# Unemployment and serious suicide attempts

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## ABSTRACT

**Background.** This study used a case–control design to examine the association between unemployment and risk of medically serious suicide attempt.

**Method.** A sample of 302 individuals who made serious suicide attempts was contrasted with 1028 randomly selected community control subjects.

**Results.** Individuals who made serious suicide attempts reported higher rates of current unemployment (OR = 4·2) than control subjects. This association was similar for males and females. However, even before adjustment for confounding factors it was evident that exposure to unemployment made only a small contribution to suicide attempt risk. The population attributable risk for exposure to unemployment was 7·3 %. After adjustment for antecedent childhood, family and educational factors the association between unemployment and risk of serious suicide attempt was reduced but remained significant (OR = 2·1), suggesting that common antecedent factors made a large contribution to risks of both unemployment and serious suicide attempt. When both antecedent family and childhood factors, and psychiatric morbidity were taken into account, unemployment was not significantly related to risks of serious suicide attempt.

**Conclusion.** The results of this study provide support for the contention that much of the association between unemployment and suicidal behaviour is non-causal, and reflects common or correlated factors that contribute to risks of both unemployment and suicidal behaviour. Any remaining association between unemployment and suicide attempt risk appears to arise from the correlation that exists between unemployment and psychiatric disorder.

## INTRODUCTION

Recently many countries have experienced increased rates of unemployment, raising concerns about psychological and other adverse health effects of unemployment (for reviews see Catalano, 1991; Jin *et al.* 1995). One focus of concern has been the role of unemployment in increasing vulnerability to suicidal behaviour, particularly among youthful populations (Boor, 1980; Platt, 1984; Diekstra, 1989; Crombie, 1990; Pritchard, 1990; Morrell *et al.* 1993).

Many (but not all) examinations of aggregate data have shown positive associations between unemployment and both completed suicide and non-fatal suicide attempts (Sainsbury *et al.* 1981; Platt & Kreitman, 1985; Diekstra, 1989; Morrell *et al.* 1993; Krupinski *et al.* 1994). In addition, studies of individual subjects have suggested that rates of unemployment are elevated among those who die by suicide or make suicide attempts (Shepherd & Barraclough, 1980; Platt & Kreitman, 1985; Hawton & Rose, 1986; Arensman *et al.* 1995; Heikkinen *et al.* 1995).

However, while associations between unemployment and suicidal behaviour have consistently been documented, the role of unemployment as a causative factor for suicidal behaviour remains unclear. This issue was reviewed by Jones *et al.* (1991) who suggested that there were three possible explanations of the association between unemployment and suicide attempt.

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*1 Vulnerability model* Unemployment may in-
crease the impact of stressful life events.
*2 Indirect causation model* Unemployment
may indirectly influence suicide risk by in-
creasing the risk of occurrence of events (for
example, relationship difficulties or financial
problems) that may precipitate suicidal behav-
iour.
*3 Non-causal model* The association between
unemployment and suicidal behaviour is, wholly
or partly, spurious and arises because both
unemployment and suicide are influenced by
common or correlated causal factors that are
antecedent to both outcomes and are related to
both suicide and unemployment.

Jones *et al.* (1991) examined the extent to
which there were causal associations between
unemployment and deliberate non-fatal self-
poisoning and concluded that there was no firm
evidence that 'unemployment acts as an indirect
causal variable or as a vulnerability factor in the
pathway to self-poisoning' (p. 175). They sug-
gested that 'the model that unemployment and
self-poisoning are non-causally associated re-
mains a viable hypothesis' (p. 175). Jones *et al.*
however, did not provide any direct test of this
hypothesis.

To test the common causal hypothesis, this
analysis presents the results of a case–control
study of unemployment and medically serious
suicide attempt in a consecutive sample of 302
individuals. The aims of this analysis were: (1)
to document the extent to which unemployment
was associated with serious suicide attempt risk
and to examine whether this relationship varied
with gender; and (2) to examine the extent to
which any associations between risk of serious
suicide attempt and unemployment could be
explained by antecedent factors including edu-
cational attainment, exposure to adverse child-
hood experiences and psychiatric morbidity.

## METHOD

This investigation is part of a larger study, the
Canterbury Suicide Project, which is a case–
control study of suicide (202 cases), medically
serious suicide attempts (302 cases) and 1028
control subjects. This analysis describes the
association between unemployment and serious
suicide attempt among individuals from this
study.

### Cases

Cases were a consecutive series of 302 individuals
aged 13 to 88 years who made medically serious
suicide attempts during the period 1 September
1991 to 31 May 1994 in the city of Christchurch,
New Zealand. Christchurch (population 315 000)
is the major conurbation of the Canterbury
region, a mixed urban/rural area with a regional
population (including Christchurch city) of
approximately 430 000. There is a sole entry
point for the region for emergency hospital
treatment at Christchurch Hospital.

Medically serious suicide attempts were de-
fined as those for which hospital admission for
more than 24 h was required and which, during
admission, met one of the following treatment
criteria.

(*i*) Treatment in specialized units including
the Intensive Care Unit, the Hyperbaric Unit
and the Burns Unit.

(*ii*) Surgery under general anaesthesia (super-
ficial cuts which did not require surgical repair
were excluded).

(*iii*) Medical treatment beyond gastric lavage,
activated charcoal or routine neurological obser-
vations. More specifically, individuals were
included in the study if they required treatments
such as antidotes for drug overdoses, telemetry
or repeated tests or investigations.

Individuals who made suicide attempts with a
high risk of fatality, such as hanging or gunshot,
who were admitted for more than 24 h but who
did not meet the above treatment criteria were
also included in the sample of serious suicide
attempts. Medically serious suicide attempts
comprised approximately one-third of all suicide
attempts requiring hospital admission.

Cases were identified by daily telephone calls
to the Emergency Department, the Psychiatric
Emergency Service and relevant admitting
wards. Individuals who met criteria for inclusion
in the study were interviewed in hospital when
medical staff considered it appropriate for them
to be seen, usually immediately prior to dis-
charge. Case identification was confined to
medically serious suicide attempts since, from a
public health perspective, medically serious
suicide attempts are a major source of morbidity
and health costs, and secondly because those
who make medically serious suicide attempts
have psychiatric and psychological profiles very

similar to those who die by suicide (Beautrais, 1996; Beautrais *et al.* 1996). In this respect, those making medically serious suicide attempts can be assumed to most resemble those who die by suicide. While information about the latter group may only be obtained from family and friends, interviewing those who made medically serious suicide attempts offers the opportunity to obtain information personally.

In total, 317 individuals made serious suicide attempts during the study period; 302 participated in the study, giving a response rate of 95·3%. Thirteen (4·1%) refused involvement and two (0·6%) were not interviewed because of language difficulties.

### Control subjects

Control subjects were selected from electoral rolls for the Canterbury region. An age and gender stratified sample was obtained in which the sample was stratified by gender and age into six age strata (18–24 years; 25–29 years; 30–39 years; 40–49 years; 50–59 years; ⩾ 60 years) with the number of subjects in each age by gender stratum being selected at a rate proportional to the known age by gender distribution of the population aged 18 years and over. Of 1200 subjects selected for the control sample, 1028 participated in the study. Ninety-three (7·8%) refused involvement, 57 (4·8%) could not be traced and 22 (1·8%) were unable adequately to complete the interview because of intellectual problems, illness or language difficulties. The estimated response rate for control subjects was therefore 85·7%.

Official estimates from the national Electoral Roll Office suggested 95·5% of the eligible population were enrolled on Canterbury electoral rolls during the study. Subjects selected from electoral rolls were mailed a letter of introduction explaining the study. The interviewer then called at subjects' homes, discussed the study and arranged to return to conduct an interview at a convenient time.

The study was approved by the Ethics Committees of the Canterbury Area Health Board and the Southern Regional Health Authority. Written informed consent was obtained from all study participants after the aims and procedures of the study had been explained. For children aged 16 and under, the consent of both the child and the parent/guardian was obtained.

### Data collection

A semi-structured interview was conducted personally with each subject in the study (cases and controls) by trained experienced interviewers to retrospectively reconstruct a life history and obtain information about potential risk factors for serious suicide attempts. For each subject a parallel interview was conducted with a 'significant other' who knew the subject well and was nominated by the subject. Fieldwork was closely monitored with each interviewer meeting weekly with the supervisor for debriefing, checking and editing of each interview.

### Measures

The following measures were used in the analysis.

#### Current unemployment

Self-report of having been unemployed and looking for work at the time of the suicide attempt (or interview).

#### Childhood and family experiences

The literature on completed suicide and non-fatal suicide attempts has consistently identified several major domains of risk including socio-demographic and educational disadvantage and measures of family dysfunction that are antecedent to suicidal behaviour (for reviews see Brent *et al.* 1987; Diekstra *et al.* 1995; Moscicki, 1995). A series of measures that spanned these domains was derived from the data base of the study for cases and controls.

#### Parental care characteristics

The Parental Bonding Instrument (PBI) (Parker, 1989) was used to evaluate retrospectively each subject's perception of the quality of parental care during childhood. (Childhood was defined, for all childhood risk factors, as the period from birth to 16 years.) This 25-item questionnaire contains a 12-item subscale that evaluates parental care on a dimension ranging from care, affection and involvement to indifference, neglect and rejection, and a 13-item subscale which measures parental control ranging from encouragement of independence to over control and intrusiveness. The PBI has been both reliable and stable over time and low care has repeatedly

been shown to be associated with a range of psychopathologies (Parker, 1989; Wilhelm & Parker, 1990). For each subject, the PBI was administered separately for both the principal mother figure and the principal father figure during childhood to yield two scores for each parent figure: maternal care, paternal care, maternal control, paternal control.

## Childhood family experiences

### Poor parental relationship

Each subject was asked to give a global rating on a four-point scale of the marital relationship of the major parent figures during the subject's childhood. Subjects were classified as having a poor parental relationship if they responded that their parents had got on together 'not very well' or 'very poorly'.

### Parental separation or divorce

Self-report of divorce or long-term separation of parent figures during childhood.

### Poor economic circumstances

Each subject was asked whether, during childhood, 'lack of money had caused problems for the family or the subject'.

## Childhood abusive experiences

### Childhood sexual abuse

Each subject was asked whether or not, during childhood, they had been 'physically or psychologically forced by anyone to engage in any unwanted sexual activity, such as unwanted sexual touching of his/her body or sexual intercourse', a definition previously used by Murphy (1985). Subjects who responded positively to this question were asked further questions relating to this activity (if they felt able to talk about the matter). Subjects were classified as having a history of childhood sexual abuse if they responded positively to the initial question and subsequent questioning established a history of childhood sexual abuse.

### Childhood physical abuse

Each subject was questioned as to whether or not, they believed they had, in their opinion, experienced physical abuse during childhood. Subjects who responded positively to this ques-

tion were asked to provide specific examples of the abusive behaviour they had experienced. Subjects were classified as having a history of physical abuse if they responded positively to the initial question and responses to subsequent questions established a history of physical abuse.

## Childhood educational experiences

### No formal educational qualifications

This involved self-report of having completed education without obtaining a formal educational qualification including New Zealand School Certificate (usually achieved at age 16), University Entrance (age 17) or Bursary examinations (aged 18). At the time the study was conducted education was compulsory in New Zealand until the age of 15 years.

### Problems with schoolwork

This involved self-report of problems or difficulties with schoolwork.

## Psychiatric morbidity

The interview for each subject included a modified version of the SCID interview (Spitzer *et al*. 1988) to generate DMS-III-R diagnoses (American Psychiatric Association, 1987) of selected mental disorders. Information gathered from both subject and significant other interviews was integrated in a diagnostic conference (this always included the principal investigator (A.L.B.) and at least one psychiatrist (P.R.J. or R.T.M.) to produce, for each subject, best estimate diagnoses of mental disorders, according to DSM-III-R criteria. The following diagnostic groupings, for current mental disorders i.e. within the month prior to the suicide attempt (or interview) were used: (*i*) affective disorders (major depression, bipolar I and bipolar II disorders); (*ii*) substance use disorders (alcohol, cannabis and other psychoactive substance abuse or dependence); (*iii*) anxiety disorders (panic disorder, agoraphobia, obsessive compulsive disorder, simple phobia, social phobia); (*iv*) eating disorders (anorexia nervosa, bulimia nervosa); (*v*) non-affective psychosis (schizophrenia, schizoaffective disorder, psychotic disorder not otherwise specified).

For conduct disorder and antisocial personality disorder, a lifetime diagnosis was obtained. Multiple diagnoses were permitted on Axis I.

The reliability of the best estimate diagnostic procedure was ascertained by a random sample of 20 % of all cases (both subjects and controls). The test–retest agreement was high with kappa coefficients (Fleiss, 1981) for the principal diagnostic categories (affective disorders, substance use disorders, anxiety disorders, eating disorders, non-affective psychosis, conduct disorder, antisocial personality disorder) ranging from 0·95 to 0·99.

## RESULTS

### Age and gender characteristics of those making serious suicide attempts

Approximately equal numbers of males and females made serious suicide attempts: 140 males (46·4 %) and 162 females (53·6 %). The mean age of those making serious suicide attempts was 30·4 years (s.d. = 14·2 years). There were no significant differences in the age by gender distribution of those who made serious suicide attempts with the mean age for females being 30·7 years (s.d. = 14·8 years) and for males, 29·9 years (s.d. = 13·4 years).

### Unemployment and risk of serious suicide attempt

Table 1 shows the relationship between unemployment (at the time of interview) and suicide attempt status (case, control) for males, females and the total sample. The association between unemployment and risk of serious suicide attempt was measured by the odds ratio (OR) (95 % confidence interval) and the significance of this association was tested using the chi-squared test of independence. Unemployment was associated with elevated odds of serious suicide attempt for males, females and the total sample.

The Population Attributable Risk (PAR) (Bruzzi *et al.* 1985) was calculated to estimate the contribution of unemployment to risk of serious suicide attempt before adjustment for potential confounding factors. The PAR indicates the (hypothetical) reduction in the rate of serious attempted suicide which would occur if unemployment were causally related to suicide attempt risk and if unemployment were eliminated. The PAR estimate suggested that, despite the significant odds ratio between unemployment and risk of serious suicide attempt, exposure to unemployment made only a small contribution to overall rates of serious suicide attempt: only 7·3 % of cases of serious suicide attempt could be attributed to unemployment, even assuming that all of the unadjusted association between unemployment and suicide attempt risk was causal.

### Associations between childhood and family factors, psychiatric morbidity and risk of serious suicide attempt

Table 2 compares rates of a series of childhood, family and educational factors among cases and control subjects. Associations between each risk factor and risk of serious suicide attempt are described by the OR (95 % confidence interval) and tested for significance using the chi-squared test of significance, and for PBI scores, the *t* test. There were pervasive relationships between childhood and family factors and risk of serious suicide attempt with those making serious suicide attempts having elevated odds of parental separation or divorce ($P < 0.0001$); poor parental marital relationship ($P < 0.0001$); poor family economic circumstances ($P < 0.0001$); childhood sexual abuse ($P < 0.0001$); childhood physical abuse ($P < 0.0001$); problems with schoolwork ($P < 0.0001$); lack of formal educational qualifications ($P < 0.0001$), and both lower PBI maternal ($P < 0.0001$) and paternal ($P < 0.0001$) care scores and higher maternal ($P < 0.0001$) and paternal ($P < 0.0001$) control scores than control subjects.

Table 2 also compares rates of a series of current mental disorders among cases and control subjects. Individuals who made serious

Table 1. *Rates of current unemployment for individuals making serious suicide attempts and for control subjects*

| | Serious suicide attempts | | Controls | | OR | P |
|---|---|---|---|---|---|---|
| | N | % | N | % | (95 % CI) | |
| Current unemployment | | | | | | |
| Male | 26/140 | 18·6 | 26/494 | 5·3 | 4·1 (2·3, 7·3) | < 0·0001 |
| Female | 13/162 | 8·0 | 9/534 | 1·7 | 5·1 (2·1, 12·1) | < 0·0001 |
| Total | 39/302 | 12·9 | 35/1028 | 3·4 | 4·2 (2·6, 6·8) | < 0·0001 |

Table 2. *Rates (%) of selected childhood and family experiences and current mental disorders of individuals making serious suicide attempts and control subjects*

| Experience | Serious suicide attempt | Controls | OR (95% CI) | P |
|---|---|---|---|---|
| I Childhood and family experiences | | | | |
| Parental care | | | | |
| Mean maternal care | 22·1 | 30·4 | | < 0·0001 |
| Mean paternal care | 17·8 | 27·8 | | < 0·05 |
| Mean maternal control | 13·9 | 9·7 | | < 0·05 |
| Mean paternal control | 13·3 | 8·8 | | < 0·05 |
| Childhood family experiences | | | | |
| Parental separation/divorce | 35·8 | 16·3 | 2·9 (1·6, 5·1) | < 0·0001 |
| Poor parental relationship | 35·0 | 7·8 | 6·3 (3·2, 12·7) | < 0·0001 |
| Poor family economic circumstances | 24·2 | 11·1 | 2·5 (1·3, 4·9) | < 0·005 |
| Childhood abusive experiences | | | | |
| Sexual abuse | 34·2 | 7·2 | 6·7 (3·3, 13·8) | < 0·0001 |
| Physical abuse | 21·7 | 2·0 | 13·8 (4·1, 47·0) | < 0·0001 |
| Childhood educational experiences | | | | |
| Problems with schoolwork | 41·7 | 19·6 | 2·9 (1·7, 5·0) | < 0·0001 |
| No formal educational qualifications | 46·2 | 11·8 | 6·5 (3·5, 11·9) | < 0·0001 |
| II Current mental disorder | | | | |
| Any affective disorder | 76·8 | 6·6 | 46·8 (32·5, 67·3) | < 0·0001 |
| Any substance use disorder | 38·7 | 9·5 | 6·0 (4·4, 8·2) | < 0·0001 |
| Any anxiety disorder | 23·5 | 5·1 | 5·8 (3·9, 8·5) | < 0·0001 |
| Any eating disorder | 7·3 | 0·3 | 26·8 (8·0, 90·3) | < 0·0001 |
| Any non-affective psychosis | 1·0 | 0·2 | 5·1 (0·9, 30·9) | NS |
| Any antisocial disorder | 30·8 | 4·5 | 9·5 (6·5, 13·9) | < 0·0001 |

suicide attempts had elevated odds of a range of current mental disorders including affective disorders ($P < 0.0001$); substance use disorders ($P < 0.0001$); anxiety disorders ($P < 0.0001$); eating disorders ($P < 0.0001$) and lifetime histories of antisocial disorders ($P < 0.0001$). Non-affective psychosis occurred infrequently in both cases (1·0%) and control subjects (0·2%).

### Unemployment and risk of serious suicide attempt adjusted for family and childhood factors and psychiatric morbidity

Table 2 suggests that the higher rates of serious suicide attempt among those who were unemployed could have arisen from antecedent family or childhood factors that were associated with both: (a) increased risks of serious suicide attempt; and (b) increased risks of unemploy-

ment. To explore this issue a series of logistic regression models was fitted to the data in Tables 1 and 2 to estimate the association between unemployment and risk of serious suicide attempt after: (*i*) adjustment for family, childhood and educational factors; (*ii*) adjustment for psychiatric morbidity; and (*iii*) adjustment for both antecedent family, childhood and educational factors, and current psychiatric morbidity.

As noted previously, cases tended to be somewhat younger than controls and the age range of cases (13–88) somewhat wider than the age range of controls (18–89). To take account of age heterogeneity in cases and controls age was introduced as a factor into all logistic regression equations. Gender was also included in each equation as a covariate factor. Variables

Table 3. *Odds ratios between current unemployment and serious suicide attempt before and after adjustment for* (I) *antecedent childhood and family factors,* (II) *current mental disorders, and* (III) *childhood and family factors and current mental disorders*

| Factors for which adjustments made | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | *P* |
|---|---|---|---|
| I   Childhood and family factors | 4·2 (2·6, 6·8) | 2·1* (1·2, 3·7) | < 0·05 |
| II   Current mental disorders | 4·2 (2·6, 6·8) | 1·95† (0·95, 4·0) | > 0·10 |
| III   Childhood and family factors and current mental disorders | 4·2 (2·6, 6·8) | 1·7‡ (0·8, 3·5) | > 0·10 |

\* Estimates were adjusted for: educational qualifications (*P* < 0·0001); childhood sexual abuse (*P* < 0·0001); poor parental relationship (*P* < 0·0001); low PBI parental care scores (*P* < 0·0001).

† Estimates were adjusted for: current affective disorder (*P* < 0·0001); current substance use disorder (*P* < 0·0002); lifetime history of antisocial disorder (*P* < 0·0001).

‡ Estimates were adjusted for: educational qualifications (*P* < 0·0001); childhood sexual abuse (*P* < 0·05); poor parental relationship (*P* < 0·05); current affective disorder (*P* < 0·0001); current substance use disorder (*P* < 0·005); lifetime history of antisocial disorder (*P* < 0·005).

were entered into each equation using forward and backward elimination until the best-fitting model was identified. The results of the logistic regression analysis are shown in Table 3, which gives the OR estimates (95% confidence intervals) between current unemployment and risk of serious suicide attempt, adjusted for the risk factors found to be significant in each equation. An account of the estimation of adjusted odds values using logistic regression is given by Breslow & Day (1980).

After adjustment for childhood, family and educational experiences, age and gender, the association between unemployment and risk of serious suicide attempt was reduced but remained statistically significant (unadjusted OR = 4·2; CI 2·6, 6·8; adjusted OR = 2·1; CI 1·2, 3·7; *P* < 0·05). Significant risk factors in the equation included: lack of formal educational qualifications (*P* < 0·0001); childhood sexual abuse (*P* < 0·0001); poor parental marital relationship during childhood (*P* < 0·0001), and low PBI scores for maternal or paternal care (*P* < 0·0001), (see Table 3).

After adjustment for psychiatric morbidity, age and gender, the association between unemployment and risk of serious suicide attempt was reduced and was statistically non-significant (unadjusted OR = 4·2; CI 2·6, 6·8; adjusted OR = 1·95; CI 0·95, 4·0: *P* > 0·10). Significant risk factors in the equation included current histories of affective disorder (*P* < 0·0001) and substance use disorder (*P* < 0·0002), and lifetime

history of antisocial disorder (*P* < 0·0001) (see Table 3).

After adjustment for antecedent family, childhood and educational factors, and current psychiatric morbidity, the observed association between unemployment and risk of serious suicide attempt was substantially reduced and was statistically non-significant (unadjusted OR = 4·2; CI 2·6, 6·8; adjusted OR = 1·7; CI 0·8, 3·5, *P* > 0·10). Significant factors in the equation included poor educational qualifications (*P* < 0·0001), childhood sexual abuse (*P* < 0·05), poor parental relationship (*P* < 0·05), current affective disorder (*P* < 0·0001), current substance use disorder (*P* < 0·005) and lifetime history of antisocial disorder (*P* < 0·005) (see Table 3).

The implications of these results are clearly that most, or perhaps all, of the association between unemployment and suicide attempt risk is explained by: (*a*) linkages between unemployment and family and childhood factors which are associated with increased risks of serious suicide attempt; and (*b*) linkages between unemployment and current psychiatric factors which are associated with increased risks of serious suicide attempt.

## DISCUSSION

This study examined the association between unemployment and serious attempted suicide in a consecutive sample of individuals who had

made serious suicide attempts, looking at the extent to which a series of antecedent childhood and family factors, and current psychiatric morbidity, were common to both unemployment and serious suicide attempts, and might contribute to both unemployment and suicide attempt behaviour.

In agreement with previous studies (Shepherd & Barraclough, 1980; Platt & Kreitman, 1984; Hawton & Rose, 1986; Arensman *et al.* 1995; Heikkinen *et al.* 1995) those making serious suicide attempts reported higher rates of current unemployment than control subjects: unemployment was associated with increased odds of serious suicide attempt of 4·1 for males and 5·1 for females. These results are consistent with studies which have shown that unemployment was associated with increased odds of suicide ranging from 2·4 to 3·4 (Iversen, 1987; Nordstrom, 1988; Platt *et al.* 1992), but the odds ratios produced in the present study were lower than the odds ratio of 10 (unadjusted for the effects of potential confounding factors) between unemployment and attempted suicide reported by Platt & Kreitman (1984).

While significant associations were found between unemployment and serious suicide attempt risk, the contribution of unemployment to overall suicide attempt rates in our study was very modest. The unadjusted PAR estimate suggested that exposure to unemployment accounted for, at most, 7·3 % of serious suicide attempts.

Much of the association between unemployment and suicide attempt risk was explained by a series of social and family factors which were antecedent to unemployment experiences but were related to suicide attempt risk. These factors included: lack of formal educational qualifications, childhood sexual abuse, poor parental marital relationship and low PBI scores for parental care. After adjustment for these factors the odds ratio between unemployment and serious suicide attempt risk reduced from 4·2 (CI 2·6, 6·8) to 2·1 (CI 1·2, 3·7) but remained statistically significant ($P < 0.05$).

Further analysis suggested that the association between unemployment and suicide attempt risk, after adjustment for childhood and family factors, was explained by linkages between unemployment and psychiatric morbidity. When both antecedent family and childhood factors and psychiatric morbidity were taken into account, unemployment was not significantly related to risks of serious suicide attempt (OR = 1·7; CI 0·8, 3·5; $P > 0.10$).

The linkages between unemployment, psychiatric morbidity and risk of serious suicide attempt, after adjustment for antecedent childhood and family factors, might be explained in two ways. First, these linkages may reflect a causal chain process in which unemployment increases risks of psychiatric morbidity which, in turn, increases risks of suicide attempt behaviour. Under this explanation some component of the linkage between unemployment and suicide attempt behaviour may reflect an indirect association that is mediated by psychiatric disorder. Alternatively, high rates of unemployment may be symptomatic of individuals with psychiatric morbidity. In this case, all of the association between unemployment and suicide attempt is likely to be non-causal and to arise because unemployment is symptomatic of high risk individuals who are characterized by a combination of psychosocial, family and educational adversity and/or psychiatric morbidity.

The results of this study provide considerable support for Jones *et al.* (1991) hypothesis that much of the association between unemployment and suicidal behaviour is non-causal and arises because the factors which place individuals at risk of suicidal behaviour are also related to increased risks of unemployment. However, the possibility remains that there is a small indirect linkage between unemployment and suicide attempt risk in which exposure to unemployment acts to promote the onset of psychiatric morbidity, and notably of depression, which in turn leads to increased risks of suicide attempt behaviour.

To place this issue in context, it should be noted that this association (if it exists) should make a very minor contribution to suicide attempt risk, given the small population attributable risk between unemployment and serious suicide attempt risk.

There are some caveats that should be considered in relation to this study. The case–control design has measured childhood and family risk factors using retrospective self-report of childhood experiences. It is possible that these reports may be influenced by recall bias in which those making serious suicide attempts were more

prone to report their childhoods adversely than control subjects. If this tendency to recall bias was also associated with an individual's unemployment status this may have resulted in the present analysis 'overcontrolling' the association between unemployment and risk of serious suicide attempt. We attempted to minimize potential recall bias by careful debriefing of each interview and by monitoring test–retest reliability, and we note that prospectively gathered data from a longitudinal study of risk factors for suicidal behaviour (Fergusson & Lynskey, 1995) has provided some confirmation that the data in our study linking childhood experiences with risk of serious suicide attempt are unlikely to have been substantially influenced by recall bias. Further, other studies, including that of Brent *et al.* (1988), for example, have suggested that retrospective data collection provides reliable, valid information for the study of suicidal behaviour.

We did not collect data which reported the temporal sequencing of unemployment periods and episodes of psychiatric morbidity, for the following reasons: (*i*) the data on unemployment were collected as part of a larger and comprehensive study of risk factors for suicidal behaviour and time constraints precluded our collecting more detailed information about episodes of unemployment; and (*ii*) we were aware of the possibility of recall bias in asking subjects to specify the onsets and offsets of episodes of both unemployment and mental health problems.

The findings from the present study apply, of course, to a particular country with a particular overall rate of unemployment and may not apply to countries in which unemployment rates or views of unemployment are different.

Despite these caveats, the weight of the evidence from this study suggests two major conclusions. First, much of the association between unemployment and suicide attempt risk appeared to arise from factors (lack of formal educational qualifications, childhood sexual abuse, poor parental relationship, low PBI scores for parental care) antecedent to both the onset of unemployment and the suicide attempt. Secondly, any remaining association between unemployment and suicide attempt appears to reflect the association that exists between unemployment and psychiatric disorder.

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