episode were exclusion criteria for control subjects, these disorders were most important in the current study. Results by Sheehan and colleagues (1998) showed a good concordance between the M.I.N.I. and SCID diagnoses, with kappa values of 0.67 and 0. 73 for respectively current mania and lifetime mania and values of 0.53 and 0.76 for respectively current psychotic disorder and lifetime psychotic disorder. In the current study a Dutch version of the M.I.N.I. was used.

Composite International Diagnostic Interview (CIDI). The CIDI (WHO, 1990) is a fully standardized diagnostic interview for assessing mental disorders. The CIDI was used to determine whether there had ever been question of alcohol and/or substance abuse/dependence. When no clear diagnosis was available, the frequency of intake was

looked at. The cutoff for alcohol intake was 15 or more drinks per week for women and 21 or more drinks per week for men. The cutoff score for substance intake was once a week or more. Reliability of the CIDI is good with kappa values of .78 for alcohol abuse/dependency and .73 for substance abuse/dependency (Wittchen, 1994). In the current study, a Dutch version of the CIDI was used (Ter Smitten, Smeets & Van den Brink, 1998).

Nederlandse Leestest voor Volwassenen (NLV). The NLV (Schmand, Lindeboom & Van Harskamp, 1992) is a Dutch reading test for adults, used to estimate the premorbid intelligence level of patients and control subjects. The current study used this test to exclude participants with a premorbid IQ <80.

Procedure

The current study consisted of two parts: (1) an online questionnaire and (2) a test day at the UMCU.

The online questionnaire contained a translated version of the Childhood Trauma Questionnaire (CTQ) among many others that were used to gather information about the participants for the main study. Some participants preferred a paper version of the questionnaire; this was sent to them by mail. Filling in the questionnaire took about an hour and a half and participants received a voucher worth €15 when they were finished.

The testing day consisted of several elements. Both patients and control subjects started by signing a written informed consent. No data was obtained without this permission. Subsequently, a blood sample was taken. Then, patients filled out two self-rate questionnaires: (1) the Inventory for Depressive Symptoms (IDS) and (2) the Altman Self-Rating Mania Scale (ASRM-NL). This was followed by a psychiatric interview, containing SCID-I, neuropsychological test (only if their affective state was euthymic according to the IDS, ASRM and SCID-I), and some additional measures (e.g. blood pressure, length and weight).

Control subjects started directly with a psychiatric interview, containing the M.I.N.I., followed by the same neuropsychological tests and additional measures.

Total time of testing was approximately three hours for patients and one hour and a half for control subjects, for which they received a voucher when finished (€30 and €20 respectively).

Data Analysis

For statistical analysis the Statistical Package for Social Sciences 20.0 (SPSS, Inc., Chicago, IL, USA) was used. To test Hypothesis 1, a Pearson's chi-square test was used. *Group* (BDI patients and control subjects) was used as the independent variable and *Childhood Trauma* was used as the dependent variable. To test Hypothesis 2 and Hypothesis 3, a logistic regression was used. The independent variable for these hypotheses was *Psychosis.* The dependent variable for Hypothesis 2 was *Childhood Trauma*. For Hypothesis 3, the dependent variables were *Childhood Physical Abuse (CPA), Childhood Emotional Abuse (CEA), Childhood Sexual Abuse (CSA), Childhood Physical Neglect (CPN)* and *Childhood Emotional Neglect (CEN).* Gender, age, completed level of education, socioeconomic status (SES) and drugs & alcohol abuse were includes as covariates.

Results

Hypothesis 1

Based on the subjects' CTQ scores it was determined whether or not they had experienced CT. Everyone who scored above the cutoff score in at least one subcategory of CT, was marked as having experienced CT. Table 3 shows the percentages of CT in control subjects, BDI patients and both groups together. Almost half of BDI patients had a history of CT. To test the first hypothesis, that the presence of CT is significantly higher in BDI patients

than in control subjects, a Pearson's chi square was used. The test showed a significant association between the group a subject belonged to and whether or not they had experienced CT, χ^2 (1) = 8.42, p = .004. Based on the odds ratio, the odds of having experienced childhood trauma is 2.1 times larger for BDI patients than for control subjects.

Table 3

Percentages of Childhood Trauma in All Subjects, Divided by Groups (N = 541)

Variable	Control Subjects	BDI patients	Total
History of CT	28.9	46.1	43.4
No history of CT	71.1	53.9	56.6

Hypothesis 2

By means of a logistic regression it was tested whether a history of CT would increase the chance of experiencing psychotic symptoms in BDI patients. Results are listed below in table 4. There was no significant effect for a history of CT (p = .215). However, a significant effect was found for age (p = .022) and education (p = .048).

Table 4

Logistic Regression Results of CT on Psychosis

		95% CI for Odds Ratio			
	B (SE)	Lower	Odds Ratio	Upper	Wald
Step 0					
Constant	1.066 (.108)				
Step 1					
Constant	3.008 (.718)				
History of CT	-.293 (.236)	.470	.746	1.185	1.537
Gender	.371 (.231)	.922	1.450	2.279	2.590
Age	**-.027 * (.012)**	.952	.974	.996	5.262
Education	**.145 * (.073)**	1.001	1.156	1.335	3.913
SES	.195 (.209)	.807	1.215	1.829	.868
Drugs & Alcohol	.324 (.243)	.859	1.382	2.224	1.783

Note: R^2 = .99 (Hosmer & Lemeshow), .053 (Cox & Snell), .079 (Nagelkerke). Model χ^2 (1) = 24.62, p <.001.

* $p < .05$

Hypothesis 3

A regression was used in order to test which types of CT increase the chance of experiencing psychosis. Results of this analysis can be found in table 5. There was no significant effect for any of the types of CT (CPA: p = .708, CEA: p = .715, CSA: p = .340, CPN: p = .600 and CEN: p = .563), so no comparison between the types of CT can be made. Again, a significant effect was found for age (p = .028). A trend was found for education (p = .069) and gender (p = .088).

Table 5

Logistic Regression Results of Types of CT on Psychosis

		95% CI for Odds Ratio			
	B (SE)	Lower	Odds Ratio	Upper	Wald
Step 0					
Constant	1.066 (.108)				
Step 1					
Constant	3.008 (.718)				
CPA	-.185 (.493)	.316	.831	2.186	.140
CEA	.128 (.351)	.571	1.137	2.263	.133
CSA	-.317 (.332)	.380	.728	1.397	.910
CPN	-.166 (.316)	.456	.847	1.574	.275
CEN	.161 (.278)	.681	1.174	2.024	.334
Gender	.399 (.234)	.942	1.491	2.359	2.913
Age	**-.026 * (.012)**	.952	.975	.997	4.807
Education	.133 (.073)	.990	1.142	1.318	3.309
SES	.179 (.210)	.792	1.196	1.805	.723
Drugs & Alcohol	.349 (.242)	.882	1.418	2.280	2.079

Note: R^2 = .25 (Hosmer & Lemeshow), .054 (Cox & Snell), .080 (Nagelkerke). Model χ^2 (1) = 25.007, p <.01.

* $p < .05$

Discussion

The aim of this study was (1) to research the presence of CT in BDI patients and control subjects to replicate earlier findings, (2) to elaborate on earlier findings by comparing the presence of psychosis in BDI patients suffering from CT and BDI patients not suffering from CT and (3) to increase the knowledge about the effect of different types of CT on psychosis in BD. The first hypothesis that was tested in this study, was that the presence of CT is higher in BDI patients than in control subjects. In line with our hypothesis and previous findings on the subject (Alvarez et al., 2011; Briere & Elliott, 2003; Brown, Cohen, Johnson & Salzinger, 1998), the results showed that BDI patients have experienced more CT than control subjects. The percentage of BDI patients with a history of CT found in this study (46.1%) is close to the percentage found by Alvarez and colleagues in 2011 (47.5%).

The second hypothesis that was tested in this study, was that the chance of experiencing psychosis is higher for BDI patients with a history of CT than for BDI patients without a history of CT. No evidence was found for this hypothesis; results showed no apparent relationship between CT and psychosis. This seems in contrast to previously mentioned findings (Bebbington et al., 2004; Jansen et al., 2004; & Spence et al., 2006, among others). However, Larsson and colleagues (2013) found that CT is associated with BD, but they also did not find an association with psychosis. Possibly, the effect of CT on psychosis is different in BD than in other psychotic disorders like schizophrenia, although this seems unlikely. Psychotic symptoms in BD and schizophrenia seem to be very similar (Bramon and Sham, 2001). A further reason why no effect was found may be the group classification. Patients who have experienced just one psychotic symptom/episode were put in the same group as patients who have experienced multiple psychotic symptoms/episodes. As a result, the two groups (psychotic and non-psychotic) may not have been distinct

enough. Perhaps if the psychotic group consisted only of people who had multiple psychotic symptoms and/or episodes a relationship would have been found.

The third hypothesis addressed this paper's main issue by testing whether different types of CT would have a different effect on psychosis. There were five sub hypotheses. In contrast to the expectations, no effect on psychosis was found for any of the subtypes of CT. There are only two other studies that studies the relationship between types of CT and psychosis in a group of BD patients (Romero et al., 2009 & Savitz et al., 2009). Both of these studies found that CPA and CSA are predictors for psychosis in BD, but they did not find this relationship for CEA, CPN and CEN. The results of the current study therefore replicate some of their findings, but not all of them. There may be a methodological explanation. The study of Romero et al. (2009) included children and adolescents only, thus these findings may be limited. Savitz et al. (2009) had a small sample size (N=25 for psychotic individuals and N=24 for non-psychotic individuals), however, they found results while controlling for mood, medication and alcohol independence/abuse. Their results may represent chance findings due to the small sample size, but it is more likely that their findings in a white South African sample are not generelizable to a Dutch sample. This may explain the discrepancy in the results. Since the current study made use of a large BDI group, while controlling for confounding factors, it is highly believable that none of the types of CT have an influence on psychosis in a large, Dutch BDI group. However, it must be taken into account that no distinction was made in severity of CT and psychosis. Spauwen, Krabbendam, Lieb, Wittchen and Van Os (2006) found that trauma is associated with more severe psychotic symptoms and not so much with the presence of psychotic symptoms. If this distinction was made in the current study, relationships may have been found.

The current study has several strengths and limitations. A first strength of this study

is that it had a case-controlled design. Secondly, both the control group and the patient group consisted of a large sample size. Subsequently, only BDI patients were included, making the results generalizable to other BDI patients. Also, this study made use of five different covariates, making sure that the findings were not the result of plausible confounding factors. In addition, the CTQ was used to look at all five types of CT and not just CT in general. To conclude, all questionnaires used were of good psychometric quality. The use of the CTQ especially can be seen as a great strength; it is a standardized and psychometrically sound measure of CT, and is therefore recommended for future research by Bendall et al. (2008) in their paper on CT and psychosis. Even though the use of the CTQ can also be seen as a limitation due to the fact that it has a retrospective manner of reporting CT and may lead to a possible recall bias, reports of CT in patients with severe mental illness have been found to be generally reliable (Gaudiano & Zimmerman, 2010). A limitation may be the lack of information about the psychotic episodes experienced by BDI patients. Perhaps CT has no direct effect on whether a BDI patient will experience psychotic symptoms, but does have an effect on the frequency and/or severity of these psychoses. It may also be the case that CT may only have an influence on psychosis in patients who already have a worse clinical outcome of BD, worsening the symptoms that are already highly present.

Future research could focus on proposed interaction of CT and other unfavorable features (besides psychosis) that increase severity in BD, like early age of onset, rapid cycling and suicidality. And, as mentioned, research could focus on specific features of psychotic episodes experienced by BDI patients. It is also necessary to replicate the findings of this study in another large BDI sample to test the generalizability of current results.

Conclusion

This study showed that bipolar I patients have experienced more childhood trauma than control subjects. There was no relationship found between childhood trauma and psychosis. This also applies for the different types of childhood trauma. No relationship was found between any of subtypes of childhood trauma and psychosis. Although the lack of information about specific features of psychosis should be taken into account, current results seem to represent the fact that a history of childhood trauma does not increase the risk of psychosis in Dutch BDI patients.

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