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*     REPORT ON THE LONGITUDINAL EXPLOITATION OF THE          *
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*          NATIONAL CHILD DEVELOPMENT STUDY                   *
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*          In areas of interest to the DHSS                   *
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by

Mildred Blaxter

NCDS Working papers prepared by the User Support Group at SSRU

No.	Title	Author(s)	Date
1.	The National Child Development Study: an introduction to the origins of the Study and the methods of data collection	P. Shepherd	October 1985
2.	Publications arising from the National Child Development Study	NCDS User Support Group and Librarian, National Children's Bureau	October 1985
3.	After School: the education and training experience of the 1958 cohort	K. Fogelman	October 1985
4.	A longitudinal study of alcohol consumption amongst young adults in Britain: I: Alcohol consumption and associated factors in young adults in Britain	C. Power	December 1985
5.	A longitudinal study of alcohol consumption amongst young adults in Britain: II: A national longitudinal study of alcohol consumption between the ages of 16 and 23	M. Ghodsian and C. Power	December 1985
6.	A longitudinal study of alcohol consumption amongst young adults in Britain: III: Childhood and adolescent characteristics associated with drinking behaviour in early adulthood	M. Ghodsian	December 1985
7.	Report on the longitudinal exploitation of the National Child Development Study in areas of interest to DHSS	Mildred Blaxter	April 1986

**REPORT ON THE LONGITUDINAL EXPLOITATION OF
THE NATIONAL CHILD DEVELOPMENT STUDY
in areas of interest to DHSS**

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INTRODUCTION

The first point which must be made concerns the immense potential of the NCDS. The national cohort studies are a unique resource in Britain, much envied by social scientists elsewhere. They represent an enormous investment of resources, which will pay greater and greater dividends as time goes by. It would seem to be the utmost folly to allow this investment to languish.

There is an immense body of research which considers specific variables relevant to the health, growth and social development of children (e.g. the relationship between birth conditions and outcomes in early childhood) but only in these cohorts is there the opportunity to follow the consequences of all major health events in adulthood and even to the next generation. There is evidence that in certain circumstances early events may determine life-long chances. The linkages have been clearly demonstrated in childhood, but we know very little about the transition from child to adult.

The NCDS is the largest of the birth cohorts, and is probably just large enough to accommodate analysis by area variables. There have been remarkable achievements in this, as in the other cohort studies, in tracing and follow-up. Losses may seem large (at 23,

approximately 4,000 out of 17,000 at birth) but when deaths and emigrations are examined, as well as non-tracing and refusal, losses of this order seem inevitable.   The cohort remains a very valuable longitudinal population.

One criticism which has frequently been made is that analysis of each sweep has tended to be cross-sectional rather than longitudinal. Thus the particular potential of a cohort study is wasted, for there are probably more efficient ways of providing a cross-sectional description of an age group at any given time.   Whatever the reasons may be for this (and inadequate resources for analysis obviously come to mind as a probable one, together perhaps with inevitable lack of continuity in staffing over such lengths of time, which might make broad views of the whole more difficult) it is probably a justified criticism of of NCDS since the earlier sweeps.   Some general review of the longitudinal potential certainly seems to be now appropriate.

The body of this review consists of a wide variety of specific suggestions for analysis.   First, however, I should like to set out briefly some of the main general points which should be borne in mind:

(1)   True longitudinal analysis has the objective of explanation, not simply description.   The value of longitudinal studies is that explanatory models can be developed from the data and tested retrospectively, by reference to data collected contemporaneously and not subject to the perils of recall.

(2)   It is in the examination of process that the longitudinal cohorts can make their greatest contribution.   Some of the most important findings have related to the timing of events and the identification of the periods of life when particular vulnerabilities exist (see e.g. Wadsworth, 1979; Wadsworth et al, 1983; Douglas, 1976).

(3) Analysis which takes the group as the unit and simply compares time A with time B (say, children's growth by social class at different ages by using average heights) is not truly longitudinal. Indeed, because of the serial correlations, longitudinal studies are less efficient for such cross-sectional parameters than independent samples. Essentially, the unit of analysis must be the <u>individual pattern</u>, the nature and direction of change for the individual in particular circumstances.

(4) Most of the previous analyses have taken health as the dependent variable and asked what health characteristics are associated with what social circumstances, geographical areas, etc. There is a need now to consider the underlying consequences of health status.

(5) It has often been noted that studies of currently "deviant" groups (with controls) often show stronger associations with retrospective factors than do representative population cohorts followed prospectively (see Rutter, 1981). The longitudinal cohorts have demonstrated that, especially in childhood, the predictive power of single factors is low. This emphasises the importance of working not backwards, but forwards, and considering a whole <u>range of possible outcomes</u>.

(6) In the earlier years of the NCDS, schedules and communications to participants frequently stressed the value of identifying children "who have been exposed to ... predisposing factors, but who are nevertheless developing normally". In fact, there has been very little study of those who are "deviant" in that outcomes are better than the norm; <u>protective factors</u> have rarely been considered. In all analyses, attention should be paid to the "unexpectedly successful" outcomes as well as the disadvantages.

(7) It is the obvious, broad, more theoretically-oriented analyses that have to a large extent been neglected in NCDS. (In contrast, the study has always been fortunate in having expert advisers and users of the data where there is a specialised interest in, for instance, one health condition or one sub-group of the cohort.) For the broad analyses - on which some stress is laid in the suggestions which follow - there is a necessity to develop <u>summary indices</u> of (for instance) "good" and "poor" health. There always seems to have been some reluctance to form composite indices of this sort, with a preference for using small items of "hard" data, especially for health issues. (One exception is the four useful categories of handicap distinguished by Fogelman (1984), and the summary indices of "social disadvantage" used by Wedge and Prosser (1973) may also be noted.) It must be pointed out that deriving composite indices of health from much less detailed or validated data - for broad purposes, and on a large scale - is a common practice and a much-studied field. In view of the

importance of this, an appendix to this report offers some suggestions about how it might be done.

(8) A legitimate critism of NCDS, I believe (certainly of more recent years) has been a reluctance or inability to use its data in a comparative way, considering where its findings can test the results of other research, or where a comparison with the other cohorts would be profitable. (There are obvious exceptions to this on some special, and more clinical, topics such as obesity, breastfeeding and eczema, tonsillitis, and circumcision, see e.g. Peckham et al, 1983; Taylor et al, 1983; Calnan et al, 1978.) Also, to provide a testing-ground for hypotheses developed in smaller studies might be one of its most important functions. This aspect is borne in mind in the suggestions which follow.

(9) The NCDS, like the other cohort studies, has been important and influential for the monitoring of shorter-term effects of social change and social policy (e.g. in the field of education). The relevance of these data for long-term effects of policy is, of course, complicated by secular change. There are, however, many ways in which comparison between the cohorts can be used to test the effects of changing norms, lifestyles and societal expectations. There are also ways in which within-cohort data can be interrogated to explore different hypotheses about the effects of the social environment (see e.g. Wadsworth, 1981, on the alternative explanations, relating on the one hand to individual psychology and on the other to societal expectations, for the association between family disruption and delinquency).

10. It seems unlikely that longitudinal analyses can be very profitably applied to the evaluation of more specific questions of health service or social service provision or utilisation. Geographical and temporal variation are factors which are too complicating. There is a sense, however, in which longitudinal study is vitally important to health and social policy. At present we have imperfect knowledge about what matters, in the long run. Policies in child health systems are at present inevitably determined without any clear proof of the relative priorities. Relevant issues are, for instance, examination of the content and timing of various assessments and methods of surveillance at different stages of childhood, firmer knowledge of this sequellae of developmental and behavioural problems, and further study of the long-term effects of stressors at each age. All these might contribute to health service or social service policies designed to combat disadvantage.

An obvious starting point from which to consider longitudinal analyses is the 23-year old cohort. This has two characteristics: it is a sample of young people on whom there is extensive data at

intervals since they were born, and it is a representative sample of 23-year olds at one moment of time. To these another can, perhaps optimistically, be added: it is a sample on whom it will be possible to collect future data.

This suggests that there are three rather different areas of consideration:

(a) Truly longitudinal analysis, using the data since birth.

(b) Short-term retrospective analysis, focussing on the antecedents of issues of interest at the age of 23.

(c) Prospects for future analysis, as the cohort progresses into older years.

The suggestions which follow are arranged in this order, dealing with (c) only briefly. Many of them may, of course, cover areas which the current NCDS team has already considered or is proposing to work on.

A   LONGITUDINAL ANALYSES

(1) Social Mobility, Inequality and Health

One of the most important issues currently under discussion in the sociology of health concerns the relationship of health to social mobility, i.e. the extent to which health is a sorting mechanism. The role of social mobility in generating, through selection, trends in the observed mortality differences by social class at various periods of time has, of course, long been recognised, but the debate

has been given impetus by the Black Report and subsequent critiques.

By retrospective categorisation of the health of the cohort members - preferably in the various stages of infancy, childhood and adolescense - and examining class of origin and achieved class in young adulthood, the question can be asked: do those with particularly good/poor health show upward/downward mobility, compared with the average experience of their class of origin? (It is important to emphasise that experience will always be relative, if secular trends in mobility and the composition and size of classes are not to obscure the results.)

The categories of the Registrar General's Social Classes are, of course, crude, but they are the ones which initially are relevant, since the debates are based on mortality rates which are similarly categorised. If anomalies and divisions are found within the experience of a social class, this is obviously a signal for the finer analysis of subgroups (perhaps by income, education or other types of occupational grouping) which will illuminate the whole meaning of changing "social class".

If health can, in fact, be shown to be a sorting mechanism by the age of 23, the great potential of NCDS lies in the possibility of examining in detail how health affects life chances. One early demonstration of the mechanisms involved was the finding in the National Study of Health and Development and in the Aberdeen Maternity Data Bank that marriage of women, upwards or downwards, relating father's social class to husband's was associated with

height as a surrogate for health and fitness) (see e.g. Illsley, 1955). In the NCDS, social class of origin of mother, mother's height, social class of origin at the cohort member's birth, and height and achieved social class at 23 of the cohort member, are all available. Moreover, there is sufficiently detailed data to go further than simply demonstrating this effect: there is the possibility of examining the specific characteristics or events which are associated with it. Possible hypotheses might relate to a higher social class of origin of the mother, parents who were also more likely to be upwardly mobile while the young woman was still a child, higher aspirations on the part of the parents for the child, particular ambitions or attitudes on the part of the girl herself, educational achievement, or different sorts of jobs held by the young women before marriage.

Studies of this mechanism have so far been restricted to women. For the young men, education and (previous) occupation of the spouse or partner is available, enabling some attempt to examine marriage patterns in the same way.

This is, of course, only one of the possible ways in which health or fitness may be associated with mobility. If a typical association is demonstrated, then a range of mechanisms which may be involved can be investigated. At what turning point might health have been crucial? Hypotheses might relate to type of schooling, educational achievement, attitudes and aspirations, vocational training, or particular types of ill-health. The protective factors can also be examined. If poor health is frequently associated with downward

mobility, what has protected those who do not show this pattern? Among which social classes is the effect greatest? Are the most significant protective factors IQ, or educational attainment, or some aspect of childhood environment?

(2) Social and Geographical Mobility: the Environment and Health

Analysis by area at cross-sectional level has always been an important and illuminating feature of NCDS. The variation by region, for several health-related topics, has in fact been shown to be greater than the variation by social class. The association of geographical mobility and health will always be complicated by the fact that there are relationships with social mobility - and vice versa. But geographical movement in the cohort provides a potential testing ground not only for hypotheses about the nature of area health inequality (how much of it is clearly environmental, how much a consequence of social characteristics of the people who live there?), but also for the examination of important questions about social mobility.

Those cohort members who have moved between "better" and "worse" environments during their lifetime should be distinguished. The 16 and 23-year old addresses of the cohorts have been linked to 1971 Census data. A composite variable describing the neighbourhood type and economic and population structure is available for these sweeps, but this will confuse the characteristics of the environment and the characteristics of the population, which need to be distinguished. Various categorisations are available, however, of areas on relevant

health variables. For earlier sweeps, even if rather broad categories have to be used this does not render the exercise useless. Scotland and England are clearly different in their health characteristics, as are the conurbations and suburban or rural areas.

Those who have been geographically mobile and also socially mobile should be distinguished from those who have moved geographically without social mobility. A series of questions can then be asked. Are those families who are both geographically and socially mobile - or even perhaps those who are geographically mobile without social mobility - more likely to be those with "healthy" children? Does the general health status of the children change on movement from an unfavourable to a favourable environment? Does this happen only when there is concurrent upward social mobility? When young people become geographically mobile on their own account, after leaving the parental home, is their health status associated with their own area of residence or are the effects of childhood environment still most prominent? Does a brief exposure or an early exposure (at what stage of life?) to the most disadvantaging environments, leave any likelihood of long-term consequences?

Secular area trends must be taken into account. Areas have a "health history", some showing relative improvement and some deterioration, and selective migration into and out of them is part of this history. The "career" (perhaps simply at the level of selecting those with poor health at 7, and seeing whether health is still poor at later ages) of those who have remained in "improving"

areas might be compared with that of the cohort members who have remained in "deteriorating" areas.

(3)   Stress in Childhood

There is much interest in the long-term effects of stresses in childhood (see e.g. Butler and Corner, 1984).   It has been pointed out that early stress can have beneficial effects for future personality, since the experience of handling it can teach coping strategy.   On the other hand, there is growing - though fragmented - evidence of adverse effects (see Haggerty, 1980, for a review).   Many of these have concerned health.   In the CHES Report, it has been concluded that illness of the mother, or separation especially in the first two years of life, may have a bearing on the onset of wheezing. In the NSHD (e.g. Douglas, 1975), prolonged or repeated admissions to hospital of those under 5 were associated with behavioural problems, and also with emotional problems in later life.   Notably, Wadsworth's analyses of NSHD data have suggested very long-term effects of early stress, even when social class, birth order and family size were taken into account, parental death, divorce or permanent separation before 5 were shown to be associated in adults with an excess of stomach ulcers and collitis, psychiatric illness, and delinquency in men, and psychiatric illness, delinquency and illegitimate births in women.

It has to be recognised that all possible stressors in childhood are not available in NCDS data.   Absence of stress can never be measured.   A sufficient number of obvious stressors is, however, available (parental death, divorce and separation; child in care;

prolonged or repeated admission to hospital; disability in family;

general social "disadvantage" as defined by Wedge and Prosser, 1973)

to:

(a) Test some of the relationships found in the NSHD cohort. For instance, does parental divorce or lone parenthood continue to be equally stressing at this later period when they were becoming more common patterns?

(b) Consider some other health conditions as possible sequellae - e.g. all gastro-intestinal complaints in men aged 23, as well as ulcer; migraine or chronic headaches; rheumatoid arthritis; chronic bronchitis (these being only some of the conditions for which stress has been implicated in etiology).

(c) Consider more carefully the timing of stressors in relation to different types of "outcome". At what age does family disruption appear to matter most? The important "sleeper" effects which have been demonstrated in connection with educational methods, or in relation to adult respiratory disease and early childhood illnesses, may be expected to be equally possible for early stress.

(d) Perhaps more interestingly, test the predictive value of a child's early reaction to stress. This might involve identifying those who had undergone stresses at 7 of specified sorts, and categorising the children into various groups of "reaction", i.e. developmental problems, behavioural problems, health problems, etc. Then the analysis should be repeated for those undergoing specified stresses between 7 and 16, and between 16 and 23. Since disadvantages cluster, many individuals will be found to have undergone stresses at 2 or even 3 of these periods. Can the type of presumptive reaction - or the absence of reaction - at 23 be predicted from the reaction at an earlier age?

(4) The Long-Term Effects of Adverse Factors at Birth

A great deal of research has paid attention to the relatively short-term sequellae of adverse factors at birth - prematurity, low birthweight or light-for-dates, complications of pregnancy, maternal smoking, etc. - and the PMS and NCDS I and II made important contributions to this (see Goldstein, 1971, among very many other publications). Effects of the less extreme birth disadvantages have commonly been found to diminish as children grow older, though some

surprisingly long-term associations have been noted - e.g. the association of various outcomes at 7 with maternal smoking.

We lack the answer to a simple question, however - which of these disadvantages matter most in the long run? Does it continue to be true, as so often shown in childhood, that the consequences of disadvantaging birth circumstances are clear only in the presence of social disadvantage? Now that the young people are of adult height, the opportunity to test the associations of low birthweight, maternal smoking, etc. with height, found at 7 and 11 is a unique one for a national sample and one which includes both sexes. The association of birth disadvantages of different sorts with an index of general "health" at 23 should also be examined. All such analyses should, of course, control for social class of origin, maternal age and parity, etc.

These issues are beset with inherent difficulties in attempting to disentangle the biological and the social, and these difficulties are compounded as the subjects become older. It must therefore be clear that the object of such analyses would be exploratory and hypothesis-generating, and they could not hope to offer proof of cause and effect relationships. They would distinguish groups, among whom finer analysis (considering e.g. environmental factors, health histories) could be done. The importance must be emphasised of including, as far as possible, deaths within the cohort.

(5) The Sequellae of Developmental and Behavioural Problems

There are many behavioural or developmental problems which cause much distress to parents (and resource-use to services) without the probability of their long-term importance being known. NCDS provides a unique opportunity, on a large enough scale, to ask: what matters? In which groups of children? Is it possible to distinguish the nature or degree of "problem" which should cause concern? Results published by Fogelman (1984) are an early illustration of the value of this approach. Children identified as having a hearing loss at 7, who mostly caught up with the cohort, are contrasted with those with a speech deficit at 7, more than half of whom still had speech problems at 16, whose attainment scores remained low, and a high number of whom developed other problems. As Fogelman notes, this is important information in relation to the provision of special schools and other services. Further work obviously needs to be done in order to identify the specific characteristics of those giving concern at 7 whose problems were not likely to be transitory. Other examples include:

(a) Ten per cent of the cohort children were eneuretic at night between the ages of 5 and 7. The "abnormality" of such a common condition might be questionable. What were the characteristics of those children for whom this was a symptom of long-term behavioural or health problems?

(b) What were the outcomes (in terms of health, educational achievement, occupational history in young adulthood, illegitimate pregnancies for females, criminal records if it is possible to obtain these) of behavioural disorders in childhood? Do behavioural disorders persist into adult life as psychiatric problems, persistent unemployment, criminality, excessive drinking, etc? What type and degree of disorder, and in whom? Are disorders in childhood or in adolescence more predictive? In what proportion of children, and in what circumstances, are these disorders merely transitory?

(c) Again, a simple analysis which remains to be done is to

ascertain whether early developmental delays predict longer-term difficulties. Similarly, the enquiry needs to be of a prospective, hypothesis-testing nature. For instance, approximately 650 children were identified as not walking by 18 months, and 960 as not talking by 2 years. (The fact that these were mothers' reports and not necessarily complete, is not a great drawback; these are at least quite large samples of children who almost certainly did experience these problems.)

Hypotheses might be that these children would prove to be educationally disadvantaged, or perhaps suffering from not then identified health problems. Choice needs to be made of a few simple indicators to test these associations – attainment, educational achievement, occupation at 23, health at 23 – with social class controlled. Most importantly, what proportion of children, under what circumstances, show no long-term effects of such developmental delay?

(6)   The Consequences of Labelling

The longitudinal data permit the examination of some very fundamental questions about the process of labelling.

Children are formally categorised by medical, social or administrative systems as "special" or "deviant" – as educationally sub-normal, physically handicapped, visually impaired, delinquent, "behaviour problems", and so on. This has two sorts of consequences: the good (and intended) result is that they may receive help, or arrangements may be made which fit their needs. The potentially bad (and unintended) result is that the labelling itself may prove disadvantageous. The distinction between the two will be most salient, of course, at the margins, and concern the child who is only slightly deviant from the norm. That the disadvantaging effects can happen is a sociological commonplace, often demonstrated empirically in special groups. The questions never asked on a large scale, however, are: what (for any given form of deviance) is the

cut-off point? The balance of advantage and disadvantage is likely to shift according to social circumstances, and these should be controlled for. Since it can no doubt be shown that the "labelled" are disadvantaged, are the consequences of their deviance better or worse than those who had exactly similar characteristics but never received a formal label?

The design of analyses to answer such questions requires careful thought, and should be directed both by theoretical considerations and expert knowledge of the relevant systems. Simply as an example, one might define an arbitrary category of "low IQ" at 7 years. Considering only those around the margins, who among this group were formally identified as ESN? What were the consequences of this identification or non-identification - i.e. what sort of schooling did they receive? What were the categories of outcome, in terms of educational achievement and employment achievement, in later years? What are the relationships between outcome and the broad categories of "treatment" or special help provided? For any given degree of initial "deviance", did those who were labelled and received special treatment have more favourable outcomes? Did this depend on the kind of treatment received, or upon the social circumstances of the family?

Similar questions could be asked about many other labels which may have long-term consequences. The answers are of considerable importance for services. For instance, it might be shown that it is positively harmful to offer "treatment" to a child with behaviour problems of a not-very-great severity. Or it might be equally shown

that these problems ought to be taken more seriously, and should be professionally tackled more often than they are. It might be shown that "physically handicapped" children ought not to be singled out, if their handicap is not great. Or it might equally be shown that it is very functional to give them special help, even for minor handicaps, early in life.

As always, this sort of hypothesis-generating analysis implies a willingness to form broad and arbitrary categories, both of children's characteristics and of outcome, without undue worry about their precision. Only when we know what we should be looking at will it then be possible to investigate the careers of small groups in more detail in order to try to demonstrate the processes involved.

(7) The predictive Value of Different Assessments

A related issue is the predictive value of assessments. At childhood sweeps various assessments of the children were made by different professionals. At 7, the children's speech was assessed by teachers, doctors, and health visitors, and there was some lack of agreement. There was some suggestion that teachers' assessments might have been influenced by cultural and social norms. Similarly, at 7 there was a strong social class difference in the teachers' assessment of physical co-ordination, and it was suspected that labelling processes might be at work. These speculations have never (I think) been treated by an examination of whether, in

children with discordant assessments, it was the parents', teachers' or doctors' assessment that had the greatest predictive value for future problems. "Outcome" variables examined in the case of physical co-ordination, for instance, might include: development of chronic illness, accident-proneness, occupational level achieved as a young adult. Similarly, "behaviour problems" at home and at school, or "social adjustment" at school, were elicited at all the childhood sweeps. For which children, and with what degree of consistency throughout childhood, were these measures discordant?

(8)   The Natural History of Specific Conditions

The specific conditions for which longitudinal analysis of NCDS might be most profitable can best be chosen by clinicians or medical researchers. Indeed, the exploitation of the cohort in this way has already been excellent: the study of obesity is not mentioned here for instance because the work which has been done, and is being done, on this topic.

Even as large a cohort as this will not, of course, produce sufficient numbers of many disease conditions. The breadth of the data combined with the fact that it was inevitably gathered for a wide variety of purposes rather than to explore particular hypotheses mean that it would be inappropriate to suggest that precise questions of an etiological nature can be answered: for this, other methods are obviously more appropriate. The material is suitable, however, for:

(a) Exploring wide aspects of the natural history of common forms of ill-health in a prospective manner - e.g. what are the sequellae, in what circumstances, of (for instance) childhood convulsions, or asthma/wheeziness, or hearing problems? Some conditions such as these have, of course, been the objects of longitudinal study through childhood. Relevant enquiries were especially made at 23, and the analyses should obviously be extended to young adulthood. Respiratory symptoms in adulthood and their association with childhood experience (including early respiratory disease, air pollution levels, smoking, and the social environment) have been an important area of study. A comparative study examining the conclusions derived from the NSHD (e.g. Colley et al, 1973) would be profitable, since there have been both environmental and behavioural changes in the period separating the two cohorts.

(b) Examining the previous health history, retrospectively, of certain small groups of particular interest - e.g. those who develop diseases such as multiple sclerosis, leukaemia and other cancers, epilepsy, diabetes. Are there factors which might be predictive? Douglas (1984), examining the effect upon achievement of the timing of the onset of chronic illness, has suggested that the low achievement of those whose illness began after the age of 15 may be due (through low success in reaching selective schools) to an association with disturbed behaviour in childhood. What type of severe chronic illness is predicted by disturbed behaviour, and in what circumstances?

(9) The Study of Special Sub-Groups

(a) The chronically ill and disabled

The study of special groups of the cohort has always been a valuable feature of NCDS. The work on the children with handicaps must be particularly mentioned, with the special follow-up at 18. To continue to study continuities in handicapping conditions, and their effects on the lives of young adults, is obviously valuable (see e.g. Walker, 1982; Fogelman, 1984). This topic has important service implications for schooling provision, training, and special employment services. The detailed longitudinal data in NCDS can very usefully supplement and illuminate the quite large body of other research in this area (e.g. the work of the Social Policy Research Unit).

(b) Children in care

There is currently much interest in the consequences of having been "in care", especially for adult mental health and parenting behaviour (see e.g. the work of Rutter et al). There is little on parenting that can be gleaned from NCDS IV, but the cohort

does have the advantage of national representativeness. A simple analysis of outcomes (in terms of educational achievement, occupational history, marriage/childbearing patterns, and adult mental health) of those who were in care, controlling for parental circumstances and for IQ, might be an important footnote to the more focussed but geographically restricted studies.

B. RETROSPECTIVE ANALYSES, FOCUSSING ON NCDS IV

Turning now to shorter-term retrospective analyses, focussing on the antecedents of issues of interest at the age of 23, I suggest that the following five are those which have most potential value. Twenty-three is a relatively "healthy" age, and this is not an all-age population sample; it is a waste of time to analyse it as if it were. The guiding question ought to be: what is of particular interest in young adulthood?

(10) Accidents

Since accidents are in fact the most important cause of death and disability in young people, and since NCDS can provide a record – perhaps imperfect, but certainly better than any other that exists – of all accidents since infancy, it would seem that this is a very fruitful area for further analysis.

(a) Serious accidents – i.e. those resulting in impairment (with some aribitrary definition of the degree and permanency of impairment that is the 'count') – are one topic. At what ages do accidents take their toll, in which social circumstances? The information from each of the sweeps needs to be assembled together. The unit of analysis here is 'the accident'.

(b) A perhaps even more important and more interesting analysis would take the unit as 'the individual'. Various categories need to be chosen and defined – the individuals who have been accident-prone both as children and as young adults; those who were accident-prone as children but not in adolescence or adulthood; those who have become accident-prone since leaving school, though they were not before. To have had one accident between the ages of 16 and 23 (which applies to almost half the cohort) is 'normal' and probably not, it should be noted, of importance.

Accidents, it can be hypothesised, are associated with (a) the environment - geographical area, urban or rural residence, housing of children, working environments; (b) behaviour and circumstances of the mother or the individuals themselves - for young adults, smoking, drinking, leisure activities, with housing, demographic, employment and income variables used as surrogates for lifestyle; for children, family sizes, housing, incomes used as surrogates; (c) characteristics of the individual - sensory disorders, motor co-ordination, disabilities, behavioural problems (all as children); psychological and physical health at 23; (d) life events and stresses - geographical movement, family break-up, marriage and childbirth, employment and unemployment. (It has to be noted that all important life events and stresses are not available, and the analysis would have to rest on a few events as examples.)

The successive sweeps offer a remarkable opportunity for testing the relative weights, at different ages, of these sets of factors. One of the first questions is: is it possible to identify accident-prone individuals, or does frequency of accidents appear to relate primarily to environment and circumstances, ceasing if the environment changes, so that accident-proneness is not a characteristic of the individual at all? If such individuals are identifiable, can their vulnerability be predicted by early lack of co-ordination, or by early behaviour problems and voluntary behaviours or attitudes (smoking, drinking, attitudes to school) which might be held to indicate readier risk-taking or greater irresponsibility? What are the protective factors at each stage of

life - e.g. amongst those who are accident-prone as children, what characteristics those who are no longer so?

(11)   Health and Employment/Unemployment

NCDS cannot (though it might in future) contribute much to the discussion about the effect of unemployment on health.   Preliminary analyses have shown that the 23-year old unemployed are less "healthy" than the employed, but not too many other factors are interrelated and there is insufficient information about health before unemployment, i.e. at ages between 16 and 23.

It is, however, possible to look at the effect of health status on employment experience.   General health categories at 16 can be formed, and for each category outcomes can be ascertained in terms of numbers of jobs, types of jobs, length of unemployment spells (with parental social class and educational achievement controlled).   The objective would be not simply to show associations, but to seek hypothesis and explanations.   What is crucial in distinguishing those with "poorer" health at 16 who have more, or less, satisfactory occupational histories to 23?   Obvious variables to look at are area, type of schooling, type of training if any, parental or individual ambitions and attitudes, type of ill-health.

With regard to mental health, the Malaise Inventory data in IV permits a particularly interesting examination of any association of poorer mental health and length (or frequency) of unemployment.

Differences in long-term psychological status could be controlled for, using the tests made at 16. In this case, there might be stronger grounds for presumption of a causal relationship, if a deterioration in mental health were found to be strongly associated with unemployment.

(12) Emotional Problems and Health

The availability of Malaise Inventory scores at 23 has offered some interesting preliminary analyses. Short-term retrospective analyses would also be of interest to answer questions such as the following:

(a) Given that "depression" is shown to be associated with unemployment, physical illness, recent adverse life events such as divorce, widowhood, death or disability of children, etc., and poor social circumstances, what appear to be the protective factors in the backgrounds of those with similar characteristics who are not "depressed"?

(b) Can "depression" at 23 be predicted by behavioural measures at 16, or even 11? What is the stability associated with "disturbance" in childhood, adolescence and young adulthood?

(c) Keeping the associations above (unemployment, health, etc.) constant, what events in childhood are associated with adult "depression"? Hypotheses to be tested might include parental separation, break-up of family, being in care, prolonged hospitalisation, serious childhood illness.

(d) Given that "depression" and employed/housewife status in young women are differently associated by social class, what are the elements of "social class" that appear to be crucial? Hypotheses to be tested might include present income, housing, educational achievement, personal aspirations as a teenager, early employment history, nature of current occupation, age at marriage (as well, of course, as distinguishing those with and without young children).

(13) Alcohol Consumption

The data available at 23 are how often the respondents "usually" drank alcohol and an account of "last week's drinking". At 16 there is "how long since you had an alcoholic drink", amount of drinking in past week, and where drinking was done. (It is perhaps an interesting commentary on changing issues that maternal drinking was not elicited in 1958.)

Twenty-three is, of course, a "heavy drinking" age. Preliminary analyses suggested that 55% of females and 81% of males reported drinking at least "once or twice a week", and 2% of females and 12% of males were identified (by the usual criteria) as "heavy drinkers".

Exhaustive cross-sectional analysis of the association of drinking habits with other variables does not seem very profitable, since these drinking data are limited and descriptive accounts of drinking habits are available elsewhere. There do, however, seem to be a sufficient number of heavy drinkers at 23 to enable at least two important detailed and more longitudinal studies to be done:

(a) The possible identification of future problem drinkers at age 16.

It is important to work both forwards and backwards: in the usual way, heavy drinkers at 23 will doubtless will found to have characteristics in common at 16. But there will also be many at 16 with these characteristics who do not become heavy drinkers. The questions might be:

Of those who drank (relatively) heavily at 16, how many are heavy drinkers at 23? What is the association with social class, drinking at home/elsewhere, educational achievement, geographical area? What are the characteristics of those who drank heavily at 16 but not at 23? What are the career-patterns (e.g. age of school-leaving, obtaining a further qualifications, periods of unemployment, stability of jobs, marriage or co-habitation, birth of children) of those who:

(a) continued as heavy drinkers from adolescence

(b) began heavy drinking after 16

(c) were heavy drinkers at adolescence, but not at 23?

With approximately 125 female and 750 male heavy drinkers at 23, numbers (while, it must be noted, larger than many studies of drinking habits), are small enough to permit quite detailed path analysis. The possible identification of a predictive instrument for heavy drinking at 23 would be of immense importance. It must always be remembered, however, that heavy drinking at 23 is not necessarily an alcohol "problem".

(b) The exploration, on a large and nationally-distributed scale, of the relationship between the development of heavy drinking habits and the work environment.

It is well-known, that alcohol consumption is related to the nature of jobs and the associated social environment. One point at issue has been whether people are selected, with already established drinking habits, into particular types of job, or whether it is the job which fosters the behaviour. An excellent opportunity exists for the testing of Plant's Scottish results more generally, by identifying those types of jobs (distinguished not only by their area of interest, e.g. the drink trade in all its forms, but also by their nature, e.g. shiftwork, heavy manual labour, sales work and other "socialising" jobs) known to be characterised by heavy drinking, testing whether indeed these young people are more likely to be heavy drinkers, and examining their drinking habits at 16. Are those who have had "at risk" jobs but have moved out of them heavy drinkers? For women members of the cohort, there would be interest not only in examining the nature of their own jobs, but also the nature of their husband's job for those who are married.

(c) Health and alcohol consumption

Any direct association of health and alcohol consumtion is, at 23, going to be difficult to establish. Heavy drinkers may indeed have poor health — but they are also likely to be in poorer social circumstances, less socially or emotionally stable, etc.; care would have to be taken to allow for all the intervening variables. There may be some interest in examining the accident patterns of the drinkers and non-drinkers, but again a whole complex of environmental circumstances, leisure activities, etc., is relevant.

The relationship of alcohol consumption to health is, however, likely to become clearer as time goes on. Given that the cohort can be retained, a unique opportunity will be presented for associating early drinking with its health consequences. The Scottish Liver Disease Survey suggested very tentatively that it was not so much excessive consumption, at any given age, that resulted in liver disease for the unfortunate minority of

drinkers, but extended regular consumption over a long period of years (Blaxter, 1983). The cohort offers the opportunity to monitor the life-long health of a quite large group of early drinkers.

(14) Smoking

The data relevant to smoking are particularly good - i.e. maternal smoking in 1958; smoking at 16 and parental smoking; for a one-in-twenty subsample at 20 specially detailed data including past and current smoking habits, reasons for smoking, intention to stop smoking, attitudes to and beliefs about the effects of smoking (Ferri and Fogelman, 1979); at 23, past and current smoking, smoking during pregnancy, smoking of spouse and others in the household.

I believe that little need be said under this heading, because the preliminary analyses made by the NCDS team and the proposals for more detailed work are comprehensive. In the same way as with alcohol consumption, the opportunity arises to establish continuities or change in smoking habits, relationship to parental smoking and that of the spouse or other household members, and the social (including employment) and individual antecedents of trends in smoking behaviour. In addition, the twenty-year old subsample permits the examination of health education and knowledge.

Again, the future importance of these data for health issues cannot be over-emphasised. It has been in the National Survey of Health and Development rather than in the NCDS that the relationship of

parental smoking, youthful smoking, air pollution, early respiratory tract illness, and respiratory disease in children and young adults has been so fruitfully studied (e.g. Colley, Douglas and Reid, 1973). It could perhaps be suggested that these analyses need to be replicated in this different cohort, especially as some of the variables - air pollution, social class patterns of smoking - are changing. Since "cough and phelgm" was specifically elicited at 23, and bronchitis and chest infections at other sweeps, data exist for longitudinal examinations of the relationship of smoking, or household smoking to respiratory health. Obviously, as the cohort grows older the value of being able to relate health to life-long smoking behaviour will increase.

C. INTERGENERATIONAL ANALYSIS

(15) Parental Generation

Some data are now available on three generations. There is not a great deal on the health of the parental generation except at childbearing, but at least social data are available throughout the years of the cohort's child's dependency. In IV, mortality in the older generations was ascertained. At any future contacts enquiry could be made about the broad outlines of occupational and social histories and the incidence of serious disease. If an actual return to the survivors of the older generation were possible, this would be a relatively economical method of studying mobility and health, both retrospectively and prospectively; an easy method of contact exists,

which is most unusual for a sample identified 20 to 30 years ago. Of course, loss from the total parental cohort would be likely to be considerable, but the whole cohort is not essential. There might be an excellent case for attempting to retrieve selected groups. Social classes have been subject to continuous change in their occupational make-up, definition, rewards, and relative life-styles and status. Which are the crucial groups in which to look for this change and its possible associations with health?

(16)   Adult Health

At a more descriptive level, there is obviously the possibility of exploring some familial patterns of illness, or the natural history of some particular conditions, as the young cohort advances into middle-age. Which adult conditions should be selected, and which retrospective variable should be examined, will depend on socio-medical theories about possible associations - e.g. the "cancer-prone" effect of certain personality traits, life events, or environments; behaviours and health outcomes.

A practical point is that the importance of attempting to record all deaths and causes of death will become greater as time goes on, and the cohort becomes increasingly a group of survivors.

(17) Family Formation

At 23, over 3,000 cohort members had children of their own. For this third generation, very limited information was collected in NCDS IV.   Some simple but interesting enquiries which are nevertheless possible are obvious: the probability, under what circumstances, of a repetition among daughters of certain reproductive behaviours of their mothers, for instance, or the inter-generational repetition of disadvantaging factors at birth (such as low birthweight).

At 23, marriage and family-building patterns are, of course, only at their beginning.   Descriptive analyses could be made, however, of the relationship of the cohort members' own family formation experiences (for both sexes) and early marriage, cohabitation, childbearing, lone parenthood and marital breakdown.

(18) The Second Generation

The study of a second generation, who will of course be born over a number of years, is fraught with practical difficulties.   It obviously means further sweeps at not too infrequent intervals, or specific attempts (focussing on the birthday-card system, for instance) to ascertain when children are born.   The small amount of information collected at 23 could be augmented by a sub-group study only of those cohort members who were parents.   A possible inter-generational continuity in attitudes to childcare and approaches to family life is obviously a point of interest.   Discontinuities and their correlates - for instance, children who were themselves poorly cared for in troubled circumstances who nevertheless bring up their

own children in a totally unproblematic way — are of almost greater importance.

The use of a "second generation" cohort for other purposes — the study of needs for and use of services, family dynamics and social networks, issues such as day care etc. — may be tempting.   It can be suggested, however, that for this other samples and other methods are more appropriate.

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APPENDIX: HEALTH VARIABLES AND INDICES

Many of the suggested analyses require the development of some
general indices of "good" and "bad" health at each age.   The breadth
of the data available - even if, especially at 23, much of it is
"soft" and not clinically-validated - certainly makes this possible.
Because it has not so far been done, some suggestions are appended -
requiring, of course, more thought and not to be defended as the only
or best way.

Particularly in relation to IV, the most important point to be made
is that although the validity of any composite indicator does depend
on using as many items of information as possible, nevertheless, not
all the data available is meaningful for a general index of "health".
To have been in hospital once, or even more often, between 16 and 23
is not to be "unhealthy".   Accidents may be of interest in their
own right but they are not relevant to general health if they have
had no consequences.   Length of time since seeing a G.P. is
completely irrelevant.   Analysing the conditions for which the
respondents were hospitalised by ICD categories or accidents by sight
of injury, is not particularly useful.   Chronic conditions and those
under medical supervision obviously are relevant, but some
distinction must be made between (a) and the relatively trivial that
has no functional consequences, (b) the relatively "serious" that
nevertheless may not be defined as handicapping - from the
preliminary analyses, this may include substantial numbers with
asthma, wheezy bronchitis, migraine, (c) chronic conditions declared
as limiting.

NCDS IV

(1)   "Handicap" - those whose ill-health affects their function

*IV Q 2 3   Select out all those declaring limiting long-
      7 8 10   standing illness, disability or infirmity.

IV Q 37-40   Add any others declaring disability through
                   injury.

                   (One might wish to make several categories of
                   functional handicap, as used by Fogelman, 1984).

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*The first item refers to the sweep - NCDS sweep I, 1965;   II, 1969;
III, 1975;   IV, 1981.   The second item identifies the instrument
e.g. PI, Parental Inverview;   EQ, Eduational Questionnaire;   ME,
Medical Examination;   AT, Attainment Tests;   etc.   The third item
refers to the number of the question or name of the item in the
original questionnaire,   e.g.   II ME   10,   11,   12   identifies three
questions about the child's vision and hearing in the Medical
Examination Form of NCDS Second Sweep.

(2)   "Ill- health" - those with more serious ill-health, not
      declared as affecting function

IV Q 16-28 IV Q 34 35	Considering only the remainder, and using a list of the 20 or so most common and "likely to be serious" conditions derived from the data and/or from prevalence literature (at this age), select out those declaring them under "any regular medical supervision" and "any other medical condition".
IV Q 16-28	Migraine, convulsions and bronchitis would obviously appear on the list, and it seems from preliminary analysis that some respondents declared these when asked about them specifically, but only then. These respondents should be added.
IV Q 44-46	add any others receiving specialist treatment for psychiatric problems.
IV MI	Perhaps add any others with very high scores on Maliase Inventory.

(3)   "Slight ill-health" - those with less serious conditions

IV Q 16-28 IV Q 34 35	Considering only the remainder, select out those with other conditions from "regular medical supervison" and "other conditions".
IV Q 29-33	Add those with cough, phlegm, hayfever.
IV Q 13	Add those declaring over- and under-weight
IV MI	To include mild psychiatric ill-health add those with "above normal" Malaise scores.
IV Q 1	Considering only the remainder, it might be legitimate to select out and add any defining their own health as only "fair" or "poor". It is most unlikely that there will be many, but the possibility of general ill-health, manifested in frequent experience of symptoms or acute illness, or by extreme unfitness, and not elicited in any other way, must be allowed for.

(4)   "Healthy"

Consider the remainder as the "healthy".

Such a successive filter would be easy to apply and would provide
four or more simple but broadly meaningful categories.   Of course,
every individual will not be accurately placed in a continuum between
health and ill-health, but such a categorisation is based on more
detailed data than many of the indices which are commonly used.

NCDS III

III ME 2   (1)
III ME Summary

	(1)
III ME 2 III ME Summary	Assessment for need for special education. Severe, moderate and slight handicap in any medical category.
	(2)
III ME 5-17	Abnormal conditions in an aribtrary category of more serious, from medical examination.
III PI 56-8	Convulsions, asthma, bronchitis and migraine.
III PI 60	Psychiatric treatment.
III PI 48	Very frequent absence from school.
III PI 50	Frequent accidents.
III PI 51	Repeated or lengthy hospitalisations.
III PI 52	Specialist treatment.
	(3)
III ME 5-17	Abnormal conditions in an arbitrary category of less seriouus, from medical examination.
III EQ 38	Behaviour problems (school).
III PI 44-46	Behaviour problems (home).
III PI 49	"Health" problems (home).

NCDS II

	(1)
II MI 9	Assessment for need for special education.
II MI 27	Handicap.
	(2)
II MI 10-24 30-49, 51-56	Abnormalities and history of medical conditions in an arbitrary category of more serious.
II PI 53, 59-62, part 64	Serious illness reported by parents, including asthma, bronchitis, convulsions, migraine, heart complaints.
II PI 68	Repeated or lengthy hospitalisations.
II PI 67 69	Specialist treatment.
II PI 50 51	Frequent accidents.
II PI 56	Very frequent absence from school.

	(3)
II MI 10-24 30-49, 51-56	Abnormalities and medical conditions in an arbitrary category of less serious.
II PI 67-69 part 64	Other "general health problems".
II EA 24	Behaviour problems (school).
II PI 77-78	Behaviour problems (home).
II PI 46-48	Bladder/bowel control.

NCDS I

	(1)
I MQ 6a, 28a	Handicap and need for special education.
I PQ 63a, I ME Summary	Severe, moderate and slight handicap in any medical category.
	(2)
I ME Summary I MQ 7-20 23, 25-27 I PQ 64-70, 72	Abnormalities and medical conditions in an arbitrary category of more serious. Added to from parents' reports.
	(3)
As above	Abnormalities and medical conditions in an arbitrary category of less serious. Added to from parents' reports.
I PQ 27-28	Clumsiness and activity.
I PQ 30	"Difficulties".
I PQ 34	Behaviour problems.

If a filtering system is used as before it might well be found that some of the above items are redundant or inefficient in that they add only very small numbers to any category: this would be a matter for trial.

It is emphasised that these categorisations are not for their own sake: they are arbitrary, and not for any descriptive account of the prevalence of ill-health. They are for use in the study of mobility, life chances, etc. When and if it is found that health, thus broadly defined, has some not-already-obvious association, then the next step would be to select out the particular groups in question and examine the specific components of health – individual diseases, turning-points, disabilities – which may be the crucial factors.

NATIONAL   CHILD   DEVELOPMENT   STUDY

The National Child Development Study (NCDS) is a continuing longitudinal
study which is seeking to follow the lives of all those living in Great
Britain who were born between 3 and 9 March, 1958.

It has its origins in the Perinatal Mortality Survey (PMS). This was
sponsored by the National Birthday Trust Fund and designed to examine the
social and obstetric factors associated with the early death or
abnormality among the 17,000 children born in England, Scotland and Wales
in that one week.

To date there have been four attempts to trace all members of the birth
cohort in order to monitor their physical, educational and social
development. These were carried out by the National Children's Bureau in
1965 (when they were aged 7), in 1969 (when they were aged 11), in 1974
(when they were aged 16) and in 1981 (when they were aged 23). In
addition, in 1978, details of public examination entry and performance
were obtained from the schools, sixth-form colleges and FE colleges.

For the birth survey information was obtained from the mother and from
medical records by the midwife. For the purposes of the first three NCDS
surveys, information was obtained from parents (who were interviewed by
health visitors), head teachers and class teachers (who completed
questionnaires), the schools health service (who carried out medical
examinations) and the subjects themselves (who completed tests of ability
and, latterly, questionnaires). In addition the birth cohort was
augmented by including immigrants born in the relevant week in the target
sample for NCDS1-3.

The 1981 survey differs in that information was obtained from the subject
(who was interviewed by a professional survey research interviewer) and
from the 1971 and 1981 Censuses (from which variables describing area of
residence were taken). Similarly, during the collection of exam data in
1978 information was obtained (by post) only from the schools attended at
the time of the third follow-up in 1974 (and from sixth-form and FE
colleges, when these were identified by schools). On these last two
occasions case no attempt was made to include new immigrants in the
survey.

All NCDS data from the surveys identified above are held by the ESRC Data
Archive at the University of Essex and are available for secondary
analysis by researchers in universities and elsewhere. The Archive also
holds a number of NCDS-related files (for example, of data collected in
the course of a special study of handicapped school-leavers, at age 18;
and the data from the 5% feasibility study, conducted at age 20, which
preceded the 1981 follow-up), which are similarly available for secondary
analysis.

Further details about the National Child Development Study can be obtained
from the NCDS User Support Group.