ORIGINAL ARTICLE

Prospectively Ascertained Child Maltreatment and Its Association With *DSM-IV* Mental Disorders in Young Adults

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Context: Evidence for an association between child maltreatment and later psychopathology heavily relies on retrospective reports of maltreatment. The few studies using prospective ascertainment of child maltreatment show weaker associations, raising the possibility that it is not maltreatment, but rather the memory of maltreatment, that raises the risk of later mental disorders.

Objectives: To estimate associations between prospectively ascertained child maltreatment and a wide range of subsequently measured *DSM-IV* mental disorders and to show the influence of retrospectively reported maltreatment in the comparison group on these associations.

Design: Retrospective cohort study.

Setting: Nationally representative New Zealand community.

Participants: Respondents aged 16 to 27 years (n=2144) from a mental health survey, 221 of whom were identified as having records on a national child protection agency database.

Main Outcome Measures: Twelve-month and lifetime prevalence of individual *DSM-IV* mood, anxiety, and substance use disorders, and disorder groups assessed with the World Health Organization Composite International Diagnostic Interview.

Results: After adjusting for demographic and socioeconomic correlates, child protection agency history was associated with several individual mental disorders, mental disorder comorbidity, and all mental disorder groups, both 12-month and lifetime. Odds of 12-month posttraumatic stress disorder were 5.12 (95% confidence interval [CI], 2.42-10.83); of any 12-month mood disorder, 1.86 (95% CI, 1.12-3.08); of any anxiety disorder, 2.41 (95% CI, 1.47-3.97); and of any substance use disorder, 1.71 (95% CI, 1.01-2.88). These associations increased in magnitude when those who retrospectively reported child maltreatment were removed from the comparison group.

Conclusions: Prospectively ascertained child maltreatment is significantly associated with a range of subsequent mood, anxiety, and substance use disorders, indicating that maltreatment, not just the memory of maltreatment, is associated with subsequent psychopathology. There is a need for both targeted mental health interventions with the present and past clients of child welfare agencies and for concerted population-level strategies to meet the needs of the many other children who experience maltreatment.

Arch Gen Psychiatry. 2010;67(7):712-719

Although child maltreatment (abuse and neglect) is only one of a number of childhood adversities that are associated with psychopathology,[1-3] it is perhaps the most controversial of such associations. The evidence for this association heavily relies on retrospective reports of past abuse,[4-9] and doubts have been raised about the reliability and validity of these reports given the substantial nonreporting of past maltreatment[10,11]; the possibility that the mental disorder outcomes under study may bias reporting of abuse via mood-congruent recall[12]; evidence that autobiographical memory can be subject to reconstruction[13]; and the possible instability of retrospective reports over time.[14,15]

Obtaining prospective data on most other childhood adversities is possible, but obtaining contemporaneous reports of abuse is very difficult when ethical considerations in most countries require that potentially abusive parents are informed of the nature of the questions and of mandatory reporting requirements if abuse is divulged. There are a small number of studies with prospective ascertainment of child maltreatment through child protection agency contact or court-reported cases. These studies provide valuable data

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but are often limited by a very small number of cases,[16-18] lack of a comparison group,[19] or indirect ascertainment of mental disorders from service use data.[20] The reports of the one study we are aware of without these limitations, by Widom and colleagues,[11,21-23] found weaker associations between court-substantiated child maltreatment and later mental disorders than the associations found in most retrospective studies. For example, Widom et al found no association between documented sexual abuse and later depression,[21] which contrasts with the many reports of a strong association between retrospectively reported sexual abuse and depression.[4-8,20,24]

This contrast in the strength of associations between prospectively vs retrospectively ascertained child maltreatment and later psychopathology, a contrast which is evident both from within-study comparisons between prospectively and retrospectively recorded maltreatment in some of the Widom et al reports[21,23] and between-study comparisons in a recent review,[25] raises the possibility that a substantial proportion of the association between retrospectively reported maltreatment and mental disorders reflects not the effects of maltreatment per se, but the effects of individuals' representations or memories of their past experiences.[21] This issue has become the source of considerable controversy.[15,26] We suggest that the sparseness of data on the associations between prospectively ascertained child maltreatment and subsequently diagnosed mental disorders, which is heavily reliant on one study, does not provide an adequate basis for resolving this controversy. The present study helps rectify this situation by providing the first data we are aware of on the association between a history of prospectively ascertained child maltreatment and a wide range of later *DSM-IV* mental disorders compared with a general population sample without that history, adjusting for demographic and socioeconomic covariates.

This study links New Zealand national child protection agency records with the data from a nationally representative community survey of mental disorders to identify which survey respondents, aged 16 to 27 years at the time of the survey, had a child protection agency history, used here as a proxy for maltreatment. Because the survey also asked about some forms of child maltreatment, we are able to use these retrospective reports to highlight an important methodological issue. We suggest that one key reason why prior prospective studies have observed a relatively weak association between child maltreatment and later mental disorders is because the comparison group in such studies also contains a considerable number of people with prior maltreatment as children (in that child protection agency or court-reported cases of maltreatment represent only a portion of child maltreatment in the population).[25] We investigate the effect of this issue in this article, which aims to (1) determine the associations between documented child protection agency involvement and subsequently assessed 12-month and lifetime *DSM-IV* mental disorders in young adults in comparison with the general population; and (2) examine these associations both with and without removal of individuals from the comparison group who retrospectively reported child maltreatment.

METHODS

SURVEY SAMPLE

Te Rau Hinengaro: The New Zealand Mental Health Survey was a nationally representative community survey involving face-to-face interviews with 12 992 individuals aged 16 years and older. Interviews were conducted from October 2003 to December 2004 with a response rate of 73.3%. Written informed consent was obtained from all participants, and ethics approval was obtained from the 14 New Zealand regional ethics committees. Internal subsampling was used to reduce respondent burden by dividing the interview into 2 parts. Part 1 included the core diagnostic assessment of mood disorders, alcohol use disorders, and most of the anxiety disorders. Part 2 included the remaining mental disorders and additional information relevant to a wide range of survey aims, including retrospective assessment of child maltreatment (via items within the posttraumatic stress disorder module). All respondents completed part 1. All part 1 respondents who met criteria for any mental disorder, had a hospital admission for mental disorder, or had made suicide plans plus a probability sample of other respondents were administered part 2. These respondents (n=7435) were weighted by the inverse of their probability of selection for part 2 of the interview to adjust for differential sampling. This article concerns respondents aged 16 to 27 years (n=2144; part 2 subsample, n=1413). A more detailed description of the survey methods is provided elsewhere.[27]

SURVEY MEASURES

Sociodemographic Correlates

The correlates we used include age at interview, sex, ethnicity (Maori, Pacific peoples, and other), mother's education, respondent's education, and household income (adjusted for household size) at the time of the survey. Respondents were asked whether their mother or the maternal figure they grew up with completed primary, secondary, or tertiary education. Education of the respondent was assessed using census questions from 2001 about secondary and tertiary qualifications. A modification of the revised Jensen equivalence scale for household income[28] was used to take account of the number of adults and the number of children in the household. Generally speaking, there was little item nonresponse, but there were 2 exceptions to this. Household income was missing for 13% of the total survey sample. The missing values were imputed by multiple regression with weights using age, sex, education, marital status, employment status, current or last job held, time since last employment, number of individuals in the household, and the New Zealand Index of Deprivation.[25] Maternal education was missing for 3% of 16- to 27-year-old individuals overall but was missing for 9% of those with child protection agency history (**Table 1**); "missing" was therefore coded as a level on the maternal education variable to adjust for its differential distribution across the 2 groups.

Mental Disorders

The World Mental Health–World Health Organization Composite International Diagnostic Interview, version 3.0 (CIDI),[29] is a fully structured, lay person–administered interview that ascertains lifetime prevalence of disorders (disorder occurring at any age up to the age at interview) plus recency of episodes or symptoms, allowing 12-month prevalence to be derived. Disorders were assessed using *DSM-IV* criteria.[30] The CIDI organic ex-

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Table 1. New Zealand Mental Health Survey Sample Characteristics for Persons Aged 16 to 27 Years (n=2144)[a]

Characteristic	No. (%)	
	Group With Child Protection Agency History	Comparison Group
Unweighted total sample, No.	221	1923
Unweighted part 2 subsample, No.	168	1245
Mean age, y	21	22
Ethnicity		
Maori	114 (39.2)	493 (15.8)
Pacific	45 (5.4)	495 (7.4)
Other	62 (55.4)	935 (76.8)
Female sex	141 (57.8)	1041 (50.6)
Educational qualification		
None	79 (30.6)	303 (11.4)
Secondary	104 (52.3)	1025 (56.8)
Tertiary	38 (17.0)	595 (31.8)
Household income		
Under half of median, lowest quartile	102 (36.2)	553 (24.9)
Half of median to median	80 (42.8)	637 (30.9)
Median to ×1.5 median	27 (13.0)	443 (25.8)
≥×1.5 Median, highest quartile	12 (8.0)	290 (18.4)
Mother's education		
Primary	27 (8.2)	175 (4.7)
Secondary	133 (59.8)	1124 (56.3)
Tertiary	42 (23.2)	569 (37.0)
Unknown/missing	19 (8.8)	55 (2.0)
Mean age at first agency contact (IQR), y	11.5 (9-14.5)	NA
Mean time agency file open (IQR), d	819 (113-901)	NA

Abbreviations: IQR, interquartile range; NA, not applicable.
[a]The sample numbers are unweighted observations; the percentages are based on weighted data.

clusion rules were imposed. The disorders included herein are anxiety disorders (panic disorder with or without agoraphobia, specific phobia, social phobia, generalized anxiety disorder, posttraumatic stress disorder [PTSD], and obsessive-compulsive disorder); mood disorders (major depressive disorder, dysthymia, and bipolar disorder [I, II, and any with mania or hypomania]); and substance use disorders (alcohol abuse and/or dependence and drug abuse and/or dependence). Diagnoses were calculated following *DSM-IV* hierarchy rules; for example, 12-month dysthymia and generalized anxiety disorder were not diagnosed if 12-month major depressive disorder was diagnosed.

Retrospectively Reported Child Maltreatment

Child maltreatment was assessed with items that correspond to 3 of the 5 accepted dimensions of child maltreatment[25]: physical abuse, sexual abuse, and witnessing intimate partner violence. Sexual abuse was measured in terms of penetrative abuse occurring prior to age 17 years (referred to herein as *child rape*) and other contact sexual abuse occurring prior to age 17 years (referred to herein as *child sexual abuse*). For child rape and child sexual abuse, the following questions were asked:

> The next two questions are about sexual assault. The first is about rape. We define this as someone either having sexual intercourse with you or penetrating your body with a finger or object when you did not want them to, either by threatening you or using force, or when you were so young that you didn't know what was happening. Did this ever happen to you? Other than rape, were you ever sexually assaulted, where someone touched you inappropriately, or when you did not want them to?

For this article, participants were coded as positive for these events if they endorsed the relevant item and indicated that it had occurred prior to age 17 years (a subsequent question was asked about age of event occurrence). For child physical abuse, the following question was asked: "As a child, were you ever badly beaten up by a parent or someone who brought you up?" Participants were coded positive for this event if they endorsed the item. For witnessing parental violence, the following question was asked: "When you were a child, up until the age of 16, did you ever witness serious physical fights at home, such as one parent beating up another parent?" Participants were coded positive for this event if they endorsed the item.

CHILD PROTECTION AGENCY HISTORY

Respondents were coded positive for a history with a child protection agency if they were identified as having been a primary client in the national electronic database of the New Zealand Child, Youth and Family (CYF) agency. This agency is responsible for child welfare and protection and becomes involved with children and their families following notification of possible abuse or neglect (41 individuals with a CYF history were routed into CYF solely from youth justice proceedings, rather than from abuse/neglect notification; these individuals were not classified as part of the CYF group). These notifications are followed up by a social worker at the CYF intake center to determine if the case requires further investigation. If so, a file is opened in the CYF database. The file will either stay open through the process of further investigation and intervention or it may be closed within a few days (eg, <8 days). File closure after a short duration does not necessarily indicate the absence of maltreatment. It may occur if it is established that a Maori or other health provider is following up on the case. For this reason, the primary predictor in this article is having a file in the database. The number of files closed within a short time is small (8 of 221 files closed <8 days), with 75% of files open for more than 113 days (Table 1). The CYF data are reviewed by social work supervisors and a national quality assurance team that completes random audits. The data used in this article were extracted under the supervision of the second author who has 10 years of experience using the database.

Identification of the CYF history of survey respondents was done in a manner that kept their names separate from the survey information they had provided (as required by the survey consent forms). Identifying data (name, date of birth, and survey number) were held separately from the main survey data set and were used to identify matches on the electronic CYF database. Information on CYF history was then incorporated into the main survey data set after names had been removed, using participants' survey numbers. Linkage was not possible for 5% of the survey sample owing to a missing name, but these missing cases were random. Ethics approval for the data linkage and subsequent analysis was obtained from the New Zealand Multi-region Ethics Committee.

All survey respondents with a CYF history were past CYF clients, with the exception of 2 respondents who were still clients at the time of the survey interview. A median of 10 years elapsed between the time that the CYF file was opened and the time of the mental disorder assessment (**Table 2**). Because the electronic CYF database commenced in 1990, this article includes only survey respondents who were aged 16 to 27 years when interviewed (in 2003-2004). The percentage of survey participants identified as having a CYF history was 10% averaged across ages 16 to 27 years: 10% for age 16 years; 13%, 17 years; 12%, 18 years; 9%, 19 years; 8%, 20 years; 10%, 21 years; 8%, 22 years; 14%, 23 years; 8%, 24 years; 14%, 25 years; 6%, 26 years; and 5%, 27 years. These percentages are high by international stan-

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Table 2. Time Elapsed Between the Opening of the Child Protection Agency File and the Mental Disorder Assessment

Years Since Child Protection Agency File Opened	No. (%) (n=221)
>0-2	11 (5)
3-4	9 (4)
5-6	18 (8)
7-8	24 (11)
9-10	50 (23)
11-12	60 (27)
13-14	45 (20)
15-16	3 (1)
≥17	1 (<1)
Median, mean (SD)	10 9.81 (3.48)

dards and reflect both a substantively higher rate of child maltreatment in New Zealand[31] and possibly a lower threshold for notification owing to the high public profile of child maltreatment in New Zealand. The lower percentages of those aged 26 and 27 years with a CYF history may indicate that there was some CYF involvement occurring prior to 1990 for this age group that was not captured in the electronic database.

STATISTICAL ANALYSIS

Estimates were weighted to take into account the probability of selection; adjust for intentional oversampling of Maori and Pacific peoples; adjust for nonresponse; and poststratify by age, sex, and ethnicity to the 2001 census population. Additional weights were applied to adjust for the probability of selection into the part 2 subsample. Cross-tabulations provided disorder prevalences, and multivariate logistic regression analyses estimated odds of mental disorders among those with and without a CYF history, adjusting for sociodemographic covariates. The odds ratios (ORs) were estimated first with the comparison group (those without a CYF history) inclusive of people retrospectively reporting child maltreatment, and second, with the comparison group exclusive of people who retrospectively reported child maltreatment. Taylor series linearization[32] was used to approximate the variance of estimates using SUDAAN, version 9.0.1, to adjust for the complex sampling design. Associations are considered statistically significant at $P < .05$.

RESULTS

Sample characteristics for those with child protection agency history and for the comparison group without that history (but including people who retrospectively reported child maltreatment) are shown in Table 1. Those with child protection agency history are more likely to be Maori, to have fewer educational qualifications, and to have lower household income at the time of survey interview. The mean age at first child protection agency contact was 11.5 years (interquartile range, 9-14.5 years), and the average length of involvement exceeded 2 years (819 days; interquartile range, 113-901 days).

Table 2 provides information on the follow-up period, the years elapsed between the age at first child protection agency involvement, and the age at mental disorder assessment. The median follow-up period was 10 years. The median follow-up period from file closure and mental disorder assessment was 8 years (data not shown).

Table 3. Individuals Retrospectively Reporting Child Maltreatment[a]

Maltreatment	No. (%) Group With Child Protection Agency History	No. (%) Comparison Group
Child rape	32 (11.7)	83 (3.2)
Child sexual abuse	41 (16.9)	117 (4.9)
Physical abuse	51 (22.8)	149 (5.4)
Witnessing parental violence	69 (31.4)	213 (8.2)
Any of the above	99 (44.5)	358 (15.4)

[a] The sample numbers are unweighted observations; the percentages are based on weighted data. Retrospectively reported childhood maltreatment was indicated by endorsement of 1 or more of the following items (see "Methods" section for full questions): child rape (prior to age 17 years); contact sexual abuse not including rape (prior to age 17 years); physical abuse (ever being badly beaten up by a caregiver or parent); and witnessing parental violence (ever witness to serious physical fights at home such as one parent beating up another parent).

Table 3 shows individuals in the child protection agency group and the comparison group who retrospectively reported childhood maltreatment, as indicated by endorsement of survey items relating to child rape, child sexual abuse, child physical abuse, or witnessing parental violence. As expected, the child protection agency group reported proportionally more child maltreatment than the general population comparison group did (44.5% vs 15.4%). The reported maltreatment in the comparison group is either somewhat lower than or consistent with the lower estimates for similar types of maltreatment in a major review.[25] These results should not be taken to indicate the total proportions experiencing maltreatment in either group. Some types of maltreatment such as emotional abuse and neglect were not asked about in the survey. Additionally, there is a high degree of nonreporting of child maltreatment (around 40% in 2 careful studies) among adults with documented maltreatment in childhood.[10,11,33]

The odds of having an individual 12-month mental disorder among those with child protection agency history compared with those without that history are shown in **Table 4** together with disorder prevalences and sample numbers. For the first 2 columns of ORs, the comparison group retains those who retrospectively reported child maltreatment. After adjustment for covariates, these data show that child protection agency history confers significantly higher odds of 5 of 11 individual disorders, with the strongest association being with PTSD (OR, 5.12). The following columns of ORs exclude those who retrospectively reported child maltreatment from the comparison group. The effect of this is to further elevate the odds of disorder among the child protection agency group, with now 7 of 11 mental disorders significantly elevated in this group after adjustment for covariates, and the odds of PTSD being substantially elevated (OR, 10.92), albeit with wide confidence intervals.

Table 5 provides estimates for lifetime disorders and shows a fairly consistent pattern of results with those for 12-month disorders, but with a greater proportion of lifetime disorders being significantly elevated in the child protection agency group. With those retrospectively re-

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Table 4. *DSM-IV* 12-Month Disorders Among Young Adults With Child Protection Agency History Compared With Those Without[a]

DSM-IV 12-Month Mental Disorder	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Excluding Retrospectively Reported Childhood Maltreatment[b]	
	No. (%)	SE	No. (%)	SE	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]
Major depressive disorder	25 (14.15)	3.35	133 (7.84)	0.93	1.94 (1.06-3.54)[d]	1.83 (0.99-3.38)	2.32 (1.26-4.27)[d]	2.23 (1.16-4.28)[d]
Dysthymia	8 (4.01)	1.79	19 (1.45)	0.40	2.83 (0.98-8.16)	3.13 (1.09-9.01)[d]	4.15 (1.35-12.78)[d]	4.33 (1.32-14.22)[d]
Bipolar disorder	18 (5.81)	1.73	92 (3.96)	0.97	1.50 (0.75-2.98)	1.35 (0.67-2.72)	2.00 (0.96-4.15)	1.79 (0.83-3.85)
Panic disorder	10 (3.93)	1.81	51 (2.30)	0.41	1.74 (0.63-4.76)	1.48 (0.49-4.47)	1.97 (0.71-5.48)	1.68 (0.52-5.40)
Specific phobia	36 (16.63)	3.17	174 (8.60)	0.79	2.12 (1.30-3.46)[d]	1.83 (1.10-3.04)[d]	2.50 (1.51-4.14)[d]	2.19 (1.29-3.74)[d]
Social phobia	30 (13.37)	2.90	143 (7.09)	0.73	2.02 (1.18-3.47)[d]	2.14 (1.22-3.75)[d]	2.32 (1.33-4.05)[d]	2.64 (1.46-4.80)[d]
GAD	5 (2.27)	1.24	31 (1.84)	0.40	1.24 (0.38-4.04)	1.41 (0.43-4.62)	1.52 (0.45-5.16)	2.12 (0.71-6.35)
PTSD	24 (10.66)	2.59	45 (2.20)	0.44	5.56 (2.83-10.93)[d]	5.12 (2.42-10.83)[d]	10.96 (4.91-24.49)[d]	10.92 (4.38-27.22)[d]
OCD	8 (3.32)	1.59	19 (1.39)	0.47	2.44 (0.74-7.98)	4.00 (1.28-12.54)[d]	2.60 (0.73-9.22)	5.21 (1.57-17.23)[d]
Alcohol abuse/dependence	27 (12.38)	2.69	161 (7.50)	0.75	1.74 (1.03-2.95)[d]	1.39 (0.78-2.46)	1.92 (1.12-3.32)[d]	1.73 (0.95-3.15)
Drug abuse/dependence	18 (9.21)	2.47	77 (3.54)	0.53	2.77 (1.43-5.34)[d]	1.99 (0.96-4.11)	3.81 (1.89-7.67)[d]	3.15 (1.38-7.22)[d]

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; OCD, obsessive-compulsive disorder; OR, odd ratio; PTSD, posttraumatic stress disorder; SE, standard error.

[a] The sample numbers are unweighted observations; the percentages are based on weighted data.

[b] Retrospectively reported childhood maltreatment was indicated by endorsement of 1 or more of the following items (see "Methods" section for full questions): child rape (prior to age 17 years); contact sexual abuse not including rape (prior to age 17 years); physical abuse (ever being badly beaten up by a caregiver or parent); and witnessing parental violence (ever witness to serious physical fights at home such as one parent beating up another parent).

[c] Adjusted for age, sex, ethnicity, maternal education, respondent education, and current household income.

[d] Statistically significant at $P < .05$.

Table 5. *DSM-IV* Lifetime Disorders Among Young Adults With Child Protection Agency History Compared With Those Without[a]

DSM-IV Lifetime Mental Disorder	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Excluding Retrospectively Reported Childhood Maltreatment[b]	
	No. (%)	SE	No. (%)	SE	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]
Major depressive disorder	50 (23.91)	3.63	252 (14.40)	1.11	1.87 (1.21-2.89)[d]	1.76 (1.13-2.73)[d]	2.30 (1.47-3.61)[d]	2.10 (1.32-3.35)[d]
Dysthymia	12 (5.57)	1.98	27 (1.83)	0.44	3.16 (1.32-7.59)[d]	3.64 (1.46-9.07)[d]	4.35 (1.71-11.09)[d]	4.82 (1.74-13.38)[d]
Bipolar disorder	23 (7.72)	1.97	144 (5.74)	0.65	1.38 (0.76-2.49)	1.23 (0.67-2.24)	1.86 (1.00-3.47)	1.68 (0.88-3.20)
Panic disorder	12 (4.27)	1.83	65 (2.97)	0.45	1.46 (0.57-3.71)	1.23 (0.45-3.36)	1.69 (0.66-4.38)	1.44 (0.50-4.11)
Specific phobia	48 (20.61)	3.35	236 (11.68)	0.90	1.96 (1.26-3.04)[d]	1.81 (1.15-2.85)[d]	2.37 (1.50-3.72)[d]	2.20 (1.37-3.53)[d]
Social phobia	46 (18.67)	3.25	212 (10.05)	0.82	2.05 (1.29-3.26)[d]	2.06 (1.26-3.39)[d]	2.49 (1.54-4.03)[d]	2.70 (1.58-4.61)[d]
GAD	19 (6.38)	1.74	73 (4.03)	0.61	1.62 (0.85-3.11)	1.66 (0.83-3.33)	2.00 (1.01-3.99)[d]	2.16 (1.03-4.51)[d]
PTSD	33 (14.16)	3.03	100 (4.40)	0.62	3.59 (2.05-6.28)[d]	2.46 (1.25-4.85)[d]	7.04 (3.80-13.06)[d]	4.86 (2.26-10.45)[d]
OCD	12 (5.43)	2.03	39 (2.41)	0.55	2.33 (0.94-5.77)	2.28 (0.94-5.54)	3.03 (1.11-8.31)[d]	4.00 (1.63-9.82)[d]
Alcohol abuse/dependence	81 (32.76)	4.01	353 (16.36)	1.09	2.49 (1.69-3.67)[d]	1.89 (1.24-2.88)[d]	3.16 (2.12-4.71)[d]	2.50 (1.59-3.91)[d]
Drug abuse/dependence	59 (25.85)	3.77	218 (10.05)	0.90	3.12 (2.04-4.77)[d]	2.27 (1.39-3.71)[d]	3.95 (2.54-6.16)[d]	3.03 (1.78-5.15)[d]

See abbreviations and footnotes to Table 4.

porting maltreatment removed from the comparison group, child protection agency history is significantly associated with all disorders except bipolar disorder and panic disorder.

Table 6 provides the estimates for disorder groups, both 12-month and lifetime, and for mental disorder comorbidity. After adjustment, the odds of all mental disorder groups and of any 3 or more disorders (but not of any 2 disorders) are significantly higher for the child protection agency group, regardless of whether those retrospectively reporting child maltreatment were excluded from the comparison group (the effect of removing those who self-reported maltreatment increases the ORs). The associations with 12-month mental disorder groups indicate that those in the child protection agency group still, after an average of 10 years since intervention to reduce maltreatment, have higher rates of mental disorder, with an approximately 3-fold increase in the odds of having multiple (≥3) disorders.

COMMENT

We found significant associations between prospectively ascertained child maltreatment (as indexed by a child protection agency history) and a number of subsequently measured 12-month and lifetime mental disorders after adjustment for socioeconomic and demographic covariates. When

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Table 6. *DSM-IV* Disorder Groups Among Young Adults With Child Protection Agency History Compared With Those Without[a]

DSM-IV Mental Disorder Group	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Including Retrospectively Reported Childhood Maltreatment[b]		Comparison Group: Excluding Retrospectively Reported Childhood Maltreatment[b]	
	No. (%)	SE	No. (%)	SE	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[c]
12-Month Disorders								
Any mood disorder	44 (20.94)	3.80	227 (11.90)	1.10	1.96 (1.19-3.23)[d]	1.86 (1.12-3.08)[d]	2.47 (1.47-4.13)[d]	2.38 (1.37-4.14)[d]
Any anxiety disorder	80 (35.74)	5.02	345 (17.92)	1.26	2.55 (1.62-4.00)[d]	2.41 (1.47-3.97)[d]	2.96 (1.87-4.69)[d]	2.92 (1.73-4.91)[d]
Any substance use disorder	38 (16.98)	3.13	186 (8.70)	0.88	2.15 (1.32-3.49)[d]	1.71 (1.01-2.88)[d]	2.55 (1.55-4.21)[d]	2.29 (1.31-4.01)[d]
Any disorder	103 (50.54)	5.03	540 (29.02)	1.81	2.55 (1.62-4.00)[d]	2.32 (1.39-3.85)[d]	2.96 (1.87-4.69)[d]	2.83 (1.68-4.80)[d]
Any 2 disorders	28 (12.13)	3.13	130 (6.11)	0.68	2.12 (1.15-3.92)[d]	1.40 (0.72-2.73)	2.54 (1.35-4.76)[d]	1.55 (0.75-3.21)
Any ≥3 disorders	28 (13.27)	3.03	110 (5.44)	0.68	2.66 (1.49-4.75)[d]	2.67 (1.47-4.87)[d]	3.71 (2.00-6.89)[d]	4.47 (2.29-8.75)[d]
Lifetime Disorders								
Any mood disorder	75 (32.91)	3.95	399 (20.23)	1.25	1.93 (1.31-2.85)[d]	1.80 (1.21-2.68)[d]	2.50 (1.67-3.74)[d]	2.31 (1.52-3.50)[d]
Any anxiety disorder	99 (43.72)	5.22	498 (25.47)	1.46	2.27 (1.47-3.52)[d]	2.04 (1.24-3.33)[d]	2.84 (1.82-2.44)[d]	2.68 (1.61-4.46)[d]
Any substance use disorder	93 (39.68)	4.32	389 (18.15)	1.12	2.97 (2.02-4.37)[d]	2.38 (1.55-3.65)[d]	3.73 (2.51-5.55)[d]	3.11 (1.97-4.91)[d]
Any disorder	136 (64.66)	5.99	795 (43.83)	2.05	2.34 (1.37-4.01)[d]	2.12 (1.20-3.75)[d]	2.91 (1.69-5.00)[d]	2.80 (1.58-4.97)[d]
Any 2 disorders	36 (17.68)	4.04	214 (10.43)	0.88	1.84 (1.05-3.25)[d]	1.30 (0.67-2.53)	2.28 (1.28-4.04)[d]	1.54 (0.77-3.08)
Any ≥3 disorders	67 (28.77)	4.13	247 (11.35)	0.94	3.16 (2.03-4.90)[d]	2.86 (1.79-4.56)[d]	4.19 (2.64-6.66)[d]	3.80 (2.29-6.33)[d]

See abbreviations and footnotes to Table 4.

individual disorders were considered, associations were strongest for some of the anxiety disorders (PTSD and obsessive-compulsive disorder). Fifteen percent of the general population comparison group retrospectively reported child maltreatment. After excluding these individuals from the comparison group, the magnitude of associations increased, with child protection agency history conferring a 10-fold higher odds of 12-month PTSD, together with elevated odds of other anxiety disorders, mood disorders, and drug use disorders. Child protection agency history was significantly associated with all mental disorder groups and with 3 or more disorders, both 12-month and lifetime, whether or not the comparison group excluded those retrospectively reporting child maltreatment.

This study has found significant associations with a greater number of mental disorders and greater magnitudes of association than a key prior study of mental disorder outcomes among those with prospectively ascertained child maltreatment.[21,22,33] This is particularly true when persons who retrospectively reported maltreatment were excluded from the comparison group. In particular, the associations we found with PTSD exceed in magnitude those observed by Widom,[22] even without excluding those who retrospectively reported maltreatment from the comparison group. We suggest that one of the main reasons for the stronger associations in this study is likely the fact that the comparison group in the Widom study was matched with the court-documented abuse group on low socioeconomic status. Because child maltreatment is associated with lower socioeconomic status,[24,25,34,35] maltreatment is likely to have been more prevalent in that comparison group than in the general population comparison group used herein. This is indicated by the fact that 49% of those in Widom and colleagues'[23] comparison group retrospectively reported maltreatment compared with 15% in this study. Such a high prevalence of maltreatment in the comparison group in their study will have considerably attenuated differences in subsequent mental disorder outcomes between the documented maltreatment group and the comparison group.

We have taken the issue of child maltreatment in the comparison group one step further in providing estimates of mental disorder outcomes in the child protection agency group relative to a comparison group with those who retrospectively reported child maltreatment removed. There are arguments for and against this strategy. The argument against it is that to the extent that retrospective reporting of child maltreatment may be exaggerated among or more likely to be recalled by those with mental disorders, removing those who report maltreatment from the comparison group may artificially inflate differences between the child protection agency group and the comparison group. These concerns are somewhat mitigated by the fact that mood-congruent recall is less likely to occur with serious, clearly operationalized adverse experiences[36,37] and it is most reliably associated with depression, not with anxiety.[12] In this study, the greatest increase in association after excluding those who reported maltreatment from the comparison group was related to an anxiety disorder (PTSD). It should also be noted that not all forms of maltreatment were asked about in the survey, and there is substantial nonreporting of child abuse by adult survivors,[10,11,33] factors that make it more probable that maltreatment was underreported than overreported in the comparison group, rendering the estimates we provide with those reporting maltreatment removed from the comparison group conservative.

The argument for removing those who retrospectively reported maltreatment from the comparison group is clearly that child maltreatment in the comparison group will attenuate or abolish any differences between the 2 groups. As both strategies have their problems, we report estimates both with and without exclusion of those who reported childhood maltreatment from the comparison group. We believe this demonstrates that the methodological is-

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sue of the prevalence of maltreatment in the comparison group, while not easily solved, is a key contributor to the apparently weaker associations between child maltreatment and mental disorders observed in prospective studies relative to those observed in retrospective studies.

We acknowledge several limitations of this study. Those with mental disorders and those with child protection agency history may have been less likely to take part in the survey, introducing a sample selection bias. This makes the estimates we report herein conservative. A second limitation, inherent in studies with prospective ascertainment of child maltreatment, is that the results do not represent the outcomes associated with maltreatment in the general population. There are 2 issues here. The first is related to the (un)representativeness of the child protection agency sample and the second is related to the (un)representativeness of the maltreatment itself. The child protection agency group is skewed toward the lower end of the socioeconomic spectrum. Although we statistically adjusted for indicators of socioeconomic status, there are some potential confounders we could not adjust for, such as parental psychopathology.[1,34] Moreover, our indicators of socioeconomic status during childhood are confined to maternal education and ethnicity, and our adjustment for current socioeconomic status (respondent educational qualifications and household income) is likely to be an overadjustment to some degree, because these variables may partially mediate the association between child maltreatment and mental health outcomes.

The second issue of how representative the maltreatment in the child protection agency group is of the severity of maltreatment in the general population is not easily determined. Although maltreatment coming to the attention of authorities is usually considered more severe than undetected maltreatment, the former group generally receives intervention, and it is possible that undetected abuse in the general population is of longer duration and, in aggregate, may be more severe.[26]

A further limitation is the fact that child protection agency history is used here as a proxy for maltreatment. These are not court-substantiated cases of abuse, and it is therefore possible that some individuals with this history are misclassified as maltreated. However, the number of individuals thus misclassified is likely to be small (because it would be unusual for the agency to become involved with families in which no maltreatment or neglect was occurring), and importantly, to the extent that such misclassification has occurred, it would reduce, not exaggerate, differences between this group and the comparison group in terms of mental disorder outcomes. Yet another factor contributing to the conservative nature of these estimates is that because the child protection agency database commenced in 1990 when participants who were aged 26 to 27 years at the time of the mental health survey were aged 12 to 13 years, some of these individuals may have been misclassified into the comparison group.

Despite these limitations, our findings that a prospectively ascertained child protection agency history is associated with higher odds of subsequent mood, anxiety, and substance use disorders support the conclusion that it is indeed child maltreatment that is associated with subsequent poor mental health outcomes, rather than just the memories of maltreatment. This implies, first, that targeted mental health interventions with present or past clients of child welfare agencies are indicated in addition to the interventions currently provided to stop or reduce the maltreatment; and second, that concerted population-level strategies are required to address the needs of the many other children who also experience maltreatment.

Submitted for Publication: August 28, 2009; final revision received November 9, 2009; accepted December 11, 2009.
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Author Contributions: Dr Scott had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
Financial Disclosure: None reported.
Funding/Support: Te Rau Hinengaro: The New Zealand Mental Health Survey was funded by the Ministry of Health, the Alcohol Advisory Council of New Zealand, and the Health Research Council of New Zealand. Part of the analysis for this article was supported by Otago University research funding.
Additional Contributions: The Kaitiaki Group and Pacific Advisory Group provided input and support for this survey, and we thank all of the participants. The survey was carried out in conjunction with the World Health Organization World Mental Health (WMH) Survey Initiative. The WMH staff provided assistance with instrumentation, fieldwork, and data analysis. These activities were supported by grant R01MH070884 from the US National Institute of Mental Health; the John D. and Catherine T. MacArthur Foundation; the Pfizer Foundation; grants R13-MH066849, R01-MH069864, and R01 DA016558 from the US Public Health Service; grant R01-TW006481 from the Fogarty International Center; the Pan American Health Organization; Eli Lilly and Company; Ortho-McNeil Pharmaceutical Inc; GlaxoSmithKline; and Bristol-Myers Squibb. The WMH publications are listed at http://www.hcp.med.harvard.edu/wmh/. We thank the New Zealand Child Youth and Family agency for access to their electronic client database.

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