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Reported parental behaviour and adult affective symptoms. 1. Associations and moderating factors

BRYAN RODGERS[1]

From the NH&MRC Social Psychiatry Research Unit, The Australian National University, Canberra, Australia; and MRC National Survey of Health and Development, University College London

SYNOPSIS Associations between retrospective ratings of parental behaviour and adult affective symptoms were investigated in a British national sample. Symptom scores at ages 36 and 43 years showed low but significant correlations with care (negative) and control (positive), as measured by the Parental Bonding Instrument. Prevalence of high symptom scores was much greater in respondents with low care–high control (affectionless control) parents than in those with high care–low control parents, but there was no synergistic effect of combined care and control. Degree of affectionless control was progressively related to risk of depression. No significant gender differences were found in these associations. Findings could not be explained as spurious relationships resulting from association with other features of childhood adversity, and there was evidence that distorted recall arising from contemporaneous depressed mood was not responsible. Work is needed to establish the causal mechanisms underlying observed associations, including inter-relationships between parental style and other early adversity, and factors mediating or moderating the long-term effects of parental behaviour.

INTRODUCTION

For many years, interest in the consequences of early environment for adult mental health concentrated on acute childhood events and parental loss in particular (Gregory, 1958; Granville-Grossman, 1968; Tennant *et al.* 1980; Paykel, 1982). More recently, a broader range of influences has been considered, including severe adversity, such as parental mental illness and substance abuse, violence in the family and physical and sexual abuse of children (Hällström, 1987; Holmes & Robins, 1988; Mullen *et al.* 1988; Kessler & Magee, 1993; Mathew *et al.* 1993) and less extreme and even acceptable parental behaviour and disciplinary practices (Raskin *et al.* 1971; Jacobson *et al.* 1975; Perris *et al.* 1986; Holmes & Robins, 1988). This shift in focus from traumatic events to enduring circumstances brought about a re-evaluation of mechanisms involved in the observed associations between disorder, in childhood or adulthood, and specific events such as parental divorce or death. Increasing emphasis has been placed on family relationships as underlying causal factors (Emery, 1982; Wolkind & Rutter, 1985; Tennant, 1988; Parker, 1992).

High rates of adult affective symptoms in offspring from divorced families have been reported by the Medical Research Council National Survey of Health and Development (NSHD), a longitudinal study of a British birth cohort (Rodgers, 1990, 1994). This study previously lacked the necessary information to consider whether those who did not experience family breakdown in childhood but whose parenting was inadequate would show a similar poor outcome. Consequently, data obtained at age 43 included retrospective ratings of parents using the Parental Bonding Instrument (PBI; Parker *et al.* 1979). This paper is concerned with associations between recollected parental style and self-reported affective symptoms. Although basic associations between reported parental behaviour and adult depression have been demonstrated consistently (Parker, 1979*a*, *b*,

[1] Address for correspondence: Dr Bryan Rodgers, NH&MRC Social Psychiatry Research Unit, The Australian National University, Canberra, ACT 0200, Australia.

1983*a*; Parker *et al.* 1987; Hickie *et al.* 1991), there are still doubts as to the precise nature of the relationship.

One area of doubt concerns the relative importance of the two dimensions measured by the PBI (i.e. care and control), an issue made more complicated by the fact that these scales typically show a substantial negative correlation with each other (Parker, 1989). Four studies using non-clinical samples have pointed to parental care being paramount, with control adding little to the prediction of depression (Parker, 1979*a*, *b*; Mackinnon *et al.* 1989; Kendler *et al.* 1993). However, there is other evidence to suggest that control is important, and that a combination of low care and high control (i.e. affectionless control) may be especially pathogenic (Parker, 1979*a*; Plantes *et al.* 1988). This putative synergistic relationship is difficult to demonstrate in the general population, requiring a large sample size.

A second area of doubt is the possible confounding of parental style with other childhood adversity, and there is little empirical evidence on this matter. It is possible, for example, that parental behaviour may differ between socio-economic groups, or could be associated with age of parents, parental illness, or family break-up (Parker, 1983*b*; Harper & Ryder, 1986; Sexton *et al.* 1989).

A third issue is whether there are interactive effects between parental style and other childhood variables. Such moderating factors may be found in the area of childhood adversity; it could be that children in less advantageous circumstances are more vulnerable to the effects of poor parenting. A further specific example of an interactive effect is the possibility of sex differences. Previous studies have not demonstrated differences in associations between PBI ratings and depression in relation to the sex of subjects, but there is an established view that boys are more vulnerable to childhood influences in general than girls (Rutter, 1987). By way of contrast, two recent studies have reported associations between parental divorce and adult depression in women, with no such finding for men (McLeod, 1991; Rodgers, 1994), and it has been suggested that stronger relationships may be seen in women when the focus is on internalizing rather than externalizing disorders (McLeod, 1991). A difference with respect to sex of parent also seems plausible, given that a greater responsibility for child rearing rests on mothers in most societies, and Birtchnell (1988) has reported larger associations of depression with mother PBI ratings than with father ratings.

A fourth issue is the important methodological question of whether present affect might bias retrospective accounts of parental behaviour. There is evidence that current depressed mood does not influence PBI ratings (Parker, 1981; Gotlib *et al.* 1988; Plantes *et al.* 1988), and a wider literature indicates that distorted perceptions are not responsible for associations between reported early adversity and psychopathology (Brewin *et al.* 1993). However, some reports have suggested that bias may occur (Wolkind & Coleman, 1983; Lewinsohn & Rosenbaum, 1987; Amato, 1991).

The NSHD is well placed to address these questions. It has a large general population sample and has the additional benefit that early environmental factors from the prospective data set have been investigated previously as predictors of adult affective disorder (Rodgers, 1990).

METHOD

Sample and data collection

The NSHD is a follow-up study of individuals born throughout Wales, Scotland and England in one week of March 1946. Multiple births and illegitimate children were excluded from the investigation, and all children of non-manual and agricultural workers and a quarter of others were selected for follow up at 2 years of age and beyond ($N = 5362$). Regular contact was maintained with this sample at a maximum of 2-year intervals during childhood, and less frequently in adulthood. Information was obtained covering socio-economic and demographic characteristics of the families of origin, educational provision for the study children, and histories of their growth, intellectual development, illnesses, behaviour problems, and personality. Adult data include histories of employment, housing, marriage, fertility and illness, measures of body shape, blood pressure and respiratory function, and assessments of symptoms in certain specific areas, including mental health.

At the most recent 43-year contact (1989–90), the PBI was chosen to assess parental style for

the following reasons: (*i*) the items and scales derived from them cover the facets of behaviour most commonly included in rating instruments of this type (Perris *et al.* 1980) and in questionnaires on recollections of parenting (Birtchnell, 1993); (*ii*) there is a substantial and growing body of evidence regarding the PBI's psychometric properties (Parker, 1989); (*iii*) there have been previous studies of the relationship between PBI ratings and depression, using both clinical and non-clinical samples (Parker, 1983*b*); and (*iv*) the instrument is appropriate for use as a self-completion inventory in large-scale fieldwork, in the form recommended by Gamsa (1987)[1]. Following the PBI, subjects were asked 'As a child do you feel you were mistreated by your parents in any way?', and were invited to comment further. Any open-ended comments elicited were coded to indicate normal, happy, restricted, unhappy or neglected upbringing and reports of psychological, physical or sexual abuse.

Also at age 43, an assessment of psychiatric symptoms was required; particularly a measure of the syndrome, characterized by symptoms of depression and anxiety, that is associated with considerable personal distress, social and occupational role handicap, and use of services. Nineteen such symptoms were rated for the 12 months preceding interview (see Appendix 1). This approach was adopted in preference to the use of existing instruments, because a measure was needed with good discrimination at lower as well as higher levels of symptomatology and because greater precision was thought necessary in rating the frequency of occurrence of individual symptoms. Information on use of medical services for 'nervous or emotional trouble or depression' was collected to enable the validation of the symptom scale as a measure of clinical significance.

Of the original 5362 survey members, 3262 were interviewed in 1989–90. At that time, 365 subjects were known to have died (6·8%) and 618 were known to have left the country (11·5%). Of the remainder, 646 had refused to participate further (14·8%), 276 were untraced (6·3%) and 195 were unwilling to be interviewed on that occasion (4·5%), giving a 74·5% response rate for those thought to be still living in Britain. In general, losses have not led to significant bias in the sample, although certain subgroups are under-represented, including those with serious psychiatric illnesses (specifically schizophrenia), poor literacy skills and learning disabilities (Wadsworth *et al.* 1992).

[1] One item of the care scale was erroneously omitted from the schedule.

Derivation of summary variables

Principal component analysis of PBI data (each item rated on a four-point scale) indicated a two-factor representation as a satisfactory, if not unique, summary of items, both for mothers' and fathers' attributes. Loadings of items on the two rotated factors confirmed the summation of scores over the subsets of care and control identified by Parker *et al.* (1979). The care dimension incorporates the degree of affection and closeness of relationships and contains such items as 'understood my problems and worries', 'was affectionate to me', and 'talked to me often'. The control dimension, also referred to as overprotection, encompasses an intrusive form of supervision and the suppression of independence. It includes 'invaded my privacy', 'was overprotective of me' and 'liked me to make my own decisions' (scored negatively). The internal consistency of individual scales was indicated by values of Cronbach's α: 0·91 for mother care, 0·83 for mother control, 0·93 for father care and 0·83 father control. Simple aggregation of items into total scale scores would have compounded the problem of missing data, and so total scores were estimated if one item of a scale was unavailable, using the percentile from the population distribution of summed scores for all other items of that scale. Total scores were available from 3066 individuals for mother care (94·0%), 2994 for mother control (91·8%), 2987 for father care (91·6%) and 2936 for father control (90·0%).

Summary scores for recent affective symptoms were also derived. Each of 18 symptoms had been rated on a scale from zero to five, indicating its frequency of occurrence over the previous 12 months and one item on suicidal feelings was also coded zero to five. Principal component analysis showed that one main factor was sufficient to encapsulate much of the item information, in keeping with the general difficulty of distinguishing depression and anxiety (Eaton & Ritter, 1988; Feldman, 1993).

Different approaches to the aggregation of individual symptom ratings failed to indicate a method superior to simple summation of item scores, as evidenced by relationships with external variables. This summation yielded a Psychiatric Symptom Frequency (PSF) scale with a possible range of 0 to 95 and a standard deviation of 11·4. Internal consistency of the scale was indicated by a value of 0·89 for Cronbach's α. External validity was assessed by a receiver operating characteristic (ROC) analysis (Hsiao *et al.* 1989), using service contact as the predicted outcome. Information on contacts with doctors and other health professionals identified 6·6% of the total sample as having a consultation (mostly with general practitioners) or receiving prescribed medication for 'nervous or emotional trouble or depression' in the 12 months before interview, and this proportion ranged from just 1% of those with the lowest PSF scores to over 60% of those with the highest scores. ROC analysis plots the curve of the relationship between sensitivity and specificity, calculated for every possible cut point on the symptom scale, and uses the area under this curve as an index of the accuracy of prediction (Hanley & McNeil, 1982). This area was found to be 0·84. Total scores were estimated for individuals with up to two missing items, using the technique of equivalent percentile points. Only 20 survey members (0·6%) had more missing items, including subjects with intellectual disabilities and others whose interviews were curtailed. The PSF scale can be utilized as a continuous dependent variable and, as such, is more discriminating at lower levels of symptomatology than typical self-completion or interview measures of depression; only 8·8% of the sample scored zero. Arbitrary cut-points can be applied to the scale, with the median and upper quartile and octiles corresponding to cuts of 8/9, 15/16 and 22/23, respectively. This last dichotomy was chosen for analyses where a discrete outcome was required, as the proportion of high scoring individuals (12·9%) was of the order of magnitude expected for 1-year prevalence of affective disorders. These high scorers included 55·6% of those who reported service use in the past 12 months.

This paper also utilizes the total symptom score obtained from assessments at age 36 using a shortened form of the Present State Examination (PSE; Wing *et al.* 1974). Reliability and validity of the PSE measures have been reported in detail elsewhere (Rodgers & Mann, 1986).

Statistical analysis

The CORR, CANCORR, GLM and STEPWISE procedures of SAS were utilized for analyses where the PSF scale was included as a continuous variable. Logistic regression was used to estimate odds ratios when the dichotomized PSF scale was the dependent variable.

RESULTS

Ratings of care and control

Distributions of PBI ratings for the whole sample showed the care scales to be notably more skewed than the control scales. This was particularly evident when considering the numbers of parents who received the most favourable ratings, i.e. maximum care or minimum control scores, percentages being 9·6% for mother care, 1·1% for mother control, 7·7% for father care and 2·1% for father control. As in previous investigations (Parker, 1989), mother figures were rated as more caring overall than father figures (by 0·35 S.D.s), and also somewhat more controlling (by 0·14 S.D.s). Scores differed in relation to the gender of respondent also, except for ratings of mother care. Means for mother control, father care and father control were higher when rated by daughters than by sons, with differences of 0·14, 0·27 and 0·32 S.D.s respectively. All differences were significant at the $P < 0{\cdot}001$ level. Uncertainty as to whether differences for male and female respondents reflect true differences in the behaviour of parents towards sons and daughters suggests that a conservative approach is to allow for such gender differences. All further analyses incorporated adjustments for the sex of respondent.

Validity of PBI ratings

Validity of the PBI scales was a prime concern, but use of the instrument in the NSHD reflected the absence of prospective assessments of parental behaviour. It was possible, however, to examine ratings where parents had divorced or separated permanently, as this is a factor known to be associated with conflict, hostility and neglect. There was a high proportion of in-

Table 1. *PBI scores by parental divorce/separation*

	Mother		Father	
	Care	Control	Care	Control
Divorced	23·1	12·8	16·7	13·5
(*N*)	(226)	(221)	(171)	(167)
Intact	25·0	12·9	22·5	12·0
(*N*)	(2839)	(2772)	(2815)	(2768)
All				
Mean	24·8	12·9	22·2	12·0
S.D.	6·7	6·6	7·6	6·4

Table 2. *PBI scores by reports of parental mistreatment*

	Mother		Father	
	Care	Control	Care	Control
Mistreated	19·1	16·5	14·7	17·2
(*N*)	(175)	(173)	(175)	(165)
Not mistreated	25·2	12·7	22·7	11·7
(*N*)	(2734)	(2672)	(2727)	(2691)
All				
Mean	24·9	12·9	22·2	12·0
S.D.	6·5	6·6	7·5	6·3

complete ratings of father figures in these instances (33%), particularly if separation occurred when survey members were very young. Completed scales showed mother figures (being natural mothers with few exceptions) were rated lower on care than mothers of intact families ($P < 0{\cdot}001$), but there was no significant difference in control. Ratings of father figures showed a large difference on the care scale ($P < 0{\cdot}001$) and a smaller, but still significant ($P = 0{\cdot}002$), difference on control (Table 1). These father figures included natural and stepfathers, but no significant differences were found on care or control ratings in this respect. In one instance there was a significant interaction between parental divorce and the respondent's sex. Sons and daughters from divorced families rated father figures as low on care, but this was especially striking in the sons, whose ratings were 1·03 S.D.s lower than sons from intact families.

Those who reported mistreatment by their parents as a child also rated mothers and fathers as low on care and high on control ($P < 0{\cdot}001$ for all comparisons), with differences in mean scores ranging from 0·59 S.D.s to 1·06 S.D.s (Table 2). There was one significant interaction, that reflected the extremely low ratings on mother care by daughters in particular who said they had been mistreated (1·20 S.D.s below ratings from daughters who did not report mistreatment). Table 3 shows PBI ratings for categories of problematical parental relationships as indicated by the open-ended comments following reports of mistreatment. Numbers in the subgroups were such that standard errors were large for each group mean and, in the main, ratings did not differ significantly across categories. The exception was for father control score ($F_{(4, 146)} = 4{\cdot}01$, $P = 0{\cdot}004$), which was lowest in the neglected group and highest in those reporting physical or sexual abuse. It was reassuring that the pattern of results in Table 3 was consistent with expectations, the restricted group rating parents as higher on both care and control than the neglected group, for example. In those reporting physical or sexual abuse, it was fathers in particular who were given extreme ratings, and presumably fathers were more likely than mothers to have been perpetrators. Some respondents commented that they had a happy upbringing, and they rated their parents as high on care and low on control in comparison to the remainder of the sample (even after excluding those reporting mistreatment). Care scores were 0·44 S.D.s above the mean of the not-mistreated group for mothers and 0·57 S.D.s above the mean for fathers ($P < 0{\cdot}001$). Control scores were 0·19 S.D.s below the mean for mothers ($P = 0{\cdot}025$) and 0·25 S.D.s below for fathers ($P = 0{\cdot}003$).

Table 3. *PBI scores by open-ended comments on upbringing*

	Mother		Father	
	Care	Control	Care	Control
Restricted	20·2	17·8	16·9	18·4
	(28)	(28)	(21)	(22)
Unhappy	17·1	16·5	12·4	17·2
	(58)	(57)	(58)	(56)
Neglected	16·7	15·6	12·2	13·4
	(31)	(32)	(31)	(31)
Psychological abuse	18·0	19·7	14·3	17·5
	(13)	(13)	(13)	(10)
Physical/sexual abuse	20·0	15·5	11·3	20·5
	(31)	(31)	(34)	(33)

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Table 4. *Correlations of symptom and PBI scores for men and women*

			Mother		Father	
	PSE	PSF	Care	Control	Care	Control
PSE	—	0·33	−0·12	0·08	−0·09	0·09
PSF	0·33	—	−0·11	0·08	−0·11	0·09
Mother						
Care	−0·08	−0·08	—	−0·47	0·45	−0·23
Control	0·14	0·16	−0·40	—	−0·21	0·56
Father						
Care	−0·08	−0·13	0·49	−0·23	—	−0·41
Control	0·07	0·16	−0·29	0·58	−0·47	—

Women above diagonal, men below.

PBI ratings and adult symptoms

Relationships between PBI measures and symptoms of depression and anxiety were assessed initially by the correlations between them. All were statistically significant but coefficients were low, ranging from 0·08 to 0·16 (Table 4), as reported elsewhere for the general population (Mackinnon *et al.* 1989). Positive correlations were observed between symptom scores and control scales and negative between symptoms and care scales, as anticipated. Care and control were themselves substantially negatively correlated, both for mothers and for fathers and as rated by sons or daughters ($r = -0{\cdot}47$ to $-0{\cdot}40$). Although there were differences between sons and daughters in some correlation coefficients (e.g. between PSF score and control ratings), none reached statistical significance. The partial correlations between PSF score and PBI ratings, after adjustment for sex of respondent, were 0·10 for mother care, 0·10 for mother control, 0·09 for father care and 0·08 for father control. Respective values for PSF score were 0·10, 0·12, 0·12 and 0·13. All these correlations were significant at the $P < 0{\cdot}001$ level.

Table 5 shows mean PSF score and percentage of high scores (i.e. PSF > 22) for each PBI scale grouped by quartiles, after adjustment for the sex of the respondent. Low care and high control were consistently associated with higher levels of affective symptoms. Inter-quartile odds ratios (Mackinnon, 1992) for decreasing care and increasing control were estimated from logistic regression. The values (along with 95% confidence intervals) were 1·24 (1·08–1·42) for mother care, 1·36 (1·18–1·57) for mother control, 1·46 (1·26–1·69) for father care and 1·51 (1·30–1·75) for father control. The low value for mother care was associated with the threshold effect seen in Table 5, where no differences were found between the three upper quartiles. A non-linear relationship was less apparent when mother care was used as a continuous variable, because the lowest quartile spanned two-thirds of the scale and there was a graded relationship with symptom score within that range.

Table 5. *Mean PSF score* and percentage of high scores by levels of parental care and control*

	Mother		Father	
	Care	Control	Care	Control
1st quartile	12·9	9·8	13·0	9·5
	16·2%	10·0%	16·9%	9·2%
	(805)	(739)	(770)	(692)
2nd quartile	10·6	10·8	11·1	10·4
	11·0%	10·9%	12·4%	10·2%
	(700)	(854)	(679)	(776)
3rd quartile	10·4	11·1	10·4	11·5
	10·1%	14·1%	10·4%	14·2%
	(878)	(665)	(736)	(753)
4th quartile	10·6	13·0	10·0	12·9
	12·7%	15·8%	10·3%	16·3%
	(680)	(734)	(799)	(713)

* S.D. = 11·4.
N shown in parentheses.

Combinations of PBI ratings

The possibility of a synergistic relationship between the two dimensions of parenting in the prediction of depression was investigated using the care and control scales both as continuous variables and as categorical variables, with quartiles again being adopted in the latter case. No statistical interactions between care and

Table 6. *Mean PSF score* and percentage of high scores by combined levels of father care and control*

Level of care	Level of control			
	1st quartile	2nd quartile	3rd quartile	4th quartile
1st quartile	11·6	11·2	12·7	13·9
	13·7%	11·5%	15·8%	19·6%
	(74)	(114)	(209)	(348)
2nd quartile	9·3	10·1	11·8	12·4
	8·5%	10·6%	14·6%	13·1%
	(108)	(174)	(209)	(176)
3rd quartile	9·6	10·2	10·7	10·9
	8·5%	9·3%	11·8%	11·8%
	(178)	(237)	(196)	(109)
4th quartile	9·0	10·6	10·7	11·1
	8·6%	10·8%	14·0%	11·1%
	(328)	(246)	(132)	(70)

* S.D. = 11·4.
N shown in parentheses.

control were found for ratings of mothers or fathers, i.e. care and control had independent and additive effects. Table 6 shows mean PSF score and percentage of high scores for 16 subgroups of the sample defined by levels of father care and control, after adjustment for sex of respondent.

In addition to the cumulative impact of separate PBI scales, analyses also revealed an increasing risk of depression when considering progressively more extreme groups, as anticipated from the graded relationships between individual scales and symptom levels. The most extreme low care–high control group of Table 6, for example, contained 19·6% high PSF scores as compared with 8·6% for the opposite extreme of high care–low control, and larger differences were found when cut-points were moved further from the norm. A contrast between the top and bottom 5% of affectionless control showed increases in risk of ten-fold in men and three-fold in women.

Stepwise regression using all PBI scales showed improvements to the model as variables were added, but mother care failed to contribute significantly to the model with all four scales. The multiple correlation coefficient for prediction of PSF score was 0·15 (adjusted for sex of respondent). The substantial inter-correlation of PBI ratings and the similarity of their association with symptom measures allowed for considerable flexibility in which were considered best predictors in multiple regression models. For example, a combination of mother care and father control accounted for a similar percentage of variance in PSF score as did a combination of mother control and father care.

Further analyses investigated whether PBI scores of the most poorly rated parent (i.e. mother or father) gave a superior prediction of adult symptoms or, conversely, whether having one good parent was protective against the adverse effects of a low care–high control parent. No such interactions between parents were found, however.

PBI ratings and other early adversity

The above relationships seemed not to arise from factors correlated with parenting style that were the true causal agents. Socio-economic status, as indicated by fathers' occupations and mothers' and fathers' education, was not significantly associated with PBI scores. An index of material home conditions in the early childhood years (Rodgers, 1978) did show a small but significant correlation with mother care ratings ($r = 0{\cdot}05$, $P = 0{\cdot}009$) but not with other PBI scales. The index included elements concerned with children's clothing and cleanliness, that would account for this relationship. When material conditions and mother care were considered in conjunction, only the latter contributed significantly to the prediction of PSF score. Other factors, including age of parents, illness in parents or children themselves, and formal educational experience of children, which were known to show some association with adult affective disorder (Rodgers, 1990), were also unrelated to PBI ratings. Significant associations with divorce and permanent separations of parents have already been described (Table 1), and there were also relationships between temporary separations from mother in early childhood and PBI scores. However, these associations between PBI ratings and separations did not account for high symptom scores in adulthood, and the correlations between PBI and PSF scores were still evident in subjects who did not experience parental disruption. Mothers' neuroticism scores, assessed by the short Maudsley Personality Inventory (Eysenck, 1958) when survey members were 15-years-old, also showed small

significant correlations with PBI ratings, negative with care and positive with control, and were predictive of symptoms in their offspring. Again, however, the relationship was sufficient to account for only a small part of the association between parental style and adult symptomatology. The importance of parental style independent of other childhood adversity was confirmed by restricting the sample to those who did not live in the poorest material conditions, who did not experience parental divorce or separation, who did not have mothers with high neuroticism scores, and who did not report mistreatment by their parents. The strength of prediction of PSF score was only slightly diminished in this better off subsample.

The further question of whether other childhood adversity might modify the effects of parental style was investigated by testing for statistical interactions between PBI scores and variables representing material conditions, family disruption, mothers' neuroticism and mistreatment by parents. In no instance were such interaction terms significant. However, the closeness to statistical significance and the similarity in nature of the findings for several different factors (all except mistreatment) justifies a description of the pattern of such results. Essentially, PBI ratings were of little value as predictors of PSF scores for those who had experienced these other forms of adversity; such groups showed high levels of affective symptoms irrespective of reported parental behaviour. For those who reported mistreatment by parents, however, PBI ratings remained predictive of adult symptoms.

DISCUSSION

This study's main findings were as follows.

1 Retrospective ratings of parental style from the PBI were associated with general reports of mistreatment in childhood, with more specific descriptions of parental restrictiveness, neglect and abuse, and with contentedness with upbringing, in a manner consistent with the contructs of care and control.

2 Low but significant correlations were found between individual PBI scales and adult affective symptoms, negative for parental care and positive for parental control, and these were of similar magnitude for a symptom measure obtained several years previously as for a contemporaneous measure.

3 Care and control had independent and additive effects in the prediction of adult symptoms, and the risk of high levels of symptoms was substantially greater in subjects rating parents as low care–high control compared with high care–low control.

4 The magnitude of association between parental style and adult symptoms did not differ significantly for mothers' and fathers' ratings or between male and female respondents.

5 PBI ratings were not associated with childhood socio-economic status, age of parents, parental illness, or childhood illness of the respondent.

6 Associations of PBI scores with poor early environment, parental separations and mothers' neuroticism were not responsible for producing a spurious relationship between parental ratings and adult symptoms.

7 Parental style was not of greater long-term importance in those who experienced other forms of childhood adversity.

These results contribute to current knowledge in this area in a number of ways.

The PBI is sensitive, in some degree, to a range of childhood abuse that goes beyond the content of its constituent items, and it is apparent that different elements of the early environment co-exist in the general population to a degree greater than expected by chance. Features such as parental affection, understanding, promotion of independence, and positive verbal and non-verbal interaction often occur together, and they are less often found in combination with negative characteristics such as overprotection, intrusive control, rejection, neglect, use of more extreme physical punishment and outright abuse. Reports of relationships between any specific aspect of the early environment and adult disorder should acknowledge the possible contribution of other aspects of adversity, and it is important to assess the extent of this contribution (Nash *et al.* 1993). Different factors may have independent effects or may interact with one another in their influence on adult outcomes (Holmes & Robins, 1988; Yama *et al.* 1993*a*, *b*). There is uncertainty as to which of the many childhood factors identified in this and other studies are the most salient for long-term

well-being, although some existing studies have incorporated assessments of multiple childhood risk factors (Cadoret *et al.* 1990; Kessler & Magee, 1993; Mullen *et al.* 1993).

The low correlations found between PBI and symptom scores do not imply trivial relationships. Mean symptom scores and percentage of high scores varied considerably across the range of PBI scales, endorsing the view that correlations of the order of 0·1 are small but not too small (Cohen, 1988) and are often considered to be extremely important in biomedical research (Rosenthal, 1990). The multiple correlation of 0·15 for combined care and control indicates an effect size equivalent or greater than those of other childhood risk factors for adult affective symptoms, such as parental divorce, and those of some more proximal risk factors that are acknowledged as being of aetiological importance (Rodgers, 1990; Amato & Keith, 1991; Kendler *et al.* 1993; Rodgers, 1994). It should be borne in mind that the strength of association in this study was constrained by the nature of the symptom measures used. The PSF scale assessed symptoms over a 12-month period and the PSE focused on just 1 month before interview, and such measures are susceptible to considerable temporal fluctuation. Assessment of affective symptomatology over much longer periods is difficult, but one would have expected stronger prediction if accurate detection of chronic and recurrent disorders had been possible (Parker, 1979*b*; Richter *et al.* 1991).

Other than in the upper range of the mother care scale, this study found graded relationships between PBI ratings and adult symptoms, which contrasted with earlier findings for childhood environmental factors from the NSHD prospective data set (Rodgers, 1990). These previous analyses had identified several factors as predictors of adult disorder, that were either comparatively rare discrete circumstances or involved only the extremes of continua of disadvantage, but had found little evidence of early benefits being protective. PBI ratings identified not only a small group of individuals with very high rates of disorder, but also much larger numbers of people with a more modest risk. From a public health viewpoint, the former would represent a target group with an opportunity for substantial reduction of risk, whereas the latter would indicate the possibility of less-focused prevention with greater potential for reducing rates of disorder in the general population.

Unlike the association between parental divorce and adult depression, there was no indication that parenting style was a better predictor of symptoms in women than men. In fact any differences appeared to be in the opposite direction, but these were not statistically significant. This argues against a notion that girls have a greater general vulnerability to adversity than boys and also against the 'response style' view that stronger links will be found in women if the focus is on internalizing disorders (McLeod, 1991). More complex models are needed to explain gender differences in relation to individual early risk factors. The findings for sex of parent were counter-intuitive. There was nothing to suggest that mothers' behaviour had greater relevance for adult mental health than fathers' behaviour.

The lack of association between PBI scores and some of the other measures of early adversity, enhanced the case that parental style may have a causal impact on adult depression for two reasons. First, because it eliminated certain alternative mechanisms where the relationship is spurious. Secondly, because it provided further evidence that unfavourable ratings of parental style are not a consequence of negative affect. Some of the groups considered were known to have high adult symptom levels (Rodgers, 1990) but did not rate their parents poorly on the PBI. On this second issue, the similar correlations of PBI scales with PSF score (a contemporaneous measure) as with PSE score (obtained 7 years previously) also indicated that current mood was not a major source of bias in reports of parenting.

Taken together, these findings demonstrate that the relationship between parental style and adult affective symptoms is an important area for investigation, both for theoretical and public health reasons. It is necessary to establish the mechanisms underlying observed associations with a greater degree of certainty. This includes: (*i*) whether parental care and control *per se* have a causal influence, direct or indirect, on adult symptom levels; and (*ii*) what factors are involved in mediating and moderating the effects of parental style in the long term (Rodgers, 1996).

APPENDIX 1

Items of the Psychiatric Symptom Frequency (PSF) Scale

How often:

(a) have you felt on edge or keyed up or mentally tense?
(b) have you been in low spirits or felt miserable?
(c) have you felt particularly low or depressed first thing in the mornings?
(d) have you had the feeling that something terrible might happen?
(e) have you had days when your thoughts were muddled or slow?
(f) have you had no appetite, not counting periods of physical illness?
(g) have you been in situations, such as in a crowd or an enclosed space or meeting people, when you became unduly anxious?
(h) have you been in situations when you felt shaky or sweaty or your heart pounded or you could not get your breath?
(i) have you had trouble getting off to sleep?
(j) have you had trouble with waking up and not being able to get back to sleep?
(k) have you been frightened or worried about becoming ill or about dying?
(l) have you felt fidgety or restless?
(m) have you found it hard to concentrate on things or found your thoughts drifting off onto other things?
(n) have there been days when you tired out very easily?
(o) have there been days when you found it difficult to get things done or had difficulty getting started on things?
(p) have you had the feeling that the future does not hold much for you?
(q) have you been so caught up in your own thoughts that you neglected things?
(r) have you seemed to lose interest in things?
(s) In the last year have you ever:
  (i) felt that life is hardly worth living?
  (ii) thought that you really would be better off dead?
  (iii) thought about taking your own life?
  (iv) made plans to take your own life?
  (v) attempted to take your own life?

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REFERENCES

Amato, P. R. (1991). Psychological distress and the recall of childhood family characteristics. *Journal of Marriage and the Family* **53**, 1011–1019.

Amato, P. R. & Keith, B. (1991). Parental divorce and adult well-being: a meta-analysis. *Journal of Marriage and the Family* **53**, 43–58.

Birtchnell, J. (1988). Depression and family relationships: a study of young, married women on a London housing estate. *British Journal of Psychiatry* **153**, 758–769.

Birtchnell, J. (1993). Does recollection of exposure to poor maternal care in childhood affect later ability to relate? *British Journal of Psychiatry* **162**, 335–344.

Brewin, C. R., Andrews, B. & Gotlib, I. H. (1993). Psychopathology and early experience: a reappraisal of retrospective reports. *Psychological Bulletin* **113**, 82–98.

Cadoret, R. J., Troughton, E., Merchant, L. M. & Whitters, A. (1990). Early life psychosocial events and adult affective symptoms. In *Straight and Devious Pathways from Childhood to Adulthood* (ed. L. N. Robins and M. Rutter), pp. 300–313. Cambridge University Press: New York.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, 2nd edn. Lawrence Erlbaum Associates: Hillsdale, N.J.

Eaton, W. W. & Ritter, C. (1988). Distinguishing anxiety and depression with field survey data. *Psychological Medicine* **18**, 155–166.

Emery, R. E. (1982). Interparental conflict and the children of discord and divorce. *Psychological Bulletin* **92**, 310–330.

Eysenck, H. J. (1958). A short questionnaire for the measurement of two dimensions of personality. *Journal of Applied Psychology* **43**, 14–17.

Feldman, L. A. (1993). Distinguishing depression and anxiety in self-report: evidence from confirmatory factor analysis on nonclinical and clinical samples. *Journal of Consulting and Clinical Psychology* **61**, 631–638.

Gamsa, A. (1987). A note on a modification of the Parental Bonding Instrument. *British Journal of Medical Psychology* **60**, 291–294.

Gotlib, I. H., Mount, J. H., Cordy, N. I. & Whiffen, V. E. (1988). Depression and perceptions of early parenting: a longitudinal investigation. *British Journal of Psychiatry* **152**, 24–27.

Granville-Grossman, K. L. (1968). The early environment in affective disorders. In *Recent Developments in Affective Disorders* (ed. A. Coppen and A. Walk), pp. 65–79. Royal Medico-Psychological Association: London.

Gregory, I. (1958). Studies of parental deprivation in psychiatric patients. *American Journal of Psychiatry* **115**, 432–442.

Hällström, T. (1987). Major depression, parental mental disorder and early family relationships. *Acta Psychiatrica Scandinavica* **75**, 259–263.

Hanley, J. A. & McNeil, B. J. (1982). The meaning and use of the area under a receiving operating characteristic (ROC) curve. *Radiology* **143**, 29–36.

Harper, J. F. & Ryder, J. M. (1986). Parental bonding, self-esteem and peer acceptance in father-absent male adolescents. *Australian Journal of Sex, Marriage and Family* **7**, 17–26.

Hickie, I., Parker, G., Wilhelm, K. & Tennant, C. (1991). Perceived interpersonal risk factors of non-endogenous depression. *Psychological Medicine* **21**, 399–412.

Holmes, S. J. & Robins, L. N. (1988). The role of parental disciplinary practices in the development of depression and alcoholism. *Psychiatry* **51**, 24–36.

Hsiao, J. K., Bartko, J. J. & Potter, W. Z. (1989). Diagnosing diagnoses: receiver operating characteristic methods in psychiatry. *Archives of General Psychiatry* **46**, 664–667.

Jacobson, S., Fasman, J. & DiMascio, A. (1975). Deprivation in the childhood of depressed women. *Journal of Nervous and Mental Disease* **160**, 5–14.

Kendler, K. S., Kessler, R. C., Neale, M. C., Heath, A. C. & Eaves, L. J. (1993). The prediction of major depression in women: toward an integrated etiologic model. *American Journal of Psychiatry* **150**, 1139–1148.

Kessler, R. C. & Magee, W. J. (1993). Childhood adversities and adult depression: basic patterns of association in a U.S. national survey. *Psychological Medicine* **23**, 679–690.

Lewinsohn, P. M. & Rosenbaum, M. (1987). Recall of parental behavior by acute depressives, remitted depressives, and non-depressives. *Journal of Personality and Social Psychology* **52**, 611–619.

Mackinnon, A. (1992). The inter-quartile odds ratio: a suggestion for the presentation of results from continuous predictors in logistic regression. *International Journal of Methods in Psychiatric Research* **2**, 233–235.

Mackinnon, A. J., Henderson, A. S., Scott, R. & Duncan-Jones, P. (1989). The parental bonding instrument (PBI): an epidemiological study in a general population sample. *Psychological Medicine* **19**, 1023–1034.

McLeod, J. D. (1991). Childhood parental loss and adult depression. *Journal of Health and Social Behavior* **32**, 205–220.

Mathew, R. J., Wilson, W. H., Blazer, D. G. & George, L. K. (1993). Psychiatric disorders in adult children of alcoholics: Data from the Epidemiologic Catchment Area project. *American Journal of Psychiatry* **150**, 793–800.

Mullen, P. E., Martin, J. L., Anderson, J. C., Romans, S. E. & Herbison, G. P. (1993). Childhood sexual abuse and mental health in adult life. *British Journal of Psychiatry* **163**, 721–732.

Mullen, P. E., Romans-Clarkson, S. E., Walton, V. A. & Herbison, G. P. (1988). Impact of sexual and physical abuse on women's mental health. *Lancet* **i**, 841–845.

Nash, M. R., Hulsey, T. L., Sexton, M. C., Harralson, T. L. & Lambert, W. (1993). Long-term sequelae of childhood sexual abuse: perceived family environment, psychopathology, and dissociation. *Journal of Consulting and Clinical Psychology* **61**, 276–283.

Parker, G. (1979*a*). Parental characteristics in relation to depressive disorders. *British Journal of Psychiatry* **134**, 138–147.

Parker, G. (1979*b*). Reported parental characteristics in relation to trait depression and anxiety levels in a non-clinical group. *Australian and New Zealand Journal of Psychiatry* **13**, 260–264.

Parker, G. (1981). Parental reports of depressives. *Journal of Affective Disorders* **131**, 131–140.

Parker, G. (1983*a*). Parental 'affectionless control' as an antecedent to adult depression: a risk factor delineated. *Archives of General Psychiatry* **40**, 956–960.

Parker, G. (1983*b*). *Parental Overprotection: A Risk Factor in Psychosocial Development*. Grune & Stratton: New York.

Parker, G. (1989). The Parental Bonding Instrument: psychometric properties reviewed. *Psychiatric Developments* **4**, 317–335.

Parker, G. (1992). Early environment. In *Handbook of Affective Disorders*, 2nd edn (ed. E. S. Paykel), pp. 171–183. Guilford Press: New York.

Parker, G., Tupling, H. & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology* **52**, 1–10.

Parker, G., Kiloh, L. & Hayward, L. (1987). Parental representations of neurotic and endogenous depressives. *Journal of Affective Disorders* **13**, 75–82.

Paykel, E. S. (1982). Life events and early environment. In *Handbook of Affective Disorders* (ed. E. S. Paykel), pp. 146–161. Churchill Livingstone: Edinburgh.

Perris, C., Jacobsson, L., Lindström, H., von Knorring, L. & Perris, H. (1980). Development of a new inventory for assessing memories of parental rearing behaviour. *Acta Psychiatrica Scandinavica* **61**, 265–274.

Perris, C., Arrindell, W. A., Perris, H., Eisemann, M., van der Ende, J. & Von Knorring, L. (1986). Perceived depriving parental rearing and depression. *British Journal of Psychiatry* **148**, 170–175.

Plantes, M. M., Prusoff, B. A., Brennan, J. & Parker, G. (1988). Parental representations of depressed outpatients from a USA sample. *Journal of Affective Disorders* **15**, 149–155.

Raskin, A., Boothe, H. H., Reatig, N. A., Schulterbrandt, J. G. & Odle, D. (1971). Factor analyses of normal and depressed patients' memories of parental behavior. *Psychological Reports* **29**, 871–879.

Richter, J., Eisemann, M. & Richter, G. (1991). Perceived parental rearing and state *versus* trait aspects of adult depression. *Psychopathology* **24**, 25–30.

Rodgers, B. (1978). Feeding in infancy and later ability and attainment: a longitudinal study. *Developmental Medicine and Child Neurology* **20**, 421–426.

Rodgers, B. (1990). Adult affective disorder and early environment. *British Journal of Psychiatry* **157**, 539–550.

Rodgers, B. (1994). Pathways between parental divorce and adult depression. *Journal of Child Psychology and Psychiatry* **35**, 1289–1308.

Rodgers, B. (1996). Reported parental behaviour and adult affective symptoms. 2. Mediating factors. *Psychological Medicine* **26**, 63–77.

Rodgers, B. & Mann, S. A. (1986). The reliability and validity of PSE assessments by lay interviewers: a national population survey. *Psychological Medicine* **16**, 689–700.

Rosenthal, R. (1990). How are we doing in soft psychology? *American Psychologist* **45**, 775–776.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry* **57**, 316–331.

Sexton, T. L., Hingst, A. G. & Regan, K. R. (1989). Parental divorce: the effect on sex-role identification and perceived parental bonding. *Australian Journal of Sex, Marriage and Family* **10**, 156–164.

Tennant, C. (1988). Parental loss in childhood. *Archives of General Psychiatry* **45**, 1045–1050.

Tennant, C., Bebbington, P. & Hurry, J. (1980). Parental death in childhood and risk of adult depressive disorders: a review. *Psychological Medicine* **10**, 289–299.

Wadsworth, M. E. J., Mann, S. L., Rodgers, B., Kuh, D. L., Hilder, W. S. & Yusuf, E. J. (1992). Loss and representativeness in a 43 year follow-up of a national birth cohort. *Journal of Epidemiology and Community Health* **46**, 300–304.

Wing, J. K., Cooper, J. E. & Sartorius, N. (1974). *The Measurement and Classification of Psychiatric Symptoms*. Cambridge University Press: London.

Wolkind, S. & Coleman, E. Z. (1983). Adult psychiatric disorder and childhood experiences: The validity of retrospective data. *British Journal of Psychiatry* **143**, 188–191.

Wolkind, S. & Rutter, M. (1985). Separation, loss and family relationships. In *Child and Adolescent Psychiatry: Modern Approaches* (ed. M. Rutter and L. Hersov), pp. 34–57. Blackwell Scientific Publications: Oxford.

Yama, M. F., Fogas, B. S., Teegarden, L. A. & Hastings, B. (1993*a*). Childhood sexual abuse and parental alcoholism. *American Journal of Orthopsychiatry* **63**, 300–305.

Yama, M. F., Tovey, S. L. & Fogas, B. S. (1993*b*). Childhood family environment and sexual abuse as predictors of anxiety and depression in adult women. *American Journal of Orthopsychiatry* **63**, 136–141.