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Sexual and physical abuse during childhood and adulthood as predictors of hallucinations, delusions and thought disorder

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In light of recent studies indicating a relationship between child abuse and the positive symptoms of schizophrenia, this study investigated the hypotheses that childhood sexual and physical abuse are related to hallucinations, delusions, and thought disorder in adults, and that those relationships are greater in those who have suffered abuse during adulthood as well as childhood. In 200 community mental-health-centre clients, the clinically evaluated symptomatology of the 92 clients whose files documented sexual or physical abuse at some point in their lives was compared with that of the 108 for whom no abuse was documented. In the 60 patients for whom child abuse was documented, hallucinations (including all six subtypes), but not delusions, thought disorder or negative symptoms, were significantly more common than in the non-abused group. Adult sexual assault was related to hallucinations, delusions, and thought disorder. In linear regression analysis, a combination of child abuse and adult abuse predicted hallucinations, delusions, and thought disorder. However, child abuse was a significant predictor of auditory and tactile hallucinations, even in the absence of adult abuse. Possible psychological and neurobiological pathways from abuse to symptoms are discussed, along with research and clinical implications.

Investigating whether child abuse (CA) is related to mental-health problems in adulthood is important theoretically, but also has crucial clinical implications in terms of the accuracy of formulations and the comprehensiveness of treatment planning. The range of adult disorders for which studies seem to indicate that CA or neglect may have a causal role includes: depression, anxiety disorders, post-traumatic stress disorder (PTSD), eating disorders, substance abuse, sexual dysfunction, personality disorders, and dissociative disorders (Beitchman *et al.*, 1992; Boney-McCoy & Finkelhor, 1996; Kendler

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et al., 2000). Studies consistently report a strong relationship between CA and suicidality (Santa Mina & Gallop, 1998). A recent study of adult outpatients found child sexual abuse to be a more powerful predictor of suicidality than a current diagnosis of depression (Read, Agar, Barker-Collo, Davies, & Moskowitz, 2001). The relationship between CA and adult psychopathology remains after controlling for mediating variables such as poverty, marital violence, and parental substance abuse or psychiatric history (Boney-McCoy & Finkelhor, 1996; Fleming, Mullen, Sibthorpe, & Banner, 1999; Kendler *et al.*, 2000; Pettigrew & Burcham, 1997). The more severe the abuse, the greater is the probability of psychiatric disorder in adulthood (Fleming *et al.*, 1999; Mullen, Martin, Anderson, Romans, & Herbison, 1993).

Nevertheless, it is still sometimes assumed that CA is less related, or even unrelated, to the most severe psychiatric disturbance, including symptoms indicative of psychosis in general and schizophrenia in particular. The literature reviewed below, however, suggests that CA may be just as powerfully related to the most severe symptomatology, including hallucinations and delusions, as it is to less severe symptomatology.

Child abuse among psychiatric inpatients

Compared with other psychiatric patients, those who experienced childhood physical abuse (CPA) or childhood sexual abuse (CSA) not only are more likely to attempt suicide, but also have earlier first admissions and longer and more frequent hospitalizations, spend more time in seclusion, receive more psychotropic medication and exhibit higher global symptom severity, (Beitchman *et al.*, 1992; Briere, Woo, McRae, Foltz, & Sitzman, 1997; Bryer, Nelson, Miller, & Krol, 1987; Goff, Brotman, Kindlon, Waites, & Amico, 1991; Pettigrew & Burcham, 1997; Read, 1998; Read, Agar *et al.*, 2001; Sansonnet-Hayden, Haley, Marriage, & Fine, 1987).

A study of girls in a child and adolescent psychiatric inpatient unit found that 73% had suffered either CSA or CPA (Ito *et al.*, 1993). In 13 studies of 'seriously mentally ill' women the percentage that had experienced CSA or CPA ranged from 45% to 92% (Goodman, Rosenberg, Mueser, & Drake, 1997). A review of 15 studies totalling 817 women inpatients, calculated that 64% reported CPA or CSA (CSA 50%, CPA 44 %) (Read, 1997). Studies of female inpatients, or predominantly psychotic outpatients, find incest rates of 22%–46% (Beck & van der Kolk, 1987; Cole, 1988; Muenzenmaier, Meyer, Struening, & Ferber, 1993; Rose, Peabody, & Stratigeas, 1991). After controlling for factors related to disruption and disadvantage in childhood, women who suffered CSA involving intercourse are 12 times more likely than non-abused females to have had a psychiatric admission (Mullen *et al.*, 1993).

Male inpatients report similar CPA rates. Their CSA rate ranges from 22% to 39% and is at least double that of men in general (Jacobson & Herald, 1990; Palmer *et al.*, 1994; Rose *et al.*, 1991; Sansonnet-Hayden *et al.*, 1987; Wurr & Partridge, 1996).

Child abuse and schizophrenia

Research measures

CSA and CPA are consistently related to scales indicative of psychosis in general and schizophrenia in particular. In the general population, CSA is related to schizotypy, including perceptual aberrations (Startup, 1999). High perceptual aberration scores, which are predictive of clinical psychoses, are 10 times more common in adults who

were maltreated as children (Berenbaum, 1999). Among women inpatients the 'Psychoticism' scale of the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1977) correlates with abuse history more strongly than any other clinical scale on the SCL-R-90 (Bryer *et al.*, 1987). 'Psychoticism' also discriminates more powerfully between men who have and have not suffered CA (Swett, Surrey, & Cohen, 1990), and correlates more strongly with the number of abuse perpetrators (Ellason & Ross, 1997), than any other SCL-90-R scale. Both the SCL-90-R Psychoticism scale and the Schizophrenia scale of the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) differentiate incest victims and non-abused women (Lundberg-Love *et al.*, 1992). Chronically mentally ill women who were abused score higher on the Beliefs and Feelings Scale, measuring psychotic symptoms (Muenzenmaier *et al.*, 1993).

Clinical diagnoses

Among child psychiatric inpatients, 77% of those who suffered CSA, but only 10% of those who had not, were diagnosed psychotic (Livingston 1987). In a mixed-gender sample of inpatients and outpatients with a schizophrenia diagnosis, 45% had suffered either CSA or CPA (Ross, Anderson, & Clark, 1994). Among women inpatients diagnosed schizophrenic, 60% had suffered CSA (Friedman & Harrison, 1984). Among chronically hospitalized psychotic women, 46% had suffered incest (Beck & van der Kolk, 1987). In a sample of "seriously mentally ill" patients (64% diagnosed as schizophrenic), 76% of the women and 48% of the men had suffered CSA (Goodman *et al.*, 1999). Among 426 first admissions for psychosis in the USA, the prevalence of lifetime trauma exposure was 63% for men (24% child abuse) and 77% for women (44% child abuse) (Neria, Bromet, Sievers, Lavelle, & Fochtman, 2002). Even a chart review (which underestimates abuse rates; see Discussion) found that 52% of female, and 28% of male, patients diagnosed with schizophrenia in a British 'special hospital' had suffered 'parental violence against patient' (Heads, Taylor, & Leese, 1997). Of 5,362 children, those whose mothers had poor parenting skills when they were 4 were significantly more likely to be diagnosed schizophrenic as adults (Jones, Rodgers, Murray, & Marmont, 1994). Of 524 child guidance clinic attenders, 35% of those who later became 'schizophrenic' had been removed from home because of neglect—twice as many as any other diagnostic group (Robins, 1966).

Parental hostility precedes, and is predictive of, schizophrenia (Rodnick, Goldstein, Lewis, & Doane, 1984). In families where both parents expressed high criticism toward their child, 91% of disturbed but non-psychotic adolescents were diagnosed (within 5 years) as schizophrenic. In families in which both parents were rated low on criticism, only 10% of similarly disturbed but non-psychotic adolescents were diagnosed schizophrenic (Norton, 1982).

Among women at a psychiatric emergency room, 53% of those who had suffered CSA had 'nonmanic psychotic disorders' (e.g. schizophrenia, psychosis not otherwise specified) compared with 25% of those not exposed to CSA; with corresponding CPA rates of 49% and 33% After controlling for 'the potential effects of demographic variables, most of which also predict victimization and/or psychiatric outcome', CSA was related to non-manic psychosis ($p = .005$) and depression ($p = .035$) but not manic or anxiety disorders (Briere *et al.*, 1997, p. 99).

Child abuse and specific symptoms

Mapping the relationship between specific types of CA and specific types of psychotic or schizophrenic symptomatology is in its infancy. Such an approach is consistent with

the recent trend towards exploring the aetiology of, and treatments for, discrete cognitions and experiences considered indicative of schizophrenia rather than continuing to employ the heterogeneous construct of 'schizophrenia' itself (Bentall, in press; Bentall & Kaney, 1996; Chadwick, Birchwood, & Trower, 1996; Morrison, 2002; Read, Mosher, & Bentall, in press). Thus far, it appears that hallucinations (particularly certain kinds of auditory hallucinations) may be more strongly related to CA (particularly CSA in general, and incest in particular) than are delusions or thought disorder.

Hallucinations

In a community survey, 46% of those with three or more Schneiderian symptoms of schizophrenia had experienced CPA or CSA, compared with 8% of those with no such symptoms (Ross & Joshi, 1992). In an inpatient sample, 77% of those reporting CSA or CPA had one or more of the 'characteristic symptoms' of schizophrenia listed in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association, 1994, p. 285): hallucinations (50%), delusions (45%), or thought disorder (27%) (Read & Argyle, 1999).

Famularo *et al.* (1992) found that hallucinations were more likely in maltreated children than in a control group. Among adolescent inpatients, those that had suffered CSA were more likely to hallucinate (Sansonnet-Hayden *et al.*, 1987). Among patients diagnosed schizophrenic, those subjected to CSA or CPA had a mean of 6.3 Schneiderian symptoms, compared with 3.3 in the non-abused patients ($p < .001$). CA was related to six Schneiderian symptoms, with the strongest relationship being voices commenting, and another being visual hallucinations (Ross *et al.*, 1994).

Ellenson (1985) identified, in 40 women, a 'post incest syndrome', including hallucinations, which was 'exclusively associated with a history of childhood incest' (p. 526). This was replicated in 10 other incest cases (Heins, Gray, & Tennant, 1990). In an inpatient study (Read & Argyle, 1999) all female incest survivors experienced hallucinations and were significantly more likely to do so than those subjected to extra-familial CSA. Those subjected to CPA were equally likely to hallucinate (53%) as those subjected to CSA (58%). Among those who had suffered both CSA and CPA, 71% experienced hallucinations. In a study of bipolar affective disorder, patients who had suffered CSA were twice as likely as other patients to experience some form of hallucination, three times more likely to have auditory hallucinations and six times more likely to hear voices commenting. However, no relationship was found with visual or tactile hallucinations (Hammersley *et al.*, in press).

Delusions

Sansonnet-Hayden *et al.* (1987) found that in adolescent inpatients, those subjected to CSA were not more likely to have delusions. Hammersley *et al.* (in press) found no relationship between CSA and delusions among bipolar affective disorder patients. However, more paranoid ideation has been found among female inpatients who had suffered CSA or CPA than those who had not (Bryer *et al.*, 1987). Paranoid ideation was also one of the symptom types related to CA among schizophrenic patients in the Ross *et al.* (1994) study, along with ideas of reference, thought insertion, and reading others' minds. High rates of sexual delusions have been found in incest survivors (Beck & van der Kolk, 1987) but not those exposed to CSA in general or CPA (Goff *et al.*, 1991).

Thought disorder

The literature on CA and thought disorder is small. Goff *et al.* (1991) found no difference. Another inpatient sample found that for those who had suffered CSA, delusions and thought disorder were equally common (both 35%), but among those who had suffered CPA, 50% experienced delusions, but only 17% had a thought disorder (Read & Argyle, 1999).

Symptom content

Famularo *et al.* (1992) found that in severely maltreated 5–10-year-olds, 'the content of the reported visual and/or auditory hallucinations or illusions tended to be strongly reminiscent of concrete details of episodes of traumatic victimization' (p. 866). In an adult inpatient study, the content of 54% of the schizophrenic symptoms of abused patients was clearly related to CA. For example, the voice commanding that a patient kill herself was the voice of the parent who had abused her as a child (Read & Argyle, 1999).

Abuse during adulthood

None of these studies relating CA to the symptoms of schizophrenia address adulthood sexual assault (ASA) or adulthood physical assault (APA). Yet, in studies of female psychiatric inpatients, the prevalence of ASA ranges from 22% to 38%, and of APA from 42% to 64% (Goodman *et al.*, 1997). In a study of chronically mentally ill outpatients, the rates for women were APA—90% and ASA—79%, and for men APA—71% and ASA—19% (Goodman *et al.*, 1999). Adulthood abuse should therefore be included when studying the relationship between CA and schizophrenic symptoms. Any such relationships might be partly explicable in terms of adult abuse. Where both child and adult abuse are related to a symptom, this may be because CA is a risk factor for being abused as an adult (Briere *et al.*, 1997; Muenzenmaier *et al.*, 1993). Furthermore, many of the studies reviewed above do not analyse CSA and CPA separately, address a limited number of symptom types (most exclude negative symptoms of schizophrenia), have studied women only, or have used samples of 100 or fewer.

Aim of the study

Therefore, the aim of the current study was to analyse, using a mixed-gender sample of 200, the individual relationships of four abuse types (ASA, CSA, APA, ASA) to four DSM-IV 'characteristic symptoms' of schizophrenia (hallucinations, delusions, thought disorder, and negative symptoms), and to the subtypes of the three positive symptoms.

Method

Participants

The participants were 114 women and 86 men treated consecutively at an urban, publicly funded, New Zealand Community Mental Health Centre (CMHC). The mean treatment length was 151 days (range 7–272). The mean age was 36.6 years (range 18–69). One hundred and forty-four were of European descent, 21 Maori, 12 Pacific Islanders, and 19 classified as 'other', and in four cases ethnicity was not noted. The most common diagnoses were depression (85), schizophrenia (28), substance abuse (20), bipolar disorder (15), personality disorder (10), anxiety disorder (9), adjustment disorder (7), PTSD (7), psychotic episode (5), schizoaffective disorder (5), and psychotic

disorder—not otherwise specified (4). To the best of our knowledge, these demographic and clinical characteristics are not atypical for New Zealand CMHCs.

Measures

All data were collected through a review of medical records. (In New Zealand 'audits' of medical records for research or administrative purposes require permission from management but not individual clients.) The 200 files, spanning a 7-month period of intakes, were read in their entirety (by a registered clinical psychologist with 20 years' clinical experience—JR and a postgraduate clinical psychology student—KA). Information was obtained regarding clinical diagnoses, details of type, subtype and content of the 'characteristic symptoms' of schizophrenia listed in DSM-IV, and documentation of any sexual or physical abuse. Because the study was a chart review, operational definitions were based on what clinicians recorded as 'abuse', 'assault', or 'rape'. The age for childhood abuse was 16 years or younger.

In 25 cases there was evidence that abuse may have occurred, but no clear conclusion had been reached. These were independently rated by two researchers (KA and JR) as to whether they were 'highly probable'; with the criterion being a subjective estimation of 95% certainty that abuse had occurred. Only the six cases in which both raters independently judged a case to be highly probable were included for analysis. An example of a case included as CSA is: '. . . has made serious accusations about being the victim of sexual abuse . . . needs to be given as much support as possible' and elsewhere in notes by different clinician '. . . was living in a situation where apparently a whole group of boys lived with an older gentleman whose relationship with them was questionable'. An example of a case included as CPA was: 'Depressed alcoholic father. Describes a background of violence and physical abuse as a child'. Examples of the 19 excluded cases are: 'raised from a babe in an abusive situation by an aunt', and 'abusive father'.

Analyses

For data in discrete categories, analysis utilized the Pearson chi-square. Independent samples *t* tests (two-tailed) were used to analyse differences involving continuous variables. Stepwise linear regression, with $p < .05$ indicating significance, was used to determine the degree to which CA alone, adult abuse alone, and child and adult abuse together, predicted the various symptoms. Because of the large number of chi-squares and *t* tests used in determining the individual relationships between types of abuse and symptom types and subtypes, the *p*-level required for indicating significance was decreased, for these tests, from the traditional $p < .05$ level to $p < .02$, in order to reduce the probability of type one (false positive) errors.

Results

Abuse prevalence and characteristics

Ninety-two charts (46%) documented at least one form of abuse. Sixty (30%) had been abused in childhood, 50 (25%) as adults, and 18 (9%) in both childhood and as adults. The percentages for the 86 men were: CSA—13% (incest 9%), CPA—16%, ASA—6%, APA—12%; and for the 114 women: CSA—25% (incest 15%), CPA—18%, ASA—9%, APA—25%

For 25 of the 40 (62.5%) that had suffered CSA, the abuse was incestuous, for 6 (15%) the abuse was extra-familial, and for 9 (22.5%) the perpetrator was unidentified. For the 25 incest cases, the most common perpetrators were father (40%) and older brother (20%). Among the 23 incest cases where the gender of the perpetrator was clear, 21 (91%) were male.

Of the six possible pairs from the four abuse types, two pairs were significantly correlated: CSA and CPA, $X^2(1) = 11.48$, $p < .005$, and CSA and ASA, $X^2(1) = 7.21$, $p < .01$. Analysis therefore includes these two combinations of abuse ('CSA+ CPA', $N = 14$; 'CSA+ ASA', $N = 7$).

Number of DSM-IV 'characteristic symptoms' of schizophrenia

The DSM-IV requires two of five 'characteristic symptoms' for a diagnosis of schizophrenia, or schizophreniform and schizoaffective disorders (American Psychiatric Association, 1994, p. 285). Forty-eight charts (24%) noted two or more of: hallucinations, delusions, thought disorder, or negative symptoms (no files noted the fifth: grossly disorganized or catatonic behaviour). Table 1 shows that having two or more symptoms was more common in those subjected to CSA (37.5%), $X^2(1) = 5.82$, $p < .02$, ASA (60%), $X^2(1) = 12.58$, $p < .001$, or CSA+ ASA (71%), $X^2(1) = 10.82$, $p < .005$, than in the non-abused group (19%). The mean number of 'characteristic symptoms' found in those subjected to both CSA and ASA was far greater ($M = 2.43$, $SD = 1.40$) than the mean of the non-abused group ($M = 0.69$, $SD = 1.14$), $t(113) = 3.87$, $p < .0005$.

Hallucinations

Fifty-seven (28.5%) charts documented one or more types of hallucinations. The presence of hallucinations was significantly related to a diagnosis of schizophrenia, $X^2(1) = 29.44$, $p < .001$. Hallucinations were significantly related to CSA, CPA, and ASA, but not to APA. They were most common in those subjected to both forms of CA (CSA+ CPA) (71%), $X^2(1) = 18.71$, $p < .0005$, or to both forms of sexual abuse (CSA+ ASA) (86%), $X^2(1) = 16.96$, $p < .0005$.

Table 2 shows that auditory hallucinations were present for 52% of the CSA patients but only 18% of those for whom no abuse was documented, $X^2(1) = 18.03$, $p < .0005$. They were also significantly more common among ASA and CPA patients, but not in the APA group.

Voices commenting were significantly related to all four abuse types. In the ASA group, 47% heard voices commenting, compared with 5% of the non-abused patients, $X^2(1) = 26.43$, $p < .0005$.

Command hallucinations to harm or kill oneself were significantly related to all four abuse types. Although only 2% of the non-abused group had command hallucinations, this was the case for 29% of both the CSA+ CPA, $X^2(1) = 18.92$, $p < .001$ and CSA+ ASA, $X^2(1) = 13.98$, $p < .001$.

Visual hallucinations, too, were significantly related to all four abuse types and were also found in 29% of the CSA+ CPA, $X^2(1) = 12.58$, $p < .001$, and CSA+ ASA groups, $X^2(1) = 8.22$, $p < .005$, compared with only 4% of the non-abused patients.

Olfactory hallucinations were not significantly related to abuse in adulthood. However, 10% of the CSA patients, $X^2(1) = 7.36$, $p < .01$, and 21% of the CSA+ CPA patients, $X^2(1) = 16.43$, $p < .001$, experienced olfactory hallucinations, compared with just 1% of the non-abused group.

Table 1. Percentages experiencing positive and negative symptoms of schizophrenia, and mean number of symptoms

	N	% Hallucinations	% Delusions	% Thought disorder	% Negative symptoms	% Two or more symptoms	Mean number of symtpoms
No abuse	108	18.5	26.9	13.0	10.2	18.5	0.69
Any abuse	92	40.2***	31.5	19.6	10.9	30.4	1.02
Child abuse	60	46.7*****	38.3	23.3	8.3	35.0*	1.17*
CSA	40	55.0*****	40.0	27.5	10.0	37.5*	1.32*
CPA	34	47.1***	35.3	11.8	8.8	29.4	1.03
CSA + CPA	14	71.4*****	35.7	7.1	14.3	28.6	1.14
Adult abuse	50	42.0***	32.0	20.0	14.0	32.0	1.08
ASA	15	60.0***	60.0**	46.7***	13.3	60.0****	1.80*
APA	39	35.9	23.1	12.8	12.8	23.1	0.85
CSA + ASA	7	85.7*****	71.4*	71.4****	14.3	71.4***	2.43*****

Note. CSA, child sexual abuse; CPA, child physical abuse; ASA, adult sexual abuse; APA, adult physical abuse.
Comparisons with No abuse group; Pearson chi-squares, except for mean number of symptoms (two-tailed *t* test): * $p < .02$; ** $p < .01$; *** $p < .005$; **** $p < .001$; ***** $p < .0005$.

Table 2. Percentages experiencing types of hallucinations

	N	Auditory hallucinations	Voices commenting	Command hallucinations[a]	Visual hallucinations	Olfactory hallucinations	Tactile hallucinations
No abuse	108	17.6	4.6	1.9	3.7	0.9	0
Any abuse	92	38.0***	22.8*****	13.0***	16.3***	4.3	7.6***
Child abuse	60	43.3*****	21.7***	13.3***	16.7***	6.7	11.7****
CSA	40	52.5*****	27.5*****	15.0***	20.0***	10.0**	12.5****
CPA	34	41.2**	20.6***	17.6****	17.6**	8.8*	11.8****
CSA + CPA	14	64.2*****	35.7****	28.6****	28.6****	21.4*****	14.3*****
Adult abuse	50	38.0**	28.0*****	16.0***	20.0***	4.0	6.0*
ASA	15	53.3***	46.7*****	20.2***	26.7***	6.7	6.7**
APA	39	33.3	23.1***	12.8**	17.9***	5.1	5.1*
CSA + ASA	7	71.4***	57.1*****	28.6****	28.6***	14.3**	14.3*****

[a] Voices instructing to kill or harm self.

Comparisons with No abuse group; Pearson chi-squares: * $p < .02$; ** $p < .01$; *** $p < .005$; **** $p < .001$; ***** $p < .0005$.

Table 3. Percentages experiencing types of delusions, and symptom content

	N	Paranoid delusions	Grandiose delusions	Ideas of reference	Thought insertion	Mind reading	Content: evil/Satan	Content: sexual
No abuse	108	23.1	11.1	11.1	4.6	0.9	2.8	1.9
Any abuse	92	27.2	8.7	10.9	6.5	3.3	8.7	4.3
Child abuse	60	33.3	11.7	11.7	6.7	3.3	13.3**	6.7
CSA	40	40.0	7.5	17.5	10.0	2.5	15.0**	7.5
CPA	34	26.5	14.7	8.8	2.9	2.9	11.8	8.8
CSA + CPA	14	35.7	7.1	21.4	7.1	0.0	14.3	14.3*
Adult abuse	50	26.0	12.0	12.0	8.0	4.0	8.0	6.0
ASA	15	53.3*	20.0	20.0	13.3	6.7	13.3	6.7
APA	39	17.9	7.7	10.3	7.6	5.1	7.7	5.1
CSA + ASA	7	71.4**	28.6	28.6	28.6*	14.3*	28.6***	14.3

Comparisons with No Abuse group; Pearson chi-squares: *$p < .02$; **$p < .01$; ***$p < .005$

Tactile hallucinations were found in none of the 108 non-abused but 7 (12%) of the 60 patients abused as children (sexually or physically), $X^2(1) = 13.15$, $p < .001$. Adult abuse was significantly, but less strongly, related.

Regression analysis

Hallucinations overall (i.e. all subtypes combined) were best predicted, in stepwise linear regression, by the group ($N = 18$) subjected to one or both forms of CA plus one or both forms of assault in adulthood (Beta = 0.29, $t = 4.24$, $p < .0005$). However, the group subjected to one or both forms of CA, but to neither form of adult abuse ($N = 42$), was also a significant predictor (Beta = 0.16, $t = 2.28$, $p < .05$). Those subjected to one or both forms of assault as an adult, but to neither form of CA ($N = 32$) did not contribute to prediction.

The same was the case for auditory hallucinations; child and adult abuse combined: (Beta = 0.23, $t = 3.29$, $p < .005$); CA only: (Beta = 0.17, $t = 2.38$, $p < .05$). Child and adult abuse combined was also a significant predictor of the other five hallucination subtypes. For three (command, visual, and olfactory) it was the only significant predictor. For tactile hallucinations, CA alone was also a significant predictor (Beta = 0.21, $t = 3.07$, $p < .005$). Voices commenting were predicted not only by child and adult abuse combined, but also by CA only (Beta = 0.15, $t = 2.04$, $p < .05$) and adult assault only (Beta = 0.22, $t = 3.12$, $p < .005$).

Delusions

Fifty-eight charts (29%) documented delusions (Table 1). Delusions were significantly related to a diagnosis of schizophrenia, $X^2(1) = 50.86$, $p < .001$. Delusions were not significantly related to either form of CA, or to both in combination. The only significant findings were that, whereas 27% of the non-abused group experienced delusions, this was the case for 60% of the ASA patients, $X^2(1) = 6.78$, $p < .01$, and 71% of the CSA+ ASA group, $X^2(1) = 6.27$, $p < .02$.

The five subtypes analysed were paranoid and grandiose plus the three forms found by Ross *et al.* (1994) to be related to CA: ideas of reference, thought insertion and reading others' minds. Table 3 shows that none of these five subtypes was related to CA. However, paranoid delusions were present in 23% of the non-abused group but 53% of the ASA group, $X^2(1) = 6.11$, $p < .02$, and 71% of the CSA+ ASA patients, $X^2(1) = 7.95$, $p < .01$.

Regression analysis

The only significant predictor of delusions was child and adult abuse combined (Beta = 0.18, $t = 2.63$, $p < .01$). This was also the case for the paranoid/persecutory (Beta = 0.14, $t = 2.01$, $p < .05$), and grandiose subtypes (Beta = 0.19, $t = 2.67$, $p < .01$). None of the other three subtypes was predicted by any of the three abuse groups used in the regression.

Thought disorder

The charts of 32 patients (16.0%) documented thought disorder or 'disorganized speech'. Thought disorder was significantly related to a diagnosis of schizophrenia, $X^2(1) = 28.00$, $p < .001$. Thought disorder was not related to CA or APA. Whereas 13% of the non-abused patients exhibited thought disorder, 47% of the ASA group,

$X^2(1) = 10.57$, $p < .005$, and 71% of the CSA+ ASA group, $X^2(1) = 16.29$, $p < .001$, did so.

Regression analysis

As was the case for delusions, only a combination of child and adult abuse was a significant predictor of thought disorder (Beta = 0.15, $t = 2.12$, $p < .05$).

Negative symptoms

Negative symptoms, documented for 21 (10.5%) of the total sample and significantly related to a diagnosis of schizophrenia, $X^2(1) = 64.27$, $p < .001$, were unrelated to any form of abuse.

Symptom content

Sexual symptom content was seven times more likely to be found (14%) in the CSA+ CPA group than in the non-abused group (2%), $X^2(1) = 6.04$, $p < .02$. Reference to evil or the devil (often in relation to a struggle between good and evil, or God and Satan) was more common in the CSA group (13%), $X^2(1) = 7.63$, $p < .01$, and the CSA+ ASA group (29%), $X^2(1) = 10.52$, $p < .005$, than in the non-abused group (3%). For both sexual and evil content the only significant predictor, in regression analysis, was combined child and adult abuse.

There were many examples of content seeming to be directly related to the documented abuse. One person, whose chart included a forensic report stating 'was abused over many years through anal penetration with the use of violence', hears the perpetrator's voice telling the patient 'to touch children'. Another person, who was 'sexually abused at age 8–9 years' has auditory hallucinations in the form of the 'voice of the abuser'. Another's chart read 'Sexual abuse: Abused from an early age . . . Raped several times by strangers and violent partners'. This person believes they are 'being tortured by people getting into body, for example "the Devil" and "the Beast"' and 'At one stage had bleeding secondary to inserting a bathroom hose into self', stating 'wanting to wash self as "people are trying to put aliens into my body"'. Another, whose chart records CSA and CPA and multiple rapes, believes that they have 'never been a child' but are an 'old man who had his penis gouged out and had silicone injected into chest and hips'. Another, whose chart documents CSA, experiences 'olfactory hallucinations (smells sperm)'. Another, whose chart read 'sexually abused by man who took pornographic photos' experiences visual hallucinations — 'sees a man standing in room' and olfactory hallucinations 'bad odour in bed at night seeping out'. Another, who suffered 'ongoing sexual abuse by relative who is a violent person', hears the 'the voice of the relative telling to jump from the bridge and kill self. Has already tried to commit suicide several times'.

Severity of abuse

Number of abuse types

The number of types of abuse was positively correlated (Pearson correlation coefficient) with the number of 'characteristic symptoms' ($r = .20$, $p < .01$). The correlation, within the 92 abuse cases, between the number of abuse types and the number of positive symptoms (hallucinations, delusions, and thought disorder) was significant ($r = .25$,

$p < .02$). Twenty-two of the 64 people (34%) who suffered one form of abuse only had at least one of the three primary positive schizophrenic symptoms, whereas this was the case for 11 of the 20 (55%) who suffered two forms of abuse, and for all 8 of those who suffered three forms of abuse. The findings are predominantly explicable in terms of the relationship between the number of abuse types and hallucinations, $X^2(1) = 13.35$, $p < .001$. Delusions and thought disorder were not significantly related to number of abuse types experienced.

Tables 1–3 show that exposure to combinations of abuse types is strongly related to the positive symptoms, and to many of their subtypes. Of those exposed to CSA+ CPA, 79% had one or more positive symptoms. This is explained, again, almost entirely in terms of the high rate of hallucinations (71%). All six hallucination subtypes are more common in the CSA+ CPA group than in either the CSA or the CPA groups. The CSA+ ASA combination has effects across all three positive symptoms, and most of their subtypes. The symptoms of this group were 10 times more likely than the non-abused group to include reference to evil or the devil.

Incest

The mean number of 'characteristic symptoms' in the 25 incest cases ($M = 1.20$, $SD = 1.32$) was greater than that in the 6 non-incest CSA cases ($M = 0.33$, $SD = 0.52$), $t(21.9) = 2.56$, $p < .02$. The following were found in none of the non-incest cases and in the indicated percentage of the incest cases: olfactory hallucinations (16%), tactile hallucinations (16%), thought insertion (16%), ideas of reference (20%), evil/Satan content (20%), voices commenting (32%), and paranoid delusions (36%).

Discussion

Limitations of the study

Chart review

Data from chart reviews rely on the judgment of clinicians. New Zealand clinicians typically use DSM-IV criteria for symptom classification but, like all clinicians, may not always have the time to be as precise as a researcher. Blind diagnoses and symptom assessment by independent diagnosticians would have been preferable. Conversely, this study has the advantage of being based on how symptoms are actually classified in clinical practice.

Of greater concern is the fact that the prevalence of abuse identified in client files is consistently lower than that identified by researchers (Rose *et al.*, 1991; Wurr & Partridge, 1996). Thus, although the abuse rates in this study are similar to other chart reviews (Read, 1998; Wurr & Partridge, 1996), some cases of abuse will have remained unidentified. This raises the possibility that abuse may actually have been more prevalent in those without hallucinations and delusions than estimated by this study. Of course it may also have been higher in those with these symptoms.

Validity of abuse disclosures

As in most studies linking CA to psychopathology years later, it was not possible to be absolutely certain that the reported abuse had occurred. Debate about whether clinicians are overestimating or underestimating abuse rates is ongoing (Good, 2000; Read & Argyle, 2000). A survey of New Zealand clinicians found that the item 'Client

may be experiencing psychotic symptoms and imagine abuse that did not actually occur' was one of the more frequently cited reasons for sometimes not taking an abuse history (Young, Read, Barker-Collo, & Harrison, 2001).

There was some form of corroborating evidence in 33 of the 40 CSA cases (82.5%). In 17 cases the person attended counselling specifically for sexual abuse. (In New Zealand sexual abuse counselling is provided by government-subsidized counsellors, only after it has been ascertained that sexual abuse counselling is appropriate.) In nine cases, the abuse had been disclosed, believed, and documented by different professionals at different times. Other evidence was: confirmation by family member (three), forensic report (two), involvement as a child with child protection agency (two), giving birth as a result of being raped as a young adolescent (one), and conviction of the perpetrator (one). For seven (17.5%), however, the only evidence was the person having disclosed the abuse and one clinician having believed and documented the reported abuse.

Dill, Chu, Grob, and Eisen found abuse disclosures by psychiatric patients to be reliable and that 'patients tend to underreport abuse histories rather than overreport them' (p. 168). Herman and Schatzow (1987) found that 74% of adult patients' abuse disclosures were validated via other sources. Goodman *et al.* (1999) found that reports of CA by psychiatric patients have a high test–retest reliability. Darves-Bornoz, Lemperiere, Degiovanni, and Galliard (1995, p. 82) found that 'The problem of incorrect allegations of sexual assaults was no different for schizophrenics than the general population'.

The current study found no significant differences, in the percentage of cases with some form of corroborating evidence, between those with and without hallucinations, delusions or thought disorder, or between those with and without a diagnosis of schizophrenia.

Type one errors

The large number of analyses conducted increased the probability of type one (false positive) errors. Although the minimum level of significance was lowered from .05 to .02, findings at the .02 level should still be regarded with some caution.

Child abuse and symptoms indicative of psychosis or schizophrenia

This study confirms previous findings that being abused as a child is related to some of the most severe forms of symptomatology in adulthood. Those subjected to CA were almost twice as likely (35%) than the non-abused patients (19%) to have two or more of the five 'characteristic symptoms' of schizophrenia, the number required for a DSM-IV diagnosis. This relationship, however, is predominantly explained by the particularly strong relationship between CA and hallucinations. Compared with the non-abused patients, CPA survivors were two and a half times, CSA survivors three times, and those subjected to both CSA and CPA almost four times, more likely to experience hallucinations. In terms of the proportion of patients abused as children who experience hallucinations, the current outpatient sample (47%) is similar to the 50% finding with an inpatient sample (Read & Argyle, 1999). Regression analysis showed that CA predicts hallucinations in the absence of abuse as an adult. This study, then, confirms those previous studies with children (Famularo *et al.*, 1992), adolescents (Sansonnet-Hayden *et al.*, 1987) and adults (Hammersley *et al.*, in press; Read & Argyle, 1999; Ross *et al.*, 1994), showing a relationship between CA and hallucinations.

The pattern of both forms of CA being significantly related to hallucinations, with CSA having a slightly stronger relationship than CPA, and a combination of both having an even worse outcome, was consistent across five of the six hallucination subtypes. Command hallucinations to harm or kill oneself were slightly more related to CPA than to CSA.

Voices commenting was the most strongly related to CA confirming previous findings with patients diagnosed with schizophrenia (Ross *et al.*, 1994) and with bipolar affective disorder (Hammersley *et al.*, in press). Our study also confirms the relationship, found by Ross *et al.*, with visual hallucinations. Olfactory hallucinations were 11 times more common in CSA patients and 24 times more common in the CSA+ CPA group, than in non-abused patients; and tactile hallucinations, absent in all 108 non-abused patients, were found in seven of the 60 who suffered CA.

Delusions were not significantly related to CSA or CPA. Although paranoid delusions were somewhat elevated for those subjected to CA, especially CSA, $X^2(1) = 4.14$, $p = .042$, this study did not replicate the finding of Ross *et al.* (1994) that being abused as a child is significantly related to paranoid ideation, ideas of reference, thought insertion, or mind reading. No relationship was found between CA in general and sexual content of symptoms, which is consistent with the finding of Goff *et al.* (1991). However, those subjected to both CSA and CPA were significantly more likely to experience sexual content.

The current study is consistent with the finding (Goff *et al.*, 1991) that there is no relationship between CA and thought disorder. Furthermore, both the New Zealand inpatient study (Read & Argyle, 1999) and the current study found a lower rate of thought disorder for CPA (17% and 12% respectively) than for CSA (35% and 27%).

Adult abuse and symptoms indicative of psychosis or schizophrenia

This appears to be the first study relating sexual and physical assaults in adulthood to specific psychotic symptoms. In the current sample ASA was, and APA was not, related to hallucinations, delusions, and thought disorder. However, regression analyses found that abuse as an adult, in the absence of CA, predicted only one type or subtype of symptom: voices commenting.

In order to understand the relative contribution of CSA and ASA, the relationships between each of these variables and the symptom types were analysed without the presence of the other. When ASA cases which did not also involve CSA were analysed, the relationships between ASA and the three positive symptoms (hallucinations, delusions, and thought disorder) were no longer statistically significant. For instance, within the ASA patients, ASA was related to thought disorder among those who had also been sexually abused as children, $X^2(1) = 8.21$, $p < .005$, but not among those who had not suffered CSA, $X^2(1) = 1.04$, $p = .307$. Consistent with the regression analysis (in which the adult abuse group included APA), voices commenting was the only symptom subtype, which was related to ASA independently of CSA, $X^2(1) = 7.84$, $p < .01$.

Severity of abuse and symptomatology

Number of abuse types

We have already noted that two particular combinations of abuse (CSA+ CPA and CSA+ ASA) were particularly related to symptomatology. Furthermore, the positive

correlation, within the 92 abuse cases, between the number of types of abuse and the number of positive symptoms of schizophrenia confirms the previously cited studies showing that greater severity of abuse leads to greater psychopathology.

Incest

Many of the symptom subtypes were found in incest cases but not in cases of extra-familial sexual abuse. Paranoid delusions and voices commenting, for instance, were present in about one third of incest cases. Previous findings of a particularly strong relationship between incest and auditory hallucinations (Ellenson, 1985; Heins *et al.*, 1990; Read & Argyle, 1999) received only tentative support from the current study. Although auditory hallucinations were more than three times more common in incest cases (56%) than non-incest CSA cases (17%), this did not attain significance, $X^2(1) = 3.00, p = .083$. The hypothesis that auditory hallucinations in incest survivors are found only when substance abuse is also present (Heins *et al.*, 1990) was not confirmed by an earlier study (Read & Argyle, 1999) or by the current study, in which 10 of the 20 incest survivors with no documented substance abuse experienced auditory hallucinations.

Possible pathways from abuse to symptoms

Not having controlled for parental dysfunction and other childhood disadvantages, the current study cannot determine whether the relationships discussed above are causal. Nevertheless numerous studies (cited earlier) show that after controlling for such variables, the relationship between CA and adult psychopathology remains, including for 'nonmanic psychotic disorders (e.g. schizophrenia, psychosis not otherwise specified)' (Briere *et al.*, 1997).

Ross *et al.* (1994) found that among schizophrenia patients, the CA group was significantly more likely to have a range of positive symptoms but slightly less likely to have negative symptoms, than the non-abused patients. They hypothesized: 'There may be at least two pathways to positive symptoms of schizophrenia. One may be primarily endogenously driven and accompanied by predominantly negative symptoms. The other may be primarily driven by childhood psychosocial trauma and accompanied by fewer negative symptoms' (p. 491). The current study appears to support Ross *et al.*, in that CA was not related to negative symptoms.

According to the Self-Trauma Model (Briere, 2002) abuse memories and flashbacks are attempts to integrate the trauma, while avoidance and numbing strategies (such as suppression of the memories, dissociation, and substance abuse) are attempts to regulate the affect triggered in this process. Although this model is usually focused on PTSD, borderline personality disorder, and dissociative disorders, it may also shed light on the psychological function of psychotic symptoms. The relationship between dissociative and psychotic symptoms is complex. Bleuler's (1911) original description of the splitting of the psychic functions in schizophrenia is very similar to modern conceptions of severe dissociation. Positive schizophrenic symptoms are actually more common in dissociative identity disorder than in schizophrenia (Ellason & Ross, 1997).

For some abused patients, delusions may be attempts to make sense of the frightening, but unrecognized, abuse flashbacks by explaining them, in distorted fashion, in relation to the present rather than the past. Similarly, it is possible that, just as dissociation regulates the negative affect of abuse memories, experiencing an abuse 'flashback' in the present (i.e. a voice in the here and now) rather than

experiencing it in the context of, and with recall of, the abuse may be a defence against overwhelming affect. Another promising research avenue would be to integrate the literature on the cognitive processes underlying delusions (Bentall & Kaney, 1996; Freeman, Gareby, Kuipers, Fowler, & Bebbington, 2002) with studies of the attributions of blame made by survivors of CA (Barker-Collo, Melnyck, & McDonald-Miszczak; Basker-Collo & Read, in press).

Ellenson (1985) provides examples of hallucinations functioning as defence mechanisms, and adds that the hallucinations of incest survivors are usually intrusive recollections in the form of sensory phenomena. Briere (2002) identifies impicit/sensory memories of CA as being devoid of cognitive content and experienced as intrusions of unexpected sensations. Trauma prior to the acquisition of language will typically be sensorimotor in nature. This may help explain the frequency of tactile and olfactory hallucinations in adults who were abused as children.

A traumagenic neurodevelopmental (TN) model of schizophrenia (Read, Perry, Moskowitz, & Connolly, 2001) hypothesizes that the diathesis for the heightened sensitivity to stress found in schizophrenia consists, for some patients, of long-lasting neurodevelopmental changes caused by childhood trauma. This TN model is supported by the similarity between the effects of childhood trauma on the developing brain and the brain abnormalities found in adults diagnosed schizophrenic. This model proposes that differences in the brains of people diagnosed schizophrenic, often assumed to be evidence of a bio-genetic etiology, may actually be caused by adverse life events.

The strong relationship between CSA and hallucinations, which becomes even stronger when followed by sexual assault as an adult, seems consistent with both self-trauma and TN models. The latter emphasizes trauma-induced dysfunction of the homeostatic hypothalamic-pituitary-adrenal axis response to stress as a result of childhood abuse, leaving one vulnerable to extreme emotional reaction and cognitive disturbance when retraumatized. In patients diagnosed schizophrenic (83% of whom had been either neglected or abused as children) an external trigger for the onset of hallucinations was found in 65% of cases. 'In most patients, the onset of auditory hallucinations was preceded by either a traumatic event or an event that activated the memory of earlier trauma' (Honig *et al.*, 1998, p. 646).

Further research can determine whether the relationship between CA and schizophrenic or psychotic symptoms found in this and previous studies is generalizable beyond the samples studied thus far. Such studies should include psychological abuse and neglect (Ito *et al.*, 1993).

Clinical implications

Many abuse cases are unidentified by clinicians (Lothian & Read, in press; Young *et al.*, 2001). People diagnosed schizophrenic are especially unlikely to be asked about abuse (Read & Fraser, 1998a) or to receive an adequate response when they disclose abuse (Agar & Read, 2002). This is particularly the case when clinicians holding strong biogenetic causal beliefs are involved (Agar & Read, 2002; Young *et al.*, 2001). One study found that support during hospitalization (e.g. counselling, opportunity to discuss abuse-related issues, or offering information about abuse) was considered for only 12% of CSA cases and 8% of CPA cases. This was significantly less likely for diagnoses indicative of psychosis. Overall, 12% were referred for post-discharge abuse counselling, but referral was not even considered for any of the patients diagnosed 'schizophrenic' (Read & Fraser, 1998b).

Many researchers have recommended routine abuse inquiry in all mental-health settings (Agar, Read, & Bush, 2002; Briere *et al.*, 1997; Dill *et al.*, 1991; Goodman *et al.*, 1997; Rose *et al.*, 1991; Swett *et al.*, 1990). Training in how to take abuse histories will benefit from emphasizing the sequelae to CA (Briere, 1999), including psychotic symptoms (Agar & Read, 2002; Young *et al.*, 2001) which, despite their high frequency in abused patients, seem to mediate against being asked about abuse.

Regardless of one's etiological beliefs, there is, for both humane and economic reasons (Franey, Geffner, & Falconer, 2001), a need for treatments more effective than those currently available to survivors of child abuse who have also been diagnosed schizophrenic. A productive therapeutic approach may be an integration of the trauma models for abuse survivors in general (Briere, 2002; Courtois 1991; Herman 1992), with treatments that are effective with psychotic symptoms (Birchwood & Tarrier, 1992; Martindale, Bateman, Crowe, & Morgison, 2000; Read *et al.*, in press), including: cognitive therapy (Chadwick *et al.*, 1996; Garety, Fowler, & Kuipers, 2000; Morrison, 2002), psychosocial–residential treatment (Mosher, Valone, & Henn, 1995), psychodynamic approaches (Goltdiener & Haslam, in press; Karon & VandenBos, 1981), and early intervention (McGorry, 2000; Johannessen, Larsen, McGlashan, & Vaglum, 2000).

Only in the last few years have treatment models emerged which directly address the needs of traumatized people who experience psychosis (Harris & Landis, 1997; Rosenberg *et al.*, 2001). A discussion of the treatment of "seriously mentally ill" (SMI) women who have been abused (Goodman *et al.*, 1997) notes that, because researchers have excluded psychotic women from abuse treatment studies, there is "a paucity of well-articulated and validated treatments for trauma effects in SMI women" (p. 690). Even approaches that focus on the family may pay no attention to abuse (Allen & Read, 1997). Thus far, all we have is tentative evidence that group therapy with "chronically mentally ill" females who were sexually abused as children has produced promising outcomes (Herder & Redner, 1991), and that, for female incest survivors: "Sharing and clarifying traumatic events over several meetings appears to have assisted all of the cases reported. Hallucinations have become less preoccupying and much less frequent" (Heins *et al.*, 1990 p. 565).

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