Stability and change in milder psychiatric disorder over 7 years in a birth cohort

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ABSTRACT

Background. Relatively little is known regarding stability or change over time in milder psychiatric disorder identified in epidemiological studies.

Methods. Data were analysed on 2890 subjects from the 1946 British birth cohort study. Psychiatric disorder was identified at age 36 years using the Present State Examination Index of Definition and 7 years later at age 43 using a symptom scale, employing a threshold to give identical 6% prevalence of disorder. Predictors were derived from recent social data and information collected earlier in childhood and younger adulthood.

Results. Over 7 years, there was considerable movement between case and non-case status. Only 1·7% of the sample satisfied case criteria at both points. Approximately two-thirds of cases at age 36 had fallen below case levels at age 43 and two-thirds of cases at age 43 were new cases. Most onsets and remissions were between definite case and non-case levels, rather than around the threshold. The strongest predictors of onset and remission were recent demographic, social and life stress variables, and earlier reported nervous disorder, with contributions from parental social background, and life history variables in adolescence.

Conclusions. There is considerable change over 7 years in milder psychiatric disorder, with around two-thirds of it episodic or fluctuating and one-third chronic. Recent social variables are strong predictors of change or chronicity, with some lasting contributions from childhood social setting and earlier life history.

INTRODUCTION

Prevalence and cross-sectional associations of psychiatric disorder identified in epidemiological studies in the community have received extensive study. However, comparatively little is known regarding stability, change, onset and remission of this milder disorder over time, or those factors predicting course. Retrospective studies of change are problematic because of inaccuracies of recall, and prospective longitudinal study of the same individuals is required over two or more waves.

The Medical Research Council National Survey of Health and Development (NSHD) is a national UK longitudinal study of a 1946 birth cohort. The data collections undertaken at the age of 36 and at age 43 included epidemiological measures of psychiatric disorder in the community. Data collection over time has also included considerable information on social circumstances and stress at age 36 and 43, and much earlier information from birth onwards regarding family-setting, development, educational achievement, behaviour and illness. Cross-sectional prevalence of disorder and its associations have previously been reported (Rodgers, 1990, 1996; Richards *et al.* 1997; Van Os *et al.* 1997; Van Os & Jones, 1999). We now report longitudinal analyses to examine the extent to which case status is stable over time, or changes between case and non-case, and pre-

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dictors of remission or onset of disorder, including both recent and earlier data collected prospectively at multiple life points.

METHOD

Subjects

The NHSD cohort has been described in detail in previous publications (Wadsworth, 1991; Wadsworth *et al.* 1992). A social class stratified sample of 5362 single legitimate births was randomly selected from all 13687 single, legitimate births occurring in England, Scotland and Wales during the week 3–9 March 1946. Information was then obtained 12 times during childhood from mothers, teachers and by direct examination, and 11 times during adulthood directly from the cohort members. At the time of the present analyses the most recent interviews had been in 1982 at age 36 and in 1989 at age 43. Some cohort loss had occurred over the years. At age 36 the studied cohort comprised 3322 subjects and at age 43 it comprised 3262. It was still reasonably representative of the population of the same age (Wadsworth *et al.* 1992).

Some subjects at each wave did not complete the full psychiatric interview. The analyses reported here required valid interviews in both waves, which were available in 2890 subjects.

Interviews for psychiatric disorder

Different interviews for psychiatric disorder were completed at the two ages, 7 years apart.

Age 36 years

In 1982 the Present State Examination (PSE) (Wing *et al.* 1974) was completed in a short version (Rodgers & Mann, 1986), by nurse interviewers, covering the month prior to interview. Subjects were later assigned scores as psychiatric cases on the Index of Definition (ID) (Wing, 1976; Wing *et al.* 1978).

Age 43 years

In 1989 interviewers administered the Psychiatric Symptom Frequency Scale (PSF) (Rodgers, 1996; Lindelow *et al.* 1997; Richards *et al.* 1997). This 18-item scale measured psychiatric symptoms, particularly of anxiety and depression, in the year before the interview. Responses were on a five-point scale: 0 = not in last year; 1 = occasionally; 2 = sometimes; 3 = quite often; 4 = very often; 5 = every day. A cut-off point of 22 on total scores was found in a validity study to identify those with emotional disturbances (Lindelow *et al.* 1997), and has been used in other reports (Rodgers, 1996; Van Os & Jones, 1999).

Criteria for cases

Age 36 years

For the 1982 data the standard well validated PSE definition of caseness was employed. Psychiatric disorder was defined at the threshold level of $\geqslant 5$ on the Index of Definition (Wing, 1976; Wing *et al.* 1978).

Age 43 years

The total score of 22 on the PSF gave comparatively high prevalence of disorder (11·8 %). Since the PSF has not been as widely validated and used as has the PSE, and to preserve comparability we employed an alternative cut-point of $\geqslant 31$ which gave an identical prevalence rate to that based earlier on the PSE (6·0 %).

Predictor variables

Independent predictor variables for changes between case and non-case status between the two points were derived from data collected at the age 36 and 43 surveys, and in childhood and young adulthood, particularly items associated with disorder in reported epidemiological or longitudinal studies.

Recent variables, age 36 and 43 years

(i) *Sociodemographic variables*

Marital status; number of children; social class of own; current or most recent occupation (age 43 only); and housing tenure.

(ii) *Economic status*

Currently employed or not; finances reported as hard to manage (age 43 only); reported lack of money (age 43 only); and, inability to pay bills (age 43 only).

(iii) *Social support*

Detailed frequency of socializing; number of friends (age 43 only); number of friends who visit home (age 36 only); and seeing parents often (aged 36 only).

(iv) *Recent life events*

This included events in the last year. There were some differences in the schedules at ages 36 and 43, with more events in the latter.

(v) *Treated disorder*

Details of treatment from own doctor for nerves in last year, (aged 36 only). To enable examination of prognostic implications of the disorder which lead to GP consultation, this single reported variable was included and used separately in later analyses.

Earlier variables

These variables concerning parental background, childhood and earlier adulthood were as follows.

(i) *Family history*

Mother's neuroticism score on the short Maudsley Personality Inventory (MPI) (Eysenck, 1958) when the subject was aged 15, subject's report aged 43 that parent ever had nervous disorder.

(ii) *Gender*

(iii) *Early life*

Birth weight; weight aged 4; height aged 4; breast feeding (months); age of weaning from breast or bottle to solids; and enuresis over 6 years.

(iv) *Parental social background*

Mother's education; father's education; lack of home amenities aged 2; housing tenure aged 4; father's social class at age 4; parental divorce by age 15; and death of parent by age 15.

(v) *Physical illness*

Report of serious physical illness (lasting longer than 3 months in any year or requiring admission for longer than 1 month) up to 15 years, combined from successive interview waves and dichotomized at median.

(vi) *Teachers' assessments aged 15*

At subjects' age 15 teachers completed a detailed assessment on 19 variables related to behaviour and schoolwork. These were condensed to two *ad hoc* derived scales, for acting out behaviour (daredevil, difficult to discipline, frequent disobedience, lying, restless, rough, work poor, lazy, shows off and attention seeking, quarrelsome and aggressive, poor concentration, cribs work frequently) and inhibited behaviour (frequently anxious, daydreams, always tired, unable to make friends, gloomy/sad, miserable with criticism, fearful, frightened of rough games, avoids attention, diffident about competing and not aggressive).

(vii) *Adolescence and young adulthood*

Highest educational qualification, number of jobs by age 18, Pintner Inventory short neuroticism score and extraversion score aged 13 (Pintner & Forlano, 1938, Douglas & Mulligan, 1961) were recorded.
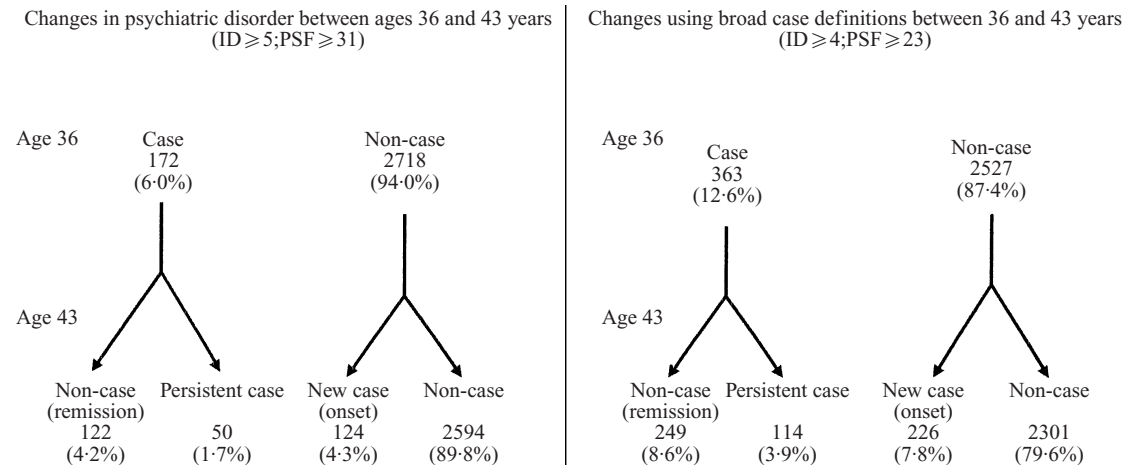
Changes in psychiatric disorder between ages 36 and 43 years
(ID ⩾ 5; PSF ⩾ 31)

Age 36 — Case 172 (6·0%) — Non-case 2718 (94·0%)

Age 43 — Non-case (remission) 122 (4·2%) — Persistent case 50 (1·7%) — New case (onset) 124 (4·3%) — Non-case 2594 (89·8%)

Changes using broad case definitions between 36 and 43 years
(ID ⩾ 4; PSF ⩾ 23)

Age 36 — Case 363 (12·6%) — Non-case 2527 (87·4%)

Age 43 — Non-case (remission) 249 (8·6%) — Persistent case 114 (3·9%) — New case (onset) 226 (7·8%) — Non-case 2301 (79·6%)

Fig. 1. Changes in caseness using standard and broad case definitions.

(viii) *Nervous trouble*

Response to question at age 26 as to whether subject ever had nervous trouble.

Analyses

Relevant data were extracted from the large dataset of the main study and were analysed using SPSS for Windows. Subjects were grouped into four groups depending on presence or absence of disorder at the two age points. Associations with independent variables were examined among the four groups as a whole, and separately for two subgroupings: (*a*) onset, among those without disorder at age 36, comparing those with and without disorder at age 43; and (*b*) remission, among those with disorder at age 36, comparing subjects with and without disorder at age 43. In order to retain comparability of odds ratios across different kinds of variables, continuous independent variables were dichotomized at medians, and multiple categories grouped to form two categories. Associations with the four group classifications were examined by cross tabulation and tested for significance by chi-square. Associations with onset and remission were first examined by logistic regression in bivariate analyses of single predictors. Multiple logistic regression analyses were then carried out in respect of onset and

remission, as described further in the results section.

RESULTS

Stability and change

The left-hand side of Fig. 1 shows the four possible groupings and interchanges of case and non-case status between age 36 and 43 years. With prevalence rates of 6·0 % at each occasion, the majority of cases of psychiatric disorder on the first occasion, 70·9 % (122/172), were below case level on the second occasion, and only 29·1 % (50) remained as cases. The majority, 71·3 % (124/174), of cases at age 43 were new cases, comprising 4·3 % of the total sample.

Subthreshold disorder

The above findings indicated considerable change in psychiatric disorder over 7 years. It was possible that the majority of changes were small, around the case thresholds. Therefore a more fine-grained analysis of changes was undertaken, cross-tabulating three levels on the Index of Definition (1982), cut at above and below 4, with three levels of grouped PSF Total scores (1989).

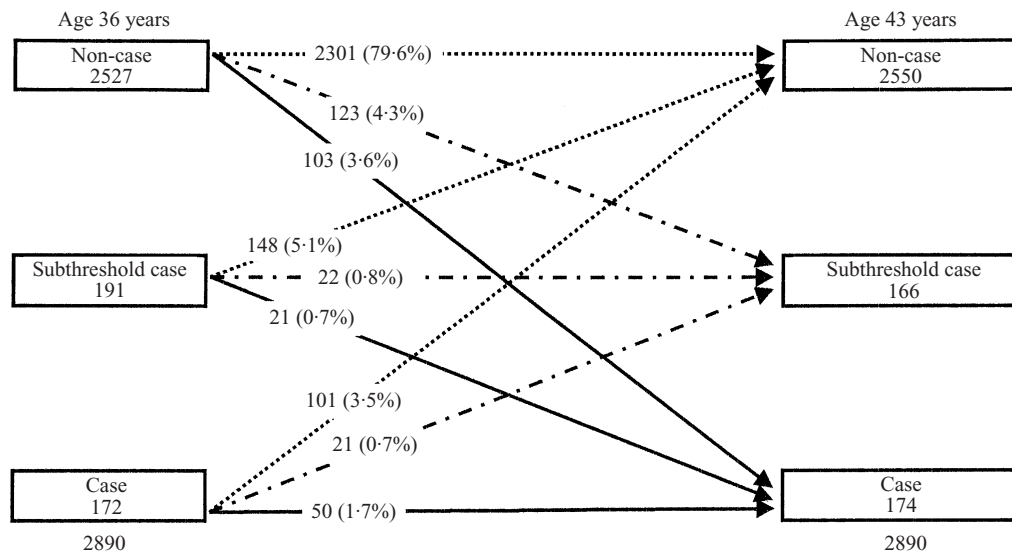This analysis showed that the majority of changes were from relatively high to relatively

FIG. 2. Movements between three case levels between ages 36 and 43 years. (Case, PSE ID5, PSF 31; Subthreshold case, PSE ID4, PSF 23.)

Table 1.   *Recent variables and patterns of disorder*

	Case 36 only ($N = 122$) %	Case 43 only ($N = 124$) %	Case 36 & 43 ($N = 50$) %	Non-case ($N = 2594$) %	χ^2 df = 3	Onset OR	Remission OR
Age 36							
Sociodemographic							
Not married (*v.* married)	23·0	16·1	32·0	14·6	17·1***	1·1	1·6
$\geqslant$ 3 children (*v.* 1–2)	25·2	32·4	41·5	28·1	4·9	1·2	2·1
Housing tenure rent/other (*v.* owned)	30·2	32·5	41·7	19·7	30·6***	2·0***	1·7
Economic							
Not in paid work (*v.* working)	33·6	28·2	46·0	19·9	36·1***	1·6*	1·7
Social support							
Frequency of socializing (< twice a week *v.* more)	42·0	46·7	64·4	43·7	6·2	1·1	2·5**
Friends visit (monthly or less *v.* more frequently)	47·5	54·8	66·7	50·3	6·4	1·2	2·2*
See parents (less than weekly *v.* more)	47·4	44·6	34·9	43·0	2·2	1·1	0·6
Life events in past year							
Two or more (*v.* 1 or none)	76·2	69·4	83·3	63·3	17·7***	1·3	1·6
Age 36 Treated disorder							
Saw Dr for nerves age 36	45·3	20·2	52·3	7·9	235·3***	3·0***	1·3
Age 43							
Sociodemographic							
Married (*v.* unmarried)	25·4	32·8	46·9	17·3	48·0***	2·3***	2·6**
Social class IIIM IV V (*v.* I,II,IIINM)	34·5	44·0	54·1	31·4	16·5***	1·7**	2·2*
Housing tenure, rent/other (*v.* owned)	14·8	21·7	38·3	12·2	35·6***	2·0**	3·6***
Economic							
Not working (*v.* working)	13·9	26·6	46·0	10·1	91·8***	3·2***	5·3***
Income hard to manage	20·7	33·6	65·3	12·0	157·5***	3·7***	7·2***
Family lack of money (yes)	17·2	28·2	63·3	8·8	193·8***	4·1***	8·3***
Unable to pay bills	8·2	17·9	40·8	5·1	133·0***	4·1***	7·7***
Social support							
Frequency of socializing (< 6mth *v.* more)	57·4	52·4	54·0	54·4	0·6	0·9	0·9
Few friends (*v.* many)	36·9	34·1	46·0	29·4	10·2*	1·2	1·5
Life events in past year							
Two or more (*v.* 1 or none)	51·6	79·7	76·0	43·2	83·8***	5·2***	3·0**

Odds ratios >1 indicate positive associations with onset, failure to remit.
* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

low levels, rather than small changes around the threshold. The right-hand side of Fig. 1 repeats changes between psychiatric case and non-case status, but taking much more inclusive thresholds at PSE ID 4 and above, PSF 23 and above, giving prevalence rates respectively of 12·6 % and 11·8 %. Among 363 cases at 36 years using this ID definition, at age 43, 249 (68·6 %) were non-cases and 114 (31·4 %) were cases. Among the 340 cases at age 43, only 114 (33·5 %) had been cases at age 36. The pattern was similar to that for the narrower definition.

Fig. 2 shows the full pattern of changes between the three levels. Few cases became subthreshold cases rather than non-cases. Among those changing from being a non-case,

the numbers becoming subthreshold cases and cases were approximately equal.

A more detailed analysis was also undertaken using each PSE Index of Definition level. Among subjects who were PSE ID levels at age 36 the proportions who became full PSF 31 and over cases aged 43 were (ID 1) 2·9 %, (ID 2) 4·5 %, (ID 3) 8·8 %, (ID 4) 11·0 %, (ID 5) 25·0 %, (ID 6/7) 50·0 %, indicating a slow rise to PSE ID 4, and a rapid rise thereafter. This phenomenon did not apply for subthreshold PSF cases, with the proportions becoming age 43 subthreshold PSF cases rising slowly from 2·9 % for PSE ID = 1 aged 36 to 13·2 % at PSE ID = 5, with a drop to 7·1 % for ID 6/7. Numbers of subjects at PSE ID levels 6 and 7 at age 36 were

Table 2. *Earlier variables*

	Case 36 only (N = 122) %	Case 43 only (N = 124) %	Case 36 & 43 (N = 50) %	Non-case (N = 2594) %	χ^2 (df = 3)	Onset (OR)	Remission (OR)
Family history							
Report of parental nervous disorder	35·5	21·1	21·3	13·9	46·6***	1·7*	0·5
Mother's neuroticism at subject's age 15 (% above median score)	54·3	51·5	50·0	43·2	8·0*	1·4	0·8
Gender							
Female (%)	66·4	62·9	74·0	48·2	36·3***	1·8**	1·4
Early life							
Birthweight (below median)	45·1	41·9	44·0	47·5	1·9	0·8	1·0
Weight age 4 (below median)	39·1	47·7	36·6	48·6	6·0	1·0	0·9
Height age 4 (below median)	45·5	50·9	42·5	48·6	1·2	1·1	0·9
Months of breastfeeding 0–3 mths ($v. \geqslant 4$)	57·8	58·3	51·1	50·9	4·4	1·4	0·8
Age at weaning (below median)	66·7	54·6	59·1	63·7	4·9	0·7*	1·4
Enuresis (over 6 years)	14·0	8·2	8·1	9·9	2·0	0·8	0·5
Parental social background							
Mother's education (primary/secondary only *v.* further/higher)	63·8	82·5	63·8	65·2	14·8**	2·5***	1·0
Father's education (primary/secondary only *v.* further/higher)	63·7	82·3	65·2	65·5	13·9**	2·5***	1·1
Home conditions age 2 (below median)	40·2	56·0	59·1	44·6	10·0*	0·6*	0·5*
Housing tenure aged 4 (rent/other *v.* owned)	71·7	82·2	86·7	72·1	10·3*	1·8*	2·6*
Father's social class aged 4 IIIM, IV, V (*v.* I, II, IIINM)	55·2	71·9	59·5	57·6	9·7*	1·9**	1·2
Parental divorce by age 15	13·3	7·7	15·0	6·4	11·7**	1·2	1·2
Mother's death by age 15	3·3	0·8	4·0	2·0	2·9	0·4	1·2
Father's death by age 15	3·3	4·8	8·0	4·5	1·8	1·1	2·6
Physical illness (by 15 years)	18·0	16·1	24·0	14·9	4·0	1·1	1·4
Teacher's assessments aged 15 years							
Acting out behaviour (above median)	51·0	55·4	75·0	49·4	12·5**	1·3	2·9**
Inhibited behaviour (above median)	56·7	51·0	50·0	44·6	7·6	1·3	0·8
Adolescence and young adulthood							
Level of highest qualification lower *v.* GCE or higher	47·0	56·9	66·0	43·3	17·8***	1·7**	2·2*
No. of jobs by age 18 (2 or more)	42·0	46·2	58·3	33·9	21·9***	1·7**	1·9
Neuroticism score aged 13 (% above median)	62·0	60·4	64·1	47·9	16·3***	1·7*	1·1
Extraversion score aged 13 (% above median)	57·0	51·0	46·2	53·7	1·6	0·9	0·7
Nervous trouble (by age 26)	36·1	33·3	60·5	16·7	92·6***	2·5***	2·7**

Odds ratios > 1 indicate positive associations with onset, failure to remit.
* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

too few to analyse the two levels separately at age 43.

Association with predictors from recent data collected at age 36 and age 43

The predictor variables described earlier were cross tabulated with the four-fold classification shown in the left-hand side of Fig. 1. In addition bivariate odds ratios were calculated by logistic regression separately for each independent variable *versus* the two-fold classifications for onset and remission.

Findings for recent variables are shown in Table 1. In analyses between the four groups, the majority of independent variables showed significant associations, which were stronger at age 43. There was a general trend for the persistent cases to show the greatest presence of risk factors for disorder, persistent non-cases the least, with cases at one time point but not the other intermediate.

In the two-group odds ratios onset was associated strongly with adverse social conditions at age 43 and remission with better social circumstances, the only exceptions being the social support variables. Fewer age 36 variables were predictive but onset was associated with rented housing and with unemployment, remission with more social contacts and contacts with friends. Seeing a doctor for nerves in the year before the age 36 interview predicted disorder at age 43 even in absence of case level

Table 3. *Logistic regressions for onset (combined scores)*

	Bivariate regression OR	Multiple regression OR
Family history	1·41	1·60*
Gender	1·82**	1·93**
Early life	0·95	0·65
Parental social background	2·40***	1·50
Physical illness to 15 years	1·10	0·85
Teacher's assessment aged 15 years		
Acting out score	1·27	1·11
Inhibited score	1·29	1·24
Adolescence and young adulthood	2·14***	1·47
Nervous trouble by 26	2·50***	1·48
Social variables aged 36	1·51*	0·83
Saw Dr in past year for nervous trouble aged 36	2·96***	2·25**
Social variables aged 43	3·68***	3·30***

Variables combined as grouped and scored in Tables 1 and 2.
Odds ratios > 1 indicate positive association with onset.
* $P < 0.05$; ** < 0.01; *** $P < 0.001$.

disorder at the age 36 interview itself, but was not related to remission.

An additional analysis not shown in Table 1 was undertaken using change in a small set of independent variables on which comparable information was available at age 36 and 43. Onset was associated with loss of spouse, loss of employment and increase in life event occurrence, remission was associated with entering employment and increase in number of friends visiting home, while changes in overall frequency of socializing were not associated with outcome.

Earlier variables

Findings for earlier variables are shown in Table 2. There was a selective pattern of associations. Associations with the four groups were strongest for gender, variables indicating family history of disorder, parental social background and life history variables from adolescence and young adulthood, and also acting out behaviour assessed by teachers. There were no associations with early life variables. Again the highest occurrence of risk factors was in the persistent cases, the lowest in the non-cases.

Prediction was stronger for onset than for remission. Occurrence of a new case at age 43 was predicted by report of parental nervous disorder, female gender, early weaning to solids, lower levels of maternal and paternal education, adverse home conditions in childhood, rented housing, lower paternal social class, lower personal educational qualifications, more jobs by age 18, higher neuroticism score age 16 and a reported history of nervous trouble by age 26. Remission was predicted by better childhood home conditions, owned parental housing, lower scores for acting out behaviour aged 15, higher educational attainment and absence of nervous trouble by age 26. Among 505 subjects reporting previous nervous trouble at age 26 among a reduced total sample of 2169, only a minority of 103 (20·4 %) were cases at either age 36, 43 or both.

Multiple logistic regressions

In order to undertake analyses of the combined effects of the independent variables, those from related areas were combined into single scores, using the groups shown in Tables 1 and 2. Organized by life history sequence from early to recent, they comprised: family history; gender (single variable); early life variables; parental social background; physical illness to age 15 (single variable); teacher's assessment aged 15, acting out score; teachers' assessment aged 15, inhibited score (single derived variables); adolescence and early adulthood; saw doctor for nervous trouble by 26 (single variable); social variables aged 36; saw doctor for nervous trouble aged 36; and social variables aged 43. Individual dichotomized variables were summed to combined scores with the adverse directions scoring high. Combined scores were then dichotomized at medians and used as independent variables in logistic regressions separately against onset and remission, both in bivariate single order regressions and in multiple regressions with all independent variables entered simultaneously. Findings for onset are shown in Table 3 and for remission in Table 4.

Onset was predicted in bivariate regressions by female gender, adverse parental social background, less favourable adolescence and early adulthood, nervous trouble by age 26, social variables aged 36, seeing doctor for nervous trouble aged 36, and social variables aged 43. In the multiple regression only female gender, seeing doctor for nervous trouble aged 36, and social variables aged 43 remained significant. In addition family history became significant.

For remission prediction was weaker. Among scores in the bivariate analyses, remission was

Table 4. *Logistic regressions for remission (combined scores)*

	Bivariate regression OR	Multiple regression OR
Family history	0·82	1·08
Gender	1·44	0·89
Early life	0·86	0·92
Parental social background	1·40	1·02
Physical illness to 15 years	1·44	1·34
Teacher's assessment aged 15 years		
Acting out score	2·89**	1·19
Inhibited score	0·76	0·64
Adolescence and young adulthood	2·19*	1·39
Nervous trouble by 26	2·71**	1·78
Social variables aged 36	1·97	1·89
Saw Dr in past year for nervous trouble aged 36	1·32	0·86
Social variables aged 43	6·78***	4·41**

Variables combined as grouped and scored in Tables 1 and 2.
Odds ratios > 1 indicate positive associations with failure to remit.
* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

predicted by absence of adolescent acting out behaviour and of nervous disorder by age 26, more favourable adolescence and young adulthood and more favourable age 43 social variables. In the multivariate analysis only the age 43 social variable score was significantly associated with remission.

DISCUSSION

This paper has investigated stability of psychiatric disorder at the level usually identified in community surveys, in members of a cohort studied at two points seven years apart. The large majority of subjects were non-cases on both occasions: the smallest proportion (1·7%) persistent cases. Just over two-thirds of cases on each occasion were not cases on the other occasion. Adjustment of thresholds to include very mild cases did not much alter this pattern of change: most onsets and remissions were between definite disorder and its absence. Definite case rates at age 43 were much higher where PSE ID levels at age 36 had been 5 or higher.

A consistent pattern of predictors emerged, with the greatest presence of risk factors in the persistent cases, and the least in those who were non-cases at both ages. The strongest predictors were recent social variables, family social background, life history variables from adolescence and early adulthood, previous evidence of nervous disorder, and for onset but not remission, female gender.

Methodology

An advantage of the study was the systematic restudy of a birth cohort. Some two-wave epidemiological studies study samples from the same population, but not the same subjects, and cannot therefore examine change patterns in individuals. Studies that follow-up the same sample often undergo considerable selective attrition. In the present study the same cohort was restudied using epidemiological case identification methods after 7 years. There had been some cohort loss at earlier periods, but the cohort was still representative (Wadsworth *et al.* 1992) and over the 7 years there was low attrition of under 2% as a result of the careful follow-up procedures.

A second advantage of the birth cohort study lay in availability of much prospectively collected risk factor data. Retrospective ascertainment of many of these variables is recognized to be highly unreliable. The coupling of epidemiological data on onset of milder psychiatric disorder with systematic prospective information from early childhood onwards has not often been possible in the past. The three-way coupling with recent stress data was a further advantage.

A potential disadvantage of the study was the use of different case finding instruments at the two ages. Direct comparisons of the two instruments have not been reported. The PSE Index of Definition has been well validated and widely used. The PSF, although used less, contains a similar spectrum of symptoms of milder disorder. However, the PSE is interview based and covers symptoms in the last month, while the PSF is based on respondent self-report and covers the frequency of symptoms in the last year. It is difficult to be sure of the implications of these differences, but in a 1 year period higher rates would be expected, depending on cut-off points. We employed overall definitions of psychiatric disorder for which there is comparability in content, and a PSF cut-off point to give a closely similar rate to that on the PSE. The validity of this procedure also depends on the assumption of constant prevalence over the 7 years between the two interview waves. While

prevalences of specific disorders may change with age, overall prevalence of milder mental disorders does not change greatly around middle age (Jorm, 2000). Lehtinen *et al.* (1991), following a Finnish population cohort after 5 and 16 years, found that overall prevalence of disorders was constant.

Also, our findings depend on cross-sectional study at two time points 7 years apart. We do not have data on new episodes which later remitted, or on remission of age 36 episodes followed by relapse. Our onsets do not necessarily reflect new disorder, but may reflect disorder present at earlier periods, as suggested by the variable of reported nervous disorder aged 26. Moreover, the 7 years spanned the same middle aged range for all subjects. Findings might be different between adolescence and young adulthood, or in old age.

In the logistic regressions our dichotomization of independent variables with multiple, categories or continuous scores resulted in some loss of information and statistical power. It was used because of the important advantage of rendering odds ratios comparable, which would not have applied across a mix of different kinds of variables. This also applied in the summary scores in Tables 3 and 4, since some of these such as gender were single categorical variables.

Other studies of stability and change

The extent to which the milder psychiatric disorder identified in community epidemiological studies is episodic or chronic has not been clear. Follow-up information available on more severe psychiatrically treated disorder does not necessarily apply at this milder level. Although most clinical diagnostic schemes and case finding instruments are based on episodes of disorder, studies such as the USA Epidemiologic Catchment Area (ECA) study have reported rates for lifetime affective disorder as ascertained retrospectively that are only about twice the 1 year prevalences (Smith & Weissman, 1992). This suggests either that much disorder is chronic and long-term, or that shorter previous episodes have been forgotten.

A small number of reports have had similar aims, with different methods. Several studies have repeated self-report symptom scales. Duncan-Jones *et al.* (1990), analysed three community samples, from Canberra,

Christchurch and Groningen, followed over 1 year, 4 years and 9 years respectively, using different measures in each case. In Canberra and Groningen between 50% and 75% of the variance in symptom levels could be attributed to between-subject differences in stable levels of symptomatology while in Christchurch it was lower, around one-third. This stable symptomatology included the stable absence of disorder shown by most subjects in our study, which is of lesser epidemiological or clinical relevance.

Kawakami *et al.* (1995) studied Japanese subjects five times at yearly intervals on the Zung Self-Rating Depression Scale. Among those not depressed at baseline, 14% were depressed on at least one later occasion. Among those depressed at baseline 20% were depressed on all four occasions, while 50% were no longer depressed by 1 year.

Geerlings *et al.* (2000) obtained CES-D depression scores on eight successive occasions at 5-month intervals. Twenty-seven per cent of initially non-depressed subjects scored over a cut-point for depression at some point, often later remitting. Among those subjects initially depressed 29% remitted, 13% showed remission and later recurrence and 24% fluctuated around the cut-point. From the same study, De Boers *et al.* (2000) reported anxiety symptoms on two occasions 3 years apart in older subjects. Prevalence rates were very high, around 28%. New cases on the second occasion were also high at 15%. Only 31% of those who were cases at initial assessment had fallen below the cut-off point at 3 years, and 62% of cases at 3 years had been cases initially. This greater stability may reflect a characteristic of anxiety or use of a very inclusive threshold. Figures from the other three reports suggest substantial change with some persistence.

Two major epidemiological studies have included long-term follow-up. In the Lundby study (Hagnell *et al.* 1982), reporting has focused on lifetime incidence rates rather than change over shorter periods. In the Stirling County Study (Murphy *et al.* 1986, 2000) a 1952 sample was followed 17 years later. On follow-up, 44% of previous prevalent cases of anxiety and depression experienced good outcome without a subsequent episode while 56% experienced subsequent episodes, of whom 27% of the original cases were classified as long-term

chronic cases, comparable with our one-third of persistent cases over 7 years.

Several other two-wave epidemiological studies have estimated inception rates between a first and second wave but usually over short periods of 1 year, and not reporting change in prevalence cases from the first wave. Surtees *et al.* (1986) re-interviewed community subjects after 6 and 12 months. Among 59 RDC depressives, at 1 year 54% were well, 25% remained ill, 20% had recovered then relapsed. They estimated a 12·6% inception rate of disorder over the year. From the Baltimore ECA site Eaton *et al.* (1997) reported from a 12–15 year follow-up. For depression first episodes lasted for a median duration of 12 weeks, recurrent episodes for 8 weeks. Among 54 prevalent cases at the start and 71 later new cases four-fifths had recovered by 5 years. Among 46 recovered prevalent cases, 14 had a recurrence. The figures from these two studies suggest substantial remission and change.

Oldehinkel *et al.* (1999) studied adolescents aged 14–17 in two waves over 20 months, using diagnostic criteria for various depressive diagnoses. The pooled 12 month prevalence rate was 8% and over 20 months the first onset incidence rate was 7%. Among those depressed at baseline, full recovery was attained by 54% of subthreshold major depressives, 43% of major depressives but only 33% of dysthymics, with an additional 20% of the first two diagnoses, 14% of the third, achieving partial remission.

Judd *et al.* (1998) reported on weekly ratings obtained over 12 year follow-up at 6 to 12 month intervals in major depressives. Subjects spent a mean of 42% of follow-up weeks with no depressive symptoms, 17% of follow-up weeks with subsyndromal depressive symptoms, 27% with minor depression and 15% with major depression. Patients had some symptoms in 59% of follow-up weeks and 27% never had an asymptomatic week. However, these subjects initially had a comparatively severe disorder receiving psychiatric treatment, mostly inpatient, rather than the milder disorder in the community epidemiological surveys reviewed above.

Findings are not fully consistent among these studies. They may depend on different case thresholds, specific criteria, and differences between different disorders. In the present study about one-third of cases at each point were cases at the other point. These figures both under-estimate chronicity because other cases at each point will have had symptoms in between and overestimate it in a proportion of subjects who will have had good remission in between. The previous literature produces somewhat comparable figures. It would appear that a substantial proportion of community cases are episodic, with many remissions over time, and onsets of disorder in other people, but that one third or more is chronic.

Risk factors

There is very extensive previous literature on recent and early social, and other background factors associated with later disorder, and comprehensive review would not be appropriate. The predictor analyses in the present study concern change in disorder, rather than its presence and absence. They also concern chronicity of disorder, the reverse of change. It is noteworthy that the chronic cases, those subjects who were cases both at age 36 and age 43, showed the highest frequency on most adverse predictors, recent and early.

One powerful predictor which emerged incidentally in the analyses was the PSE ID level at age 36, which predicted caseness at age 43 but with a marked acceleration at ID5, the PSE caseness threshold level. Definite disorder at this level did behave differently to subthreshold symptoms in predicting disorder 7 years later, suggesting a discontinuity with milder symptoms. The ID levels were originally devised to reflect likelihood of psychiatric caseness, but tend to parallel severity of symptoms. There were no cases at the maximum level of 8 in this community sample.

In general the kind of variables which we have studied have been found related to psychiatric disorders in epidemiological prevalence studies. In earlier analyses of data from the present cohort Van Os & Jones (1999) found cross-sectional prevalence of disorder at ages 36 and 43 associated with female gender, maternal neuroticism, subjects' neuroticism, teachers' behavioural assessments, poorer performance on cognitive tests in childhood, and recent life events. Abnormal neuropsychiatric developmental measures were also related to later disorder (Van Os *et al.* 1997).

De Boers *et al.* (2000) in the study cited earlier, found the strongest predictors of anxiety onset were female gender, neuroticism, hearing and eyesight problems. The first two of these, also predicted absence of remission. These findings bear some resemblance to ours. In the companion study of depression by Geerlings *et al.* (2000) new episodes were predicted by various sociodemographic variables and by poor physical health, the only other variable examined. Remission predictors were much weaker.

Kessler & Magee (1993) studied childhood adversity, mainly using variables similar to those in our group of parental social background, in relation to prevalence of adult depression in the community, and also new lifetime onset and recurrence, both ascertained retrospectively. Early adversity was moderately strongly related to prevalence of adult depression, mainly through associations with earlier depression that then led to later depression. It was more weakly associated with recent new onsets or recurrences.

We found weaker prediction for remission than for onset. Prediction of remission had less statistical power than prediction of onset, since it was based on the 172 age 36 cases rather than the 2718 non-cases. Odds ratios, reflecting magnitude of effect rather than its significance, were not very different in the two analyses of combined variables. However, there also appears to be some consistency in the studies cited that predictors are stronger for onset. This is in keeping with evidence that in clinical depression life events have stronger effects on onset than on remission and recurrence (Paykel *et al.* 1996), and suggests that processes inducing disorder and those maintaining it are partly different, and that course after onset may be more autonomous. The stronger effects which we have found of age 43 variables compared with those at age 36 probably reflects their recency in relation to outcomes which depended on age 43 state. The age 43 variables were not truly predictive but contemporaneous with outcome, so that some might be consequences of disorder.

The significant effect of variables in earlier life in influencing patterns of change later in life is impressive. It was selective, not including variables from early infancy, but later childhood social setting, life history, variables from adolescence and adulthood, evidence of previous

nervous disorder, together with gender and parental psychiatric disorder. The influence of gender is well known. The other factors attest to the enduring influence of familial and probably genetic factors, family social setting, and of life history variables manifesting themselves in the teenage years.

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