SOCIAL STRESSORS, INFORMAL SUPPORT, AND DEPRESSIVE ILLNESS AMONG THE RURAL ELDERLY

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Social Stressors, Informal Support, and Depressive Illness among the Rural Elderly

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Two random samples of elderly people living in rural communities and a non-random sample of elderly patients were interviewed using Brown and Harris's (1978) investigator-based methods to determine if adverse life events and difficulties were of aetiological importance for onset of clinical depression.

When both community samples were analysed separately neither severe events, major difficulties, nor marked health difficulties were significantly associated with onset. When the samples were combined, however, severe events and marked health difficulties were aetiologically important, although major difficulties were not. Comparing samples showed that the cell proportions in each table were not significantly different, and that combining samples did not produce misleading results. We therefore concluded in favour of the results from the combined samples. Analyses of the patient sample showed that severe events and major difficulties were significantly associated with onset. Marked difficulties were not, however, aetiologically important.

Half the respondents in both rural communities had experienced a life event. Chronic difficulties were far more prevalent; most people reported two difficulties which typically were longstanding. Analyses of the content of events and difficulties highlights the importance of deteriorating health for many elderly people. However, at least three-quarters of the events and difficulties were judged to be of minor threat or severity. Compared with Murphy's (1982) study of the urban elderly our rural subjects had fewer severe events, major difficulties and, in one of the samples, fewer marked health difficulties. It was suggested that the lower rate of stressors in rural areas was responsible for their non-significant association with depression onset when samples were analysed separately.

An implicit assumption of Brown and Harris's (1978) methods is that judgements of the potential threat and severity of events and difficulties is generalizable. Evidence from this study shows this assumption is incorrect and that age is an important factor in the perception of severe events and difficulties.

Levels of perceived social support and satisfaction with support were significantly higher in one of the community samples compared to the patient group. An examination of the "stress buffering" hypothesis showed that both stressors and social support had direct independent effects on depression and life satisfaction.

Acknowledgements

The work reported in this thesis could not have been undertaken without the contributions of a number of colleagues. In the following brief history of the research reported in this thesis I have endeavoured to gratefully acknowledge the considerable advice and assistance of others and to specify my role in the project. Seven years have passed since the project was conceived. During this time some of the initial ideas have undergone considerable revision and some people who contributed to the project have moved away. I apologise in advance if my memories are not fully in accord with those of others or if I have failed to acknowledge anyone. This is due entirely to the passage of time and the ageing process.

The initial research was financed for a period of two years by the Mental Health Foundation with a grant to Professor John Copeland. From its inception this was, however, very much a collaborative project and involved staff from the University departments of Psychiatry and Psychology together with National Health Service Psychiatrists. The entire project proceeded under the aegis of the Institute of Human Ageing at the University of Liverpool.

The objective of the proposed research was to conduct an epidemiological survey of the prevalence and incidence of clinical depression among three samples of elderly subjects and to determine the role of life events in

precipitating clinical depression. The proposed samples were; (1) a random sample of rural elderly subjects living in the Nantwich area, (2) a random sample of elderly subjects living in a "recently rural" community, namely South Wirral, and (3) a hospital sample of depressed patients. The location of the hospital sample was at this point undecided. Two further aspects of the study design had been agreed at this early stage. Firstly, it was decided to use Brown and Harris's (1978) investigator-based methods to elicit life events. Secondly, on the advice of Dr. Ann Davies it was agreed to carry out the psychiatric and life events interviews separately.

It was at this stage in the development of the project that a research assistant, Ms. Gill Roberts, and a research student, namely myself, were employed. During the first two weeks of our association with the project we both underwent training in the use of Brown and Harris's methods at Bedford College.

After a few months and before interviewing began, Gill Roberts left the study to get married. Also, the psychiatrist with responsibility for conducting the mental state assessements on the "recently rural" sample in the Wirral left to take up another post. Consequently, in the first instance it was decided to proceed with interviewing the Nantwich sample. Most of the decisions concerning the design and methodology of the study in Nantwich were taken jointly by Professor Copeland, Dr.Ann

Davies, Mr. Mike Dewey, and myself.

Before commencing in Nantwich a considerable amount of developmental work was completed. It is difficult to convey to those unfamiliar with Brown and Harris's methods the amount of clerical and administrative work associated with the procedure. Much of this was completed by the writer. Modifications were also necessary to make the Bedford College technique suitable for use with the elderly in rural communities. The selection of demographic variables for inclusion in the study followed a literature review by the writer. This review also prompted a number of hypotheses, the consideration of which led to the inclusion of a measure of life satisfaction (Bigot, 1974), and a pilot questionnaire on how elderly people cope with stressors. This work was completed by the writer under supervision from Dr. Ann Davies and Professor Copeland. Though data on coping was gathered in Nantwich, Denbigh, and Liverpool, it is not reported in this thesis.

Gill Roberts and I were responsible for gathering the sample in Nantwich with some assistance and advice given by Mike Dewey. Drs. David Neal and Mary Harrison had obtained the consent of the general practitioners in Nantwich to interview their patients. Before commencing the study Ms. Roberts and I visited each group practice to explain the nature of the project and to obtain individually signed "letters of introduction" from each doctor. Interviewing in Nantwich began in August 1982.

All the psychiatric interviews there were carried out by Drs. Neal and Harrison and they also provided the psychiatric diagnoses. The first 49 life events interviews were carried out by myself. Although a second research assistant, namely Ms. Sue Wilkinson had been appointed in July 1982 it was necessary for her to be trained in Brown and Harris's methods at Bedford College before she could begin interviewing. After Sue Wilkinson had been trained she, for logistic reasons, took responsibility for interviewing in Nantwich and completed the remaining 41 life events interviews.

Following the departure of the psychiatrist in Wirral it was not possible to proceed with this proposed sample. However, thanks to Professor Copeland we were fortunate in being able to recruit Dr. Anathakopan who was based at The North Wales Hospital in Denbigh. As Dr. Anathakopan and I both lived in North Wales it was decided to interview a second rural community sample based in and around the town of Denbigh. Further, as I was Welsh speaking it was agreed that I should carry out the life events interviewing in North Wales. Dr. Anathakopan, Sue Wilkinson, and I obtained permission from the Denbigh general practitioners to interview their patients. The sample was drawn by Sue Wilkinson and me with some assistance from Dr. Charles Crosby. After discussions with Dr. Ann Davies it was decided that I should attempt to develop a measure of Social Support for use in Denbigh. A new measure, the

Index of Social Support was developed by myself under the supervision of Dr. Davies and this was piloted in Denbigh. All the 155 life events interviews in Denbigh were carried out by the writer, and the psychiatric assessments were conducted by Dr. Anathakopan.

Arrangements for interviewing the patient sample were made by Professor Copeland. All these psychiatric assessments were carried out by Dr. Ravindran, and all the life events interviews were carried out by the writer. The rating of life events and difficulties was very time consuming. The ratings and re-ratings were carried out by a panel of four raters who subsequently became known as the gang-of-four; they were Dr. Ann Davies, Ms. Sue Wilkinson, Mr. John Downes, and I. Sue Wilkinson and I trained Dr. Davies and Mr. Downes in the use of the Bedford College rating procedures.

The idea of comparing the life event ratings of the gang-of-four psychologists with those of elderly people was suggested by Dr. Ann Davies following discussions with the writer. The panel study was funded for a period of 12 months by an ESRC grant to Dr. Ann Davies and the writer was employed as a research assistant on the project. Dr. Davies and I were primarily responsible for the study design and methodology with assistance and advice given by Sue Wilkinson. All three of us contributed equally in carrying out the study.

All the statistical analyses reported in the thesis

were carried out by the writer under supervision from Dr. Ann Davies.

Finally, I would like to extend a special word of thanks to Dr. Ann Davies. While a number of colleagues contributed to the work reported in this thesis Dr. Davies has undoubtedly taken the leading role. Her unstinting enthusiasm, work, leadership, and support were an inspiration. I have been extremely fortunate in being able to work with her and have learnt a great deal. For this I will always be grateful.

CONTENTS

INTRODUCTION

In this study I have chosen to examine the daily experiences of elderly people living in rural communities to determine whether they have a causal role in clinical depression. Although it is generally acknowledged that genetic and personality factors may also be of aetiological importance in depression, existing evidence remains indirect and unimpressive. In contrast, within the individual's immediate and ongoing experiences there is growing evidence that there are factors which are of significant importance (e.g. Brown and Harris,1978; Murphy,1982).

Studies of elderly people living at home have consistently shown that depression is relatively common (e.g.Kay et al.,1964). Although estimated prevalence rates vary due to the adoption of differing operational criteria, "the rates of clinically significant depression are in the region of 10 to 15 percent of the general elderly population" (Gurland and Toner,1982). Whilst some of this morbidity is transient, many elderly people experience enduring symptoms of depression (Jacoby, 1981).

Although the syndrome is relatively common many people with conspicuous depression are not recognised as depressed by their general practitioners (Williamson et al,1964). However, they consume resources of manpower in both the health and social services. Persons with

psychiatric disorders consult their doctors more often for both emotional and physical symptoms, and they have a higher rate of physical disorders (Eastwood,1975).

There are three reasons to suggest that research on the causes of depression among the elderly deserves attention. Firstly, depression is a prevalent disorder which causes distress both to the sufferer and his/her family. Secondly, it deserves attention on the grounds of economics. Thirdly, the causes of depression are far from being understood. Without knowledge of origins and causes neither preventative nor therapeutic measures can be built on a sure foundation.

Despite a lack of conceptual clarity the construct of "life satisfaction" has attained some popularity among social gerontologists who appear to regard it as a useful indicator of adjustment and successful ageing. In conventional useage "satisfaction" refers to the fulfillment of needs, expectations, wishes, or desires (George and Bearon,1980). Life satisfaction refers to a cognitive assessment of the overall conditions of existence as derived from a comparison of one's aspirations to actual achievements (Campbell et al,1976). Whilst the metric distinguishes between elderly depressives and normals (Gilleard et al,1981), life satisfaction is not simply a secondary measure of mental health. Rather it provides a positive measure of morale, and in the context of the present study this acts as a

useful counter-weight to those negative aspects of old age (i.e. stressors and depression) with which we are primarily concerned. Further, in aetiological research, cases of depression which have not onset within a specified period (i.e. chronic depressives) can tell us nothing about possible causes. To permit "causal" conclusions to be drawn these subjects are "excluded" from certain analyses. The inclusion of life satisfaction as an outcome variable enables us to consider all subjects (although we could not draw any conclusions about its origins).

Wenger (1982), noted that the image of the rural community "as a haven of peace and neighbourliness" continues to have seductive appeal. It is seen to offer a benign environment for the elderly, because the breakdown of the extended family is less advanced. The persistence of these stereotyped images is partly due to the lack of empirical studies of elderly people living in rural communities. The rural dimension has received little attention despite evidence from the U.S.A. that the rural elderly have more sickness and disability than the urban elderly (e.g. Palmore,1984-85).

Until recently epidemiology has largely focused on sociodemographic variables as indicators of the distributions of syndromes. Unfortunately, such variables cannot be used to explain the basic processes at work in the onset of a disorder. Consequently, the search for

causal factors has shifted to embrace the personal experience of the individual in the recent or more distant past. The main hypothesis has been that recent or continuing exposure to stressors leads to an increased incidence of psychiatric illness. Evidence is accumulating that such stressors do contribute to the onset of depression. However, it is also the case that many individuals do not become depressed after such exposure. This suggests that there must be powerful modifying factors at work.

Two such modifying factors are considered in this study. The first is that of social support. Evidence from a number of studies (e.g. Lin and Dean, 1984), suggests that social support can counter the effect of stressors. Through some as yet unclearly defined processes, social ties are presumed to enable individuals to cope more successfully (i.e. they are less likely to become depressed). The major focus of research has centered around the "stress-buffering hypothesis" (e.g. Caplan,1974; Dean and Lin,1977) which predicts that the benefits of social support will be greater for those experiencing high levels of stress. An alternative possibility is that social support has a general or direct effect regardless of the level of stress experienced. Past research has disagreed on which of these two possibilities is more likely.

The second modifying factor to be considered is age.

A number of authors (e.g. Brim and Ryff,1980) have argued that the properties of stressors change over different age groups. Neugarten and Moore (1968), for example, suggest that the elderly do not find normative events, such as death or retirement, unsettling because they are "anticipated and rehearsed". The idea that individuals at different ages may think and feel differently about events is of crucial importance in the present study. An explcit assumption of Brown and Harris's (1978) investigator-based method is that consensus judgements of potential threat made by a panel of raters is generalizable. However, there is evidence (e.g Jacobs and Douglas,1979; Sands and Parker,1980) to suggest that this may not be the case. Consequently, the method of using groups of research workers as judges of potential stress who, in terms of education, social class, and other characteristics, are atypical of their study populations (e.g. working-class women; the urban elderly), may severely constrain the external validity of the enterprise. In this study we will compare the judgements of the potential threat of stressors made by the investigating team with that of an elderly panel to check this point.

Using epidemiology to find the causes of depression

Epidemiology seeks to determine the distribution of a disorder in a population and the factors which influence that distribution (Lilienfeld,1976). The

apparent simplicty of this aim conceals the complexity of the undertaking, which is methodologically very demanding. It firstly requires the prudent selection of a set of explanatory variables to include causal factors of importance. It then requires a reliable and valid method of identifying the chosen response variable in the population. Finally, it is necessary to obtain data on both the explanatory and response variables which can be related in such a way that a causal effect can be inferred.

Each of the above "stages" has a bearing on the strength of the causal connections which can be infered between the explanatory and response variables. One methodological issue of prominence in the literature (e.g. Lloyd, 1980) is whether data on the explanatory variable is gathered before (i.e. prospectively) or after (i.e. retrospectively) the onset of the response variable. The methodological problems of retrospective cross-sectional studies have been discussed in detail (e.g. Tennant et al,1981a). In essence they are, first, the problems of accurately dating acute stressors (i.e. events) and illness to ensure that events precede illness onset. This may be particularly problematic with onset of depressive illness which can be insidious. Secondly, bias of "effort after meaning" may occur, where recently ill people magnify the impact of experienced stressors in order to explain or rationalize their illness.

Prospective studies eliminate these problems, and so provide potentially more powerful evidence for a causal association between stressors and depression. However, Finlay-Jones (1981) correctly notes that provided sufficient attention is paid to detail, correlational data from cross-sectional studies can suggest causal links.

Aims of the study

There are four main aims:

1. To investigate the relationship between the occurrence of acute and chronic stressors and onset of clinical depression among elderly people living in two rural communities. This is the principal thrust of the study and was largely inspired by the influential work of Brown and his associates at Bedford College. A similar investigation undertaken by Murphy (1982), focused on an urban elderly population, and further differed in important methodological ways.

2. To examine levels of perceived social support and satisfaction with suport among one of the community samples, and to compare them with those of a sample of depressed hospital patients. The role of social support in protecting the individual against the deleterious influence of stressors will be examined. In particular, we shall seek to determine if social support "buffers" against the adverse effects of stressors or whether it directly effects reported levels of life satisfaction and

the likelihood of becoming depressed.

3. Theoretical and empirical evidence suggests that elderly people perceive some stressors as less threatening in comparison with younger people. With the Bedford College method of Brown and Harris (1978), judgements of the threat of stressors are made by the research team, which in this instance was a relatively young group of psychologists. To establish the external validity of these ratings it is necessary to compare them with those made by an elderly panel. Chapter Nine describes such a study.

4. Research on life events and ongoing difficulties, has primarily attempted to determine their importance in precipitating psychiatric illness. While considerable effort has been devoted to scaling potential stressors for severity of their impact, little attention has been paid to description of the types of stressors which people experience in their everyday lives, and their distributions in the community. This is unfortunate, for as Murrell et al.(1984) point out, such knowledge would be of value in assessing the need for programmes of intervention with the elderly. It is also the case that this data would enhance understanding of the links between stressors and illness. The present work seeks to investigate the types and frequencies of life events and difficulties which elderly people experience, and will relate these to the demographic characteristics of the

samples.

CHAPTER TWO

SOCIAL STRESSORS AND PSYCHOLOGICAL ILLNESS

The concept of stress is widely invoked not only in the medical and scientific literature but also in the popular media. The principal reason is undoubtedly the belief that stress is a causal factor in disease and illness. However, while the notion is intrinsically attractive the majority of studies of stress and psychological illness have failed to demonstrate "a clinically significant association" (Andrews and Tennant,1978), though statistically significant relationships have often been reported (Cochrane and Sobol,1980).

Many who work in this field believe that a substantial proportion of the extant research is sufficiently flawed in conceptualisation and design so as to preclude identification of clear-cut relationships even if they exist. It is important, therefore to examine the conceptual and methodological assumptions and problems underlying explanations of the stress-illness link. Reference will be made to specific studies to illustrate the points under discussion.

Conceptual Issues

A major problem with the stress-illness hypothesis is the lack of an agreed definition of stress. This, in part, is because the phenomenon has been examined from many different disciplinary perspectives; anthropological

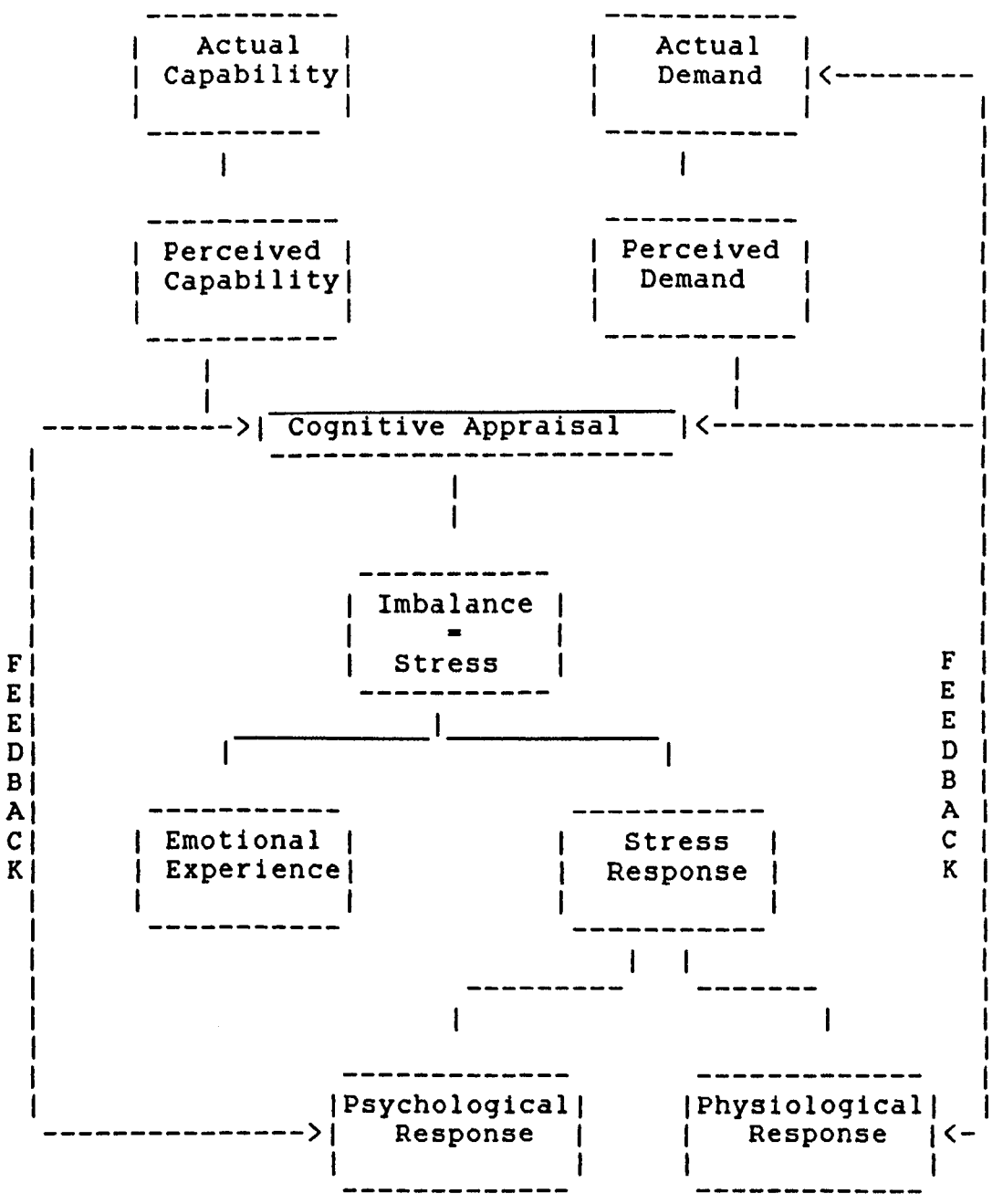
(e.g.Cannon,1942), physiological (e.g.Selye,1956), cultural (e.g. Zborowski, 1969), ethological (e.g. Tinbergen, 1974), and psychological (e.g. Lazarus,1966). Moreover, individuals within disciplines have thought about stress in different ways, studied different phenomena, used different methodologies, and made different assumptions.

Beach (1950), suggested that if the term stress "is going to refer to anything from homeostatic mechanisms..to cerebral activity..,we are apt to arrive at a very inclusive but equally indefinite concept". Mason (1975b) more recently echoed Beach's concern when he noted that "the general picture in the field can still only be described as one of confusion" since the "term 'stress' has been used variously to refer to 'stimulus'.. 'response'..'interaction'..and more comprehensive combinations of these factors".

A transactional model of stress

Currently, transactional models of stress are dominant because they are more able to account for the available data. The approach has largely been developed by cognitive psychologists, in particular Lazarus and his colleagues (Lazarus,1966; Lazarus and Cohen,1977; Lazarus et al.,1980), and will be adopted in the current study. A simplified transactional model of stress (adapted from Cox and Mackay,1976) is given overleaf.

Figure 2.1 A simplified transactional model of stress



According to this model, stress can be defined as "a perceptual phenomenon arising from a comparison between the perceived demand on the individual and his or her ability to cope". An imbalance in this cognitive appraisal gives rise to the experience of stress and to

the stress response. If normal coping is ineffective, stress is prolonged and abnormal responses may occur. The occurrence of these and prolonged exposure to stress may give rise to functional and structural damage. The progress of these events is, of course, subject to individual variation, due to mediating factors such as social support, financial resources, and health.

Although cognitive appraisal is of central importance to the model there may be direct physical effects of stressors that occur regardless of appraisal outcome. For example, studies of noise as a stressor show that while cognitive appraisal affects levels of annoyance, hearing loss may occur irrespective of appraisal.

Life events and stress

The notion of a "life event" was introduced by Hawkins, Davies and Holmes (1957), who were able to show that the development and exacerbation of symptoms of pulmonary tuberculosis could be statistically linked to the prior occurrence of major changes in the patient's social environment. Since that time, life events research has occupied a prominent position in social psychiatry, having provided the basis for over 1000 publications (Holmes,1979).

Life events have been defined as "discrete recent changes in the social and personal environment" (Paykel, 1983). A survey of the literature shows, however, that

there is terminological confusion surrounding the concept. Life events have variously been called "life stress" (Surtees and Ingham,1980), "life event stress" (Tennant,1983), "life stressors" (Aneshensel and Stone,1982), "life changes" (Monroe,1982), and "adverse experiences" (Steele et al.,1980). The use of different terms is due both to conceptual sloppiness and the adoption of differing models of stress. Terms such as "life stress" and "life event stress" can only be correctly employed within the parameters of a stimulus-based model of stress (e.g. Selye,1956), which describes stress "in terms of the stimulus characteristics of disturbing or noxious environments" (Cox,1978). However, this model fails to account for individual differences in reponse to seemingly similar stressful stimuli due to its neglect of perceptual mechanisms. We all know, as Gilbert and Sullivan put it, that "things are seldom what they seem". Much depends upon context, mood, and experience when we interpret the meaning of an event. The death of a partner can be a catastrophic blow to one person and a liberation to another. With the exception of extreme and sudden life threatening situations, no raw stimulus is a universal stressor.

It is clear from this discussion that life events are <u>not</u> synonymous with stress. Rather, within the context of a transactional model they can be thought of as <u>potential</u> stressors. Moreover, within the sphere of

potential stressors, life events describe only a limited domain. Other, equally important stressors, include chronic and intermittently chronic difficulties. One advantage of this conceptualisation is that apparently stressful events and difficulties are not equated with negative outcomes. Such an equation arbitrarily excludes the possibility of stressors having positive effects associated with successfully meeting demands. Among such changes might be increased physical stamina, more effective coping styles, or stronger social ties.

Defining a life event as a potential stressor is not wholly satisfactory. Essentially anything can be a potential stressor, though most will have little or no impact on the individual. However, it does represent a step forward; a life event so defined can be conceptualised independent of its actual effects, and, more importantly, it also forces one to consider the context (i.e individual differences) surrounding its occurrence. Greater definitional precision can be achieved by considering the salient characteristics of life events, and the characteristics of people's lives that are likely to prompt illness.

Life events and illness

The idea put forward in early studies (e.g. Rabkin and Struening,1976) that a numerical accumulation of experienced life events predisposes to illness has been recognised as too simple. Brown and Harris (1978), have

questioned the assumption of additivity, having shown that once a single severe event has been experienced, the others do not matter much. Further, the model ignores both the quality of life events (i.e. the characteristics of an event which make it more or less noxious), and the conditions surrounding the occurrence of the event.

Among the characteristics of life events found to influence illness onset are; magnitude, intensity, duration, and inherent ambiguity (Lazarus et al.,1974). Other seemingly salient event characteristics include the degree to which the occurrence of an event can be controlled (Dohrenwend and Dohrenwend,1974). The timing of an event in terms of the life cycle, and appropriateness for that particular stage in the life cycle also seems to be important (Neugarten,1974).

Two hypotheses have been put forward to account for the influence of these, and other, life event characteristics. On the one hand, it has been argued that the effect of an event is mediated by the degree of personal adjustment demanded (e.g. Masuda and Holmes,1978). Thus, an accumulation of life events which demands a substantial amount of life change is considered to be more likely to produce illness than a set of events demanding little personal adjustment. If change per se is responsible for the deleterious effects of life events then both 'positive' and 'negative' events should be associated with increased probability of illness.

However, the literature is nearly unanimous in finding that when a list of life events is separated into subscales of positive and negative items the undesirable events are the more strongly related to physical and psychological illness. This finding is consistent across varied subject samples, dependent variables, and life event measures (Mueller et al.,1977; Vinokur and Selzer,1975).

The second hypothesis suggests that the mediating link between life events and illness is due to the undesirability of the event. For example, some investigators (e.g. Paykel,1974) have demonstrated that 'losses' and 'exits' from social roles cluster before depressive onset, as do undesirable events in general, although role 'entrances' and desirable events do not show this clustering. This specificity is, however, weak; such events also cluster before the onset of other disorders, both psychiatric and medical. Furthermore, they seem to account for for only 25% of precipitating events among depressed patients.

Both the 'life change' and 'undesirability' hypotheses have received some support. However, a comparative study of change and undesirability in relation to the onset of neurotic disorders found strongly in favour of emotional undesirability as the more important factor (Mueller et al.,1977). Similarly, Byrne and Whyte (1980) showed that measures of life event

undesirability, but not life change, distinguished a group of survivors of myocardial infarction from a comparison group. Thus in those studies which have compared the two hypotheses the evidence tends to favour 'undesirability' as the characteristic of life events that most accurately reflects their potential as stressors, at least for certain classes of illness.

Methodological Issues

Whilst a substantial number of studies have consistently shown evidence of a statistical association between life events and psychological disorder, in particular depression, there is still a lingering doubt concerning the nature of this association. Lloyd (1980), stated the problem thus: "...one cannot be fully assured that the relationship is a causal one. The obvious limitation of the studies..is that they involve no experimental manipulations, and thus could reflect a correlational, rather than a causal, relationship".

Experimental and quasi-experimental designs

In the classical experimental design subjects are randomly assigned to control and experimental groups, and the explanatory variable can be manipulated. Such designs allow for all the operations that make causal inference possible; comparison, manipulation, and control. Research involving life events and illness do not lend themselves to manipulation and direct control, so that causal inference is much more problematic. In this situation

quasi-experimental designs are the norm.

Two variants of the quasi-experimental approach have been used in life events research. In one, known as the ex post facto or retrospective design, the investigator measures the response variable (e.g. depressed or non-depressed state) after it has 'occurred' and then retrospectively gathers information concerning the explanatory variable (e.g. life events). In the second, prospective, design the investigator measures the reponse variable before it 'occurs', although data on the explanatory variable is again gathered retrospectively (life events can only be measured after they have occurred).

The great majority of life event studies have employed retrospective designs; they are generally easier to execute and less costly in time and manpower than prospective designs. Whilst both retrospective and prospective research designs share common problems (e.g. determing the reliability and validity of event recall), those of the former design are undoubtedly greater. One particular problem is that it can be extremely difficult to determine the direction of causality because the order of temporal precedence is not always clear. Life events may prompt an episode of illness onset, but another interpretation, involving a third variable such as life-style is just as plausible.

Prior to considering these methodological problems

in greater detail it is helpful to outline the methods by which life events have been measured.

The measurement of life events

Two different approaches to the measurement of life events have been developed. The first, the life events inventory technique, is a 'respondent based'(Brown,1981) measure in that crucial aspects of the measurement process reside in the hands of the respondent. For example, it is the respondent who decides the threshold of severity for reporting an event and the domain of persons possibly encompassed by the event.

The respondent-based approach is exemplified by the Social Readjustment Rating Scale (SRRS) of Holmes and Rahe (1967), and derivative instruments (e.g. Paykel et al.,1971;Tennant and Andrews,1976). It uses a standard list of life events which have been weighted for significance by a sizeable sample of the general population. In practice these have been samples of convenience, thereby raising doubt over the generalizability of the weights (Mendels and Weinstein,1972; Dohrenwend et al.,1978). The ratings are then averaged and the occurrence of the pre-ordained events in the study sample elicited either by presentation of the standard list or by interview.

The second, 'investigator-based', approach has been developed by Brown and his colleagues (e.g. Brown,1974), and can only be used with a personal interview. This

approach settles those questions concerning the threshold of severity for recording a particular event before data is collected. Then by the use of systematic interviewing, sufficient information is gathered for a decision to be made about whether or not an event has occurred, and, if so, its nature, including the potential threat involved. During the interview probes are utilised and spontaneous comment encouraged. In essence "it tries to obtain a coherent 'story' about any incident mentioned by the respondent which appears to be of relevance to the research enquiry" (Brown,1981).

Though more time consuming, the investigator-based measure has definite advantages. In particular, it is highly sensitive to individual differences in the meaning of an event. For example, with the SRRS an event such as an operation is always given the same score in terms of its undesirability irrespective of its nature. An operation is simply an operation. Assigning a standard weight by agreement ignores the particular circumstances of the individual to whom the life event occurrs. In contrast, with the investigator-based approach considerable background material can be collected and used to make quite subtle ratings. These ratings of contextual threat are an attempt to quantify the likely meaning of an event for the person experiencing it, taking into account the context in which it occurs. This allows for individual differences in event impact to

emerge. However, the procedure does have one major disadvantage: it requires a great deal of time and skill to collect all the information. Further, "in spite of all precautions, it is difficult to be confident that a sympathetic interviewer, knowing that the subject became ill after the event, has not exaggerated the circumstances" (Paykel,1983).

A number of other significant problems arise from the respondent-based approach. Of particular concern is the low reliability and validity of instruments such as the SRRS (Brown,1981). For example, Yager et al (1981) found that the average agreement between respondent and spouse about the occurrence of particular life events during the previous two months was, on average, only one-third. Brown (1981) has argued that this "is due to vagueness of most of the questions..and failure to question the respondent further about his replies".

Several authors (e.g.Dohrenwend and Dohrenwend,1978; Lehman, 1978; Tausig,1982), have also pointed to the contamination between life events and symptoms of illness in scales such as the SRRS. Some of the 43 events contained in the SRRS, such as 'change in eating habits' and 'change in sleeping habits', can easily be interpreted as symptoms rather than causes of illness, particularly affective disorder. Indeed, Hudgens (1974) claimed that 29 of the 43 events could be viewed as symptoms and/or consequences of illness instead of

precipitants. The inclusion of symptom-like events undermines the validity of studies using the Holmes and Rahe inventory (Tennant et al.1981a). Interestingly Tausig (1982), found that the inclusion of symptom-like events in the SRRS did not significantly inflate the correlation between life events and illness. In contrast, Thoits (1981) found that the significant correlation between undesirable events and psycho- physiological distress no longer reached significance after the effects of health-related events were controlled. Thus symptom-like events may confound the stressor-symptom relationship only for certain response variables.

In spite of the apparent advantages of the investigator-based approach, the alternative tradition has dominated research. Brown (1981) has suggested that one important reason for this is "the fact that respondent-based instruments are cheaper". Whilst this is true, it is also the case that they are far easier to use and thus offer the investigator a convenient method of studying the elusive, hypothetical link between psychsocial processes and physical (or psychological) functioning.

The temporal relationship between life events and illness

We have already briefly referred to the difficulties of disentangling antecedents from consequences in retrospective studies of life events. It revolves around the problem of "..establishing the criterion of time-

order to secure causal inference" (Susser,1981). To demonstrate a causal effect of life events it is necessary to to show that the event both precedes the onset of the disorder and is independent of the disorder (and thus not merely an indication of insidious onset). This requires a meticulous attention to the recording and dating of life events and illness onset.

The recall and reporting of life events

Two general sources of error can be identified with regard to the recall and reporting of life events; errors due either to ordinary forgetting or to the condition of being ill.

Not surprisingly, several groups of investigators have demonstrated that event omission is associated with longer periods of recall. It is notable, however, that the highest rates of forgetting have been recorded for studies employing respondent-based methods (Paykel,1983). For example, Jenkins, Hurst and Rose (1979),reported that memory of events chosen from a standard inventory decreased by between 34% and 46% over a 9 month test-retest interval. Even life events as presumably memorable as hospitalisation are increasingly underreported with the passage of time, so that in one survey 40% of the respondents failed to report such an event one year later (Lilienfeld,1976). However, Mendels and Weinstein (1972) have argued that where time influences the recall of life events, it is by way of forgetting trivial events and not

major ones, and certainly not in the fabrication of events that have not occured. This is confirmed by Brown and Harris (1978), who found no fall-off for severe events, only for the less severe, and mainly in the period 6-12 months prior to interview. Similarly, Paykel (1980) was able to calculate a 9% failure-to-recall rate over 6 months when data were carefully collected by interview.

The second source of potential contamination stems from the condition of being ill. Here there are two particular problems. One concerns the need to exclude those events which are a consequence of illness. The second concerns "effort after meaning" (Bartlett,1932), where recently ill persons might report more events or magnify their impact in order to explain or rationalise their illness.

With regard to the former, it is clear that events which appear to antedate an illness onset (e.g. marriage breakdown, loss of job) are not necessarily independent of the disorder. To combat this Brown and his colleagues (e.g. Brown et al.,1973) introduced the notion of an 'independent' event i.e. the idea that on detailed scrutiny certain events can be isolated which would be unlikely to have been brought about by concurrent illness. Although some events, such as deaths of other persons are almost always independent of the subject, there are other events where the judgement of

independence is not so clear cut. An example of particular relevance to the present study concerns the well-established correlation between physical illness and depression among elderly people. In chapter 3, we shall discuss how symptoms of physical illness can mimic depression, and how depression can in turn mimic physical illness, so that the direction of causality is far from clear. Despite this complexity, Brown and his colleagues have consistently rated physical illness events as independent of psychological illness such as depression.

A dramatic example of "effort after meaning" was offered by Brown (1974), who cited a study published before the genetic aetiology of Down's syndrome was established: mothers of Down's syndrome children reported more "shocks" early in pregnancy than did mothers of normal controls. Despite the attraction of the argument there is little empirical evidence to suggest that "effort after meaning" constitutes a serious problem. If the hypothesis were correct one would anticipate that patients who had experienced an event would judge it to be more threatning than patients who had not. However several studies (e.g. Ndetei and Vadher,1981) have failed to find evidence of this, even when employing the Bedford College methods. These are specifically designed to guard against "effort after meaning" by witholding information from raters of the respondents clinical status and his/her reports about actual response to an event. Thus

when Brown and Harris (1978) compared their trained panel's ratings of events with those of depressives they found 84% agreement between the subjective and objective determinations of whether an event was severe or non-severe. The depressives rated an event severe in 10% of the cases, whereas the panelists rated the event severe 5% of the time. Brown and Harris indicated that the patient was probably accurately describing the impact of the event in 16 of the 22 instances in which the patient alone rated the event as severe. Thus, there was little evidence that the depressed patients' subjective scalings were biased.

Dating the occurrence of a life event

Accuracy in the dating of life events is an essential requirement particularly where events and illness onset occur in close proximity. In their studies Brown and Harris (1978) have used personally significant 'anchor dates' such as birthdays, holidays etc. in an attempt to enhance the accuracy of dating life events. However, the efficay of such procedures has yet to be demonstrated.

Sudman and Bradburn (1973) have suggested that the recall of events may be subject to "telescoping" i.e. the reporting of events as occurring more recently than they actually did. However, the evidence again suggests that this is not a grave problem in studies of life events and illness onset. Based on the assumption that

events occur to normals at a constant rate over time, telescoping would be inferred if objectively verifiable more distant events were reported less frequently than more recent events. Brown and Harris (1978) found that there was no fall-off over the course of one year in the reporting of severe events by a general population sample, a finding which has been repeated using similar methods in a sample of female general practice patients who had no recent onset of a severe psychiatric disorder (Finlay-Jones and Brown, 1981).

A related problem concerns situations where the negative consequences of an event appear to predate its actual date of occurrence. For example, a study by Kasl et al (1975) found that following the shutdown of a factory, there was no increase in the number of symptoms reported by their sample. However, they also found that during the six week period anticipating the actual shutdown the workers reported significantly more complaints. This suggests that the period before the actual event may have been more stressful than the event itself. This observation would not present a problem for Brown and Harris's methods because the news of the factory's impending closure would itself be recorded as a distinct life event, and the time between that news and the actual closure (if greater than one month) would be recorded as a "difficulty". Here again the limitations of life event inventories such as the SRRS are evident;

their neglect of ongoing difficulties implies that potential stressors are adequately described by life events. Brown and Harris (1978) have repeatedly demonstrated the need to consider both acute and chronic stressors if we are to comprehend the complexity of the stressor-illness link.

Concordance between subject and informants in the reporting of life events

A frequent method of assessing the accuracy of respondents recall in retrospective life event studies has been to compare the agreement between subjects and informants in the reporting of events. Yager et al.(1981), for example, compared the reports of male psychiatric patients, male nonpatients, and their partners on the Schedule of Recent Experience, for three separate two-month periods, of events experienced by the index person. For all groups, perfect agreement was obtained for only one-third of events reported by at least one member of the pair. All patients had chronic, rather than acute, illness so that illness status evidently did not play a role in recall. However, using their more detailed procedures Brown and Harris (1978) found concordances of 81% for individual events in schizophrenics and 79% in depressives. Similarly, Murphy (1982) who also used Brown's method reported agreement of 81% between subject and relatives about the occurrence of life events and ongoing difficulties.

That inter-informant agreement is high for investigator-based measures would appear to suggest two things; firstly, that such measures are reliable, and secondly, that we know what actually happened (i.e that they are valid). However, data on inter-informant agreement, which are invariably based on the reports of the subjects and a close relative, does not lend itself to such conclusions. Family members are not independent reporters. Events and difficulties, particularly those of a severe nature, have an impact on the individual and his family. Individuals will seek to understand these happenings in an attempt to make sense of them. In so doing they will enter into discussions with each other, so that high levels of agreement about events may well constitute a case of non-independent consensus. Similarly, low agreement between reports does not necessarily mean that a measure has low validity. It is quite possible that two informants have seen 'different' phenomena or different aspects of the same phenomena. Agreement between reports may tell us little or nothing about what actually happened. Corroborability is not a universal attribute of all objective data. Certain kinds of reports, e.g.hospital admissions, are open to the possibility of external check whereas others (e.g. marital rows) are not.

Psychiatric status and the dating of illness onset

Determining the aetiological role of life events in

the onset of psychological illness requires that one determine both whether a subject has been ill at any time within a specific period (usually six to twelve months) predating interview, and at what point in time the illness began.

Duncan-Jones (1981) has suggested that recall of neurotic symptoms will be less reliable than that of life events, and suggests three reasons for this. Firstly, the presence or absence of a symptom of neurosis is often not clear even to the clinically trained interviewer. Secondly, questions about psychiatric symptoms will often be perceived as threats, and these may prompt distorted answers. Thirdly, the reporting of an illness is affected by social desirability (Cannell et al.,1977). He concludes that "whilst it is generally accepted that a person's present psychiatric state can be established with fair reliability this is not the case with persons who are no longer ill at time of interview". Arguments such as these have led some, notably Bebbington et al.(1981), to suggest that attempts to date a psychiatric onset should be limited to episodes currently active at the time of interview. However, greater diagnostic precision can be attained only at the cost of attenuating the association between life events and illness onset. This will occurr because a number of onset cases of transient duration (i.e. they are no longer active cases at time of interview) who may also have

experienced a severe life event, will be treated as non-cases.

In addition to arguments surrounding the optimal period for dating the onset of an illness, reservations have been expressed about the entire enterprise. Thus, Winokur (1979), states that it is often very difficult to date the onset of a depressive disorder, especially if insidious. If this is so, it is almost impossible to determine cause and effect relationships between life events and depressive illness. Most investigators, however, would agree that this view is unduly pessimistic. For example, Finlay-Jones (1981) has stated that "The onset of illness can be dated reliably given sufficient effort". This observation follows from the research of Brown and his colleagues (e.g. Brown and Birley,1968) who found almost complete agreement about the date of onset of a schizophrenic episode between the patient and a relative when seen separately by different interviewers. High patient-relative concordance (86%) was also found with regard to the onset of depression (Brown and Harris,1978). Of course patient-relative concordance on the date of onset does not mean that a reliable description of the illness's incipient symptoms has been described. It is possible that the patient and informant are actually agreeing on the date of symptom exacerbation.

Recall accuracy of elderly people

There is no evidence to suggest that accuracy of recall is more of a problem for normal elderly people than for other groups. Fozard et al.(1971), give the following summary of the currently accepted position; "Laboratory, psychometric, and impressionistic data indicate that pronounced age decrements occur in the capacity as well as the time required to remember newly learned information. In contrast, the capacity of older adults to remember information in short and long-term memory is not decreased. While older adults require more time to retrieve information from short-and-long-term memory, they appear more efficient in searching L.T.M.".

Theoretical Issues

For some time it has been recognised that it is an over-simplification to view life events as direct aetiologic factors in the development of illness. Current models of the stressor-illness link have recognised the neccessity of considering additional variables (e.g. coping and social support) which appear to mediate the association. A number of theoretical and empirical models have been developed in an attempt to integrate these constructs into a single scheme of how life events can affect health.

At least three major models of life events and psychological illness have evolved. Dohrenwend and Dohrenwend (1981) outlined six models, but several of these are related to each another. In the simplest and

historically earliest approach, the "victimization" model, the prospective patient by chance is exposed to environmental stressors that directly cause illness. This conception of illness and stressors scarely applies to most medical or psychological conditions as they are understood today, although it is valid with respect to rare and catastrophic situations such as prisoner of war or concentration camp internment. In such extreme conditions, the probability of both immediate and delayed illness is significantly increased for perfectly healthy people (Ursano et al,1981). In sufficiently adverse circumstances, then, it is not a matter of whether but of when disorders will be manifested.

A second construction, the interactive model, suggests that because of pre-existing deficiencies in coping and interpersonal skills, people who later become clinically ill either are unable to forestall the occurrence of undesirable life events or by their behaviour actively provoke them. At the same time they lack the ability to make good events happen. Their longstanding limitations not only influence the number and extent of life events they encounter but also determine the availability and extent of mediating factors such as access to social and family supports. This interactive model has also been advocated (e.g. Shaw,1982) as an explanation of depression.

A model more generally relevant to the study of

psychological disorder is called the vulnerability hypothesis (Dohrenwend and Dohrenwend, 1981). According to this model chance exposure to stressors triggers illness onset in already vulnerable people. The source of vulnerability is thought to vary according to the disorder and may include childhood experiences, family relationships, or genetic predisposition. In addition the resources available to the person such as social support, financial backing, or personal coping skills are considered mediating factors determining the impact of the stressor on the person and affecting the probability of his becoming ill. This is perhaps the most popular current model, and has been advocated by Brown and Harris (1978) in their studies of depression.

How important are life events in the development of illness?

Despite the methodological problems that we have discussed, an association been life events and psychological illness has been found repeatedly using both respondent and investigator-based measures. However, the effect of life events has generally been modest, with most studies reporting correlations of below 0.3 between events and illness onset (Dohrenwend and Dohrenwend,1981; Rabkin and Struening,1976). While life events alter the risk for depression (Paykel,1978), the difference in practical terms is unimpressive. Hudgens (1974) noted that most people do not become mentally ill even when terrible things happen to them. A recent report showed

that less than a quarter of repatriated Vietnam prisioners of war had diagnosable psychiatric conditions upon release (Ursano et al.,1981). Milder stressors experienced in ordinary living should be even less likely to induce illness. Paykel (1974) estimated, for example, that less than 10% of role exits are followed by clinical depression, and Clayton (1974) found that one year after bereavement, only 16% of her sample were clinically depressed.

The cumulative evidence from studies of the relationship between life events and illness shows that although individuals are at greater risk of becoming ill if they have had a life event than if they have not, they are still more likely to remain well than to become sick. Some would suggest that this is a true measure of the role of life events. Others believe that certain vulnerable sub-groups are at greater risk but that these correlations are balanced by low correlations in sub-groups of people who are relatively invulnerable to stress.

Recently, Cooke and Hole (1983) and Brown (1985) have argued that frequently used measures of the aetiological importance of life events (e.g. correlation coefficients and 'percentage variance explained') are inappropriate. This is because these measures reflect the accuracy with which it can be predicted that a person will become ill following a life event. Instead they

advocate, and have used, measures such as 'relative risk' which describes how much the occurrence of a life event increases the chances of having an illness. This approach has been used, for example, in stating how much smoking adds to the risk of developing lung-cancer. It can be especially useful when the number of people who develop an illness is relatively small but the increase induced by the risk factor is a large percentage of that number. Thus, although the association between smoking and lung cancer accounts for only 0.003 percent of the variance explained (Cooke and Hole,1983), this does not mean that smoking is unimportant; indeed it carries a high relative risk because very few non-smokers develop lung cancer. In a similar manner, although most people who experience a severe life event do not become ill, this does not mean that life events are unimportant in the aetiology of illness.

Summary

Despite the confusion that appears to surround the concept of stress, it continues to be compelling for both layperson and scientist. One reason for this is that sources of stress extend from the most immediate contexts of peoples' lives to the outermost boundaries of societies and cultures.

Given such complexity we began this chapter by offering a cognitive definition of both stress and life events, and by pointing out that the two concepts are not

synonymous. Stress may be recognised by physiological, biochemical, or psychological changes in the individual, and is likely to arise when an imbalance arises between the perceived demand on a person and his/her perceived ability to cope. Life events, on the other hand, are discrete recent changes in the social and personal environment; they are potentially stressful to the extent that they are cognitively interpreted as threatening.

For much of this chapter we have been concerned with the methodological problems of demonstrating causal links between life events, ongoing difficulties, and depression onset. It is clear that the extent of these problems are either emphasized or attenuated depending on the nature of one's chosen experimental design (i.e. retrospective versus prospective), and method of measurement (i.e. respondent versus investigator-based approach). Investigator-based prospective studies offer the best approach to the problem, respondent-based retrospective studies, the worst.

Perhaps the most salient message to be taken from this chapter is that many of the problems discussed can be overcome given careful attention to measurement and conceptualisation issues.

CHAPTER THREE

CLINICAL DEPRESSION IN OLD AGE

Depressive illness in late life, the symptoms of which are very unpleasant and cause great suffering, is a common and serious problem. First admission rates, which Post (1976) describes as "likely to be a fair reflection of the true incidence rates of severe depressions at different ages" show a distribution skewed to a peak in the sixth and seventh decades (Norris,1959). Moreover, while the immediate prognosis is relatively good, especially for the 'young-old' patient, longer term outcome is one of high and persistent morbidity (Epstein,1976; Jacoby,1981; Murphy,1983).

At the outset one must recognize that the concept of depression is still evolving. Whilst it can fairly be claimed that considerable progress has been made (e.g. Wing et al.,1978), it is still the case that "the current clinical diagnostic criteria for depression and its subtypes leave much to be desired" (Carroll,1984). There are many reasons for this unhappy state of affairs. One persistent problem stems from the fact that the concept is enshrined in ordinary language. "He is a fool that is not melancholy once a day" states an old Russian proverb, reminding us of the fact that depression can refer to a normal mood state, a ubiquitous phenomenon of daily life. However at the level of illness, depression is regarded as a syndrome or cluster of symptoms that tends to occur

together, probably reflecting a common pathophysiology but arising from diverse causes.

Paykel and Norton (1982), have given a full and clear description of the clinical features for the depressive syndrome (reproduced below). This description can best be thought of as representing a psychiatric consensus of the symptoms (not all of which are always present) most frequently associated with depression seen at inpatient or outpatient level.

Figure 3.1 Clinical features of the depressive syndrome

PSYCHOLOGICAL	Mood	Depression and sadness Inability to enjoy Crying Diurnal variation Variability Often anxiety
	Content of Thought	Worthlessness and Guilt Pessimism and Hopelessness
	Suicidal Feelings & Behaviour	Suicidal thoughts Suicidal attempts Suicide
PHYSICAL	Somatic	Sleep change (less) Appetite change Constipation Loss of Libido & Sexual response Hypochondriasis
	Psychomotor	Retardation Agitation
SOCIAL	Function and Behaviour	Loss of energy Loss of interest Poor self-care Poor concentration Work impairment Social withdrawl Often irritability and friction

The enigma of a case of depression

Classification is one of the most fundamental activities of any branch of learning. It is fundamental in two senses: it is a necessary preliminary to almost any useful communication; and it involves assumptions about the relationships between the different components of the system which largely determine the questions that can be asked. If the assumptions are correct the subsequent development of knowlege is greatly facilitated.

It might seem from figure 3.1, that the clinical manifestations of depression readily permit one to identify a person who is depressed. This simply is not so: depressive illness among the elderly is often missed by primary care physicians (Kay et al.,1964; Williamson et al.,1964).

Copeland (1981), describes the concept of 'caseness' as "a chimera existing only in the mind of the investigator". This is not a denial of the concept per se, but simply a recognition that imposing a categorical distiction (i.e. illness versus health) on symptoms which are continuously distributed in the community (Williams et al.,1980) is fraught with difficulty.

An almost obsessive concern with the problems of classification has been paralleled by neglect of a more thorny issue. The distiction between 'mental' and 'physical' illness in both psychology and psychiatry is

testimony to the influence of psychophysical dualism. Whilst it is beyond the brief of this thesis to review evidence on the sterility of dualism (the reader is refered to Bunge, 1980 for a full discussion), recent evidence from the study of depression (see below), makes the dualist position untenable. For example, it is clear that depression can mimic and precipitate physical illness. Likewise physical illness can mimic and precipitate depression. It is necessary to recognize that men and women are complex biopsychosocial organisms, which receive, store, process, create and transmit information, and assign meaning to it, which in turn elicits emotional responses. The latter, by virtue of their physiological concomittants may affect all body functions, both in health and disease. Aetiology is as a rule multifactorial. The relative weight of each class of causative factors (psychological, social and biological) varies from disease to disease and from case to case. Some factors are necessary and some only contributory.

It is a feature of the history of the classification of disease for the defining characteristic of an illness to start as its clinical syndrome. Later, as understanding of pathogenesis develops, the focus of classification changes to a structural, physiological or biochemical analogy. Such is the case with depression. Initial attempts at classifiction were symptom based. The concept of a depressive disorder "was elaborated as a

result of experience with severely ill patients in the large psychiatric hospitals..." (Bebbington, 1978). In this environment the clinical syndrome was typically pronounced and readily identifiable. However with the increasing detection of depression in the community the concept was broadened to include milder disorders which shared some of the features of the more severe illness. In this context many of the symptoms defining the clinical syndrome of depression are unimodally distributed so that there is no natural boundary between those who are clearly depressed and those who are well. Between the two extremes lies a broad spectrum of mild disorders and borderline states which community studies have shown to be relatively common in the general population (e.g. Srole et al.,1962; Ingham and Miller, 1976).

This imperfect state is by no means unique to depression. It can be just as difficult to define clear boundaries with 'physical' illnesses such as diabetes (Genuth et al.,1976), and essential hypertension (Ingham and Miller, 1976). However the classification of depression is beset by difficulties of another order because there are no agreed pathlogical markers. As noted above, depression is defined syndromally on the basis of behaviours. Some relate to potentially observable phenomena such as weight loss and sleep disturbance, (though in practice they are seldom measured

objectively), but most decribe subtle self-perceptions of changed feeling. Furthermore the terms in which the patient 'sees' and communicates this changed feeling are cultural products, and the way in which a psychiatrist interprets complaints is likewise culture bound. Old prejudices and fears die hard and it is probable that many patients still prefer to suffer almost any 'physical' disease than a 'mental' disorder, with its disturbing implications of loss of control and moral culpability.

The potential for misdiagnosis of depression within a community setting is considerable. Schraberg (1978), argues that misdiagnosis are rare, though others (e.g.Blusewicz et al.,1977; Raskin,1982; Keaton,1984), suggest that it occurs often. Among the elderly errors of diagnosis are more frequent. Whilst the symptoms of depression in the elderly are similar to those characteristic of depression in other age groups (Blumenthal, 1980), there is a tendency for the elderly to report mood disturbance with less intensity and to give more emphasis to the somatic symptoms of depression (Gurland,1976). One is often faced with the difficulty of determining whether such symptoms are due to depression (perhaps mimicing or amplifying somatic complaints), or a 'physical' disorder or, as is common, both. Steuer et al (1980) warn that "without a thorough medical examination it can be especially difficult to sort out diagnosable

physical illness from somatic complaints of psychological origin".

The somatizing of complaints and minimizing of the affective components of depression may, in part, stem from generational (cohort) effects or from the reinforcing behaviour of physicians unaware of the degree to which somatic complaints are primary manifestations of depression (Engel,1977). Another factor is that patients may feel stigmatized by psychiatric symptoms or be unwilling to ask for emotional help.

The vegetative somatic symptoms of depression (sleep,appetite and weight disturbance, constipation, fatigue etc.) are well known. Among the elderly pain is a common feature of somatization in depression. Watts (1976), reported that 27% of depressive patients in a primary care clinic complained of pain. The head, abdomen, back, and chest are common sites of chronic pain complaints in depressed patients (Lindsay and Wychoff, 1981). Other common somatic symptoms of depression include flatulence, dysuria and oral discomfort (bad taste, burning tongue toothache etc.). It has been estimated that as many as one-third of cases of depression among the elderly are 'masked' by somatic complaints (Gerner,1979; Roth,1955). Another interesting feature of depression among the elderly is that it can mimic dementia (Gerner,1979). The syndrome of 'pseudodementia' is estimated to occur in about 15

percent of the elderly with severe depression (Roth, 1976), and includes cognitive and memory impairment, inability to perform self-care tasks, apathy, confusion, difficulty in sleeping, early morning wakening, and agitation (Gerner,1979). Complex behavioural patterns may also mask depression. These patterns include abuse of family members (leading to frequent complaints by family and friends about the demands made on them) and an exaggeration of a sense of helplessness.

Many neurological, endocrine, nutritional, and metabolic disorders produce symptoms that can be mistaken for depression. Symptoms of multiple sclerosis, normal pressure hydrocephalus, and tumours of the temporal lobe are frequently confounded with depression (Goodstein and Farrell,1977; Rosen and Swiger,1976). The same is true of symptoms associated with endocrine disorders such as hyperparathyroidism (Taylor, 1975). The neurologic and endocrine conditions are found most often in younger individuals while the metabolic and nutritional disorders that mimic depression are more common in the elderly.

A number of prescribed drugs are responsible for the development or aggravation of depression, or the production of depression-like symptoms. Of all the drugs taken by the elderly, antihypertensive drugs are the most likely to induce depression. As many as 20 percent of all elderly patients treated with antihypertensive drugs manifest symptoms of depression such as sadness,

weakness, apathy, agitation and insomnia (Whitlock, 1984). Other drugs taken by the elderly that predispose them to depression include phenacetin, benzodiazepines, barbiturates, phenylbutazone, indomethacin, some antibiotics, anticonvulsants, antiparkinsonian agents, phenothiazines, amphetamines, digitalis, alcohol, choline, steroids and physostigmine (Blumenthal,1980).

It is apparent that large numbers of elderly patients suffer concurrently from significant depression and one or more major chronic diseases and that depression may amplify the somatic complaints of medical illness. Kerr et al (1969) even suggested that late-onset depression in males "may be an early and direct manifestation of latent carcinoma". Links between depression and other physical illnesses have also been suggested. In a sample of depressed patients, Nasr et al (1981) found that one third suffered from bronchial asthma, compared to 6 percent in a schizophrenic sample. Further, the incidence of these disorders in the relatives of depressed patients was twice that in the relatives of the schizophrenic patients. Dirks et al.,(1980), have used the term "psychomaintenance" to denote the process in which psychological factors such as depression sustain and increase the perceived severity of already established medical illness. This process is a common feature in patients with advanced renal failure (Abram,1978), advanced cancer (Plumb and Holland,1981),

and heart disease (Lipowski,1979). A number of studies have also clearly indicated that psychiatric patients are at increased risk for morbidity and mortality due to 'physical' illness (Eastwood,1975; Goldberg, 1979; Koranyi, 1979, 1980).

These findings suggest that the link between somatic complaints and depression works in both directions. Depression can trigger or amplify medical symptoms, medical illness can trigger or amplify depression, anxiety and other psychological symptoms. Thus, it is extremely difficult to disentangle 'physical' illness from somatic complaints of psychological origin. This is particularly important for epidemiological research where a thorough medical examination is not possible.

Reliable classification is a necessary preliminary to useful communication. It is evident that if the defining characteristics of a case vary between surveys then the number and types of cases found will differ. There are a number of sources of variance which contribute to the problem of case definition. We have already discussed one source of such variance, namely patient variability. Depression may present atypically and with a wide range of symptom severity. Another source of variance concerns the observer (Spitzer and Williams,1981). Attempts to bring this under control have primarily consisted of the development of standardized psychiatric interviews (e.g. Geriatric Mental State,

Copeland et al.,1976). These help to ensure that key symptoms are not forgotten by the interviewer, and that the style and persistence of interviewing does not result in either quantitative or qualitative differences in the symtoms recorded. Standardized instruments undoubtedly contribute to the reliability of case finding, particularly when the interviewer is trained in the administration and scoring of the schedule.

It is estimated that two-thirds of diagnosic disagreements are the result of criterion variance (Spitzer and Williams,1980). Without reliable and valid diagnostic criteria, case finding becomes erratic, epidemiological surveys are inconclusive or ungeneralizable, and it is difficult to calculate accurate estimates of incidence and prevalence (Klerman,1980). Over the last fifteen years a number of operationalized diagnostic criteria have been developed. Among the most popular of these are the International Classification of Diseases (ICD, WHO, 1978), Research Diagnostic Criteria (RDC, Spitzer et al.,1978), and the Diagnostic and Statistical Manual (DSM III, American Psychiatirc Association,1980). In their community surveys Brown and Harris (1978), used explicitly clinical case criteria and subsequently published (Finlay-Jones et al.,1980) a post hoc check-list of these criteria.

Despite the introduction of structured interviews and operationally defined diagnostic systems, major

disagreements in identifying cases of depression still occur. when the different systems are utilized. This is particularly true in general population surveys, where, for example, there was only 54 percent agreement between I.D., RDC, Feighner criteria, and the Bedford College checklist in identifying cases of depression in the same community sample (Sashidharan,1985).

Although the diagnostic criteria have been generally welcomed by psychiatrists, the response from psychologists has been guarded. Thus, for example, the American Psychological Association have never fully endorsed the DSM III and a recent survey of psychologists in the U.S.A. (Smith and Kraft,1983), showed an unequivocable rejection of DSM III "..as a desireable diagnostic option". Similarly Eysenck, Wakefield and Friedman (1983), argue that whilst "the system may be acceptable to psychiatrists...in our view it is not acceptable in principle to psychologists, and no tinkering with it will solve the basic faults inherent in the general model constructed by generations of psychiatrists".

As the diagnostic criteria for a case of depression in this study were drawn from DSM III it is clearly important to consider the reservations that have been expressed. Carroll (1984), warns "against the assumption that, because DSM III criteria have been adopted by the profession, they are necessarily valid. The reality is

that DSM III criteria represent an arbitary, nominal convention for diagnosis. Validity is established not by agreement but by evidence". DSM III merely provides a set of nonstatistical algorithms which are not based on data, were generated by consensus rather than by research, and have never been validated by standard procedures such as response to specific treatments, studies of natural history or family history, or use of biological markers. A number of studies have also shown that DSM III criteria are only moderately reliable for the diagnosis of depression and its subtypes (e.g. Melancholia). The diagnoses of major depression were found to have kappa coefficients of 0.60 to 0.65 (Fleiss,1981). This level of reliability was obtained by a group of full-time academic psychiatrists who had worked together for many years in the clinical investigation of depressed patients. "It is likely that the diagnostic reliability for major depressive disorder....would be significantly worse in general practice settings " (Carroll,1984).

Carroll has also argued that there is "...little that is intellectually satisfying about the DSM III criteria for a major depressive disorder. These criteria amount to a catalogue of common symptoms, and they are in no way linked by coherent underlying constructs". He goes on to point out that "they also suffer from the problem of being cast as disjunctive criteria. This means that in section B, for example, patients need satisfy only four

from a total of twenty possible symptoms. Therefore (and this occurs in practice), several patients may be assigned the same diagnosis without having any symptoms in common".

The aetiology of depressive illness

It is sometimes assumed that depression is part of the normal life style of the elderly, since elderly people are subject to mourning and separation from children, and to the cumulative losses of status, income, and physical health. However this assumption fails to explain how substantial numbers of elderly persons remain free of depression in spite of suffering these stresses. Such stresses though associated with the vicissitudes of ageing, cannot constitute necessary and sufficient 'causes' of depression in later life.

The aetiology of depression is in most instances multifactorial. However, certain risk factors appear to predispose to depression in old-age.

1. Biological Factors

Individual differences are always present, but there is increasing evidence that the aged are biologically more prone to depression. Lipton (1976), cites the increase in monoamine oxidase (MAO) in plasma platelets and in the human hindbrain with increasing age. MAO is an enzyme involved in the metabolism of norepinephrine. Low norepinephrine or amine levels in brain tissue are associated with depression. Diminishing thyroid function

and decreased responsiveness of the pituitary to the hypothalamic releasing factor makes it difficult for the aged to cope with stress. Alterations in gonadal function also play a part, particularly in women. The availability of MAO is inversely proportional to the level of oestrogen. With the post-menopausal decrease in oestrogen, the level of MAO increases.

Recent experiments (e.g. Vogel et al.,1977) indicate that REM sleep deprivation leads to depression. Older people sleep less (Georgotas, 1983), and there is also evidence that they dream less frequently and for shorter periods (Grauer,1977). This again would make them more prone to depression.

A biochemical or physiologic explanation alone, even allowing for a possible genetic predisposition, seems inadequate. This is emphasized by Mendlewicz (1976), who points out that the morbidity risk for relatives of patients with late onset depression is lower than for relatives of patients who become depressed at a younger age. Psychological and environmental factors certainly play a part in the aetiology of depression.

2. Life events and environmental stress

Social stress, however defined, plays an important aetiological role in the genesis of many types of psychological disorders including depression. Much of the evidence bearing on this hypothesis has been reviewed elsewhere, and so here we shall only comment on the

principal findings of what is a voluminous literature.

Depressed persons experience significantly more negative life events prior to the onset and treatment of their disorders than do nondepressed controls in a comparable time period (Paykel,1979; Murphy,1982). Some studies have sought to clarify the particular types and temporal patterning of events specific to depression. It emmerges that loss or 'exit' events (such as death or marital separation) which may have particularly strong effects on self-esteem, occur more frequently among depressed than among non-depressed persons (Paykel,1979). However, the inclusion of such events as bereavement may well represent a confusion of normal and abnormal reactions to loss. After all, most people will be sad after the loss of a relative. Among depressed patients, a peak in the co-occurrence of events has been observed in the three-to-six-month period prior to the onset of depression, although cumulative effects may extend for twelve months or more (Brown and Harris,1978).

Despite the proliferation of studies showing an association between severe life events and depression, exposure to events is only moderately related to the occurrence of depressive disorder. Some persons do not become depressed even though exposed to one or more negative events, whereas others are depressed in the absence of such events. Consequently many investigators have, in addition, examined variables such as social

support and coping which are thought to mediate the relationship between life events and psychopathology. Unfortunately much of this evidence is contradictory due to the confounding of measures of life events and social support (Thoits,1982)(see chapter 4).

3. Personality and psychodynamic factors

It is widely believed that persons prone to depression are characterized by low self-esteem, clinging and dependent interpersonal relations, and a limited capacity for mature and enduring object relations (Kaplan and Sadock,1981). Although these traits are common among depressives, no single personality trait, constellation or type has been established as uniquely predisposed to depression.

Early childhood experiences are considered to bear some causal relation to later psychiatric morbidity in adult life. Parental 'loss' has been the experience most commonly assessed and has been considered of some importance in the development of conditions such as depressive disorders (Hilgard and Newman,1963), and neuroses (Barry and Lindemann,1960). The psychoanalytic literature suggests that depression is the most likely outcome following parental loss (Freud,1957; Bowlby,1973). However in many studies the term 'loss' is rather nebulous, being used to include a poor quality of parenting, child abuse, parent-child separations, and parental death. In a recent study (Tennant et al.,1981a),

no significant relationship was found between childhood separations and adult psychiatric morbidity. However in a subsequent study these authors found that separations caused by parental illness and marital discord between the ages of 5 years to 10 years were related to morbidity (Tennant et al.,1982).

The epidemiology of depressive disorders

Discussion here is confined to studies of English speaking countries and general population samples (i.e. those excluding hospital outpatients).

Prior to reviewing this literature it is useful to define the different measures of risk used. 'Incidence' is the rate at which new cases of a disorder occur in the population i.e. new cases occuring over a specified time interval (typically one month to a year), divided by the population at risk. Blazer (1982) has suggested that in studies of late life depression, the point at which an episode is identified rarely corresponds to the onset of the disorder. "In fact, a series of events may occur. Etiologic factors impact upon a vulnerable individual leading to undetected biological changes. These changes later become manifest as symptoms, following which a diagnosis is made. Recall of the day or week of symptom onset not only can be biased by poor memory, but usually does not represent the point at which the biologic changes began". 'Point prevalence' is defined as that proportion of the population that has the disorder being

studied at a given point in time. 'Period prevalence' is the proportion of the population that either has the disorder at the beginning of a specified time interval or has it develop over the interval. Period prevalence is a hybrid measure that does not distinguish between incident and prevalent cases.

Points to note when considering prevalence estimates

Estimates of the extent of depressive illness in the general population vary considerably. There are a number of reasons for this, some of which have already been discussed. For example, many of the assessed variables are unimodally distributed in the general population (Williams et al.,1980), so that the boundary between normality and 'caseness' is essentialy arbitary. Other factors to be borne in mind when comparing reported prevalence rates are as follows; 1) Is the estimate based on psychiatric diagnosis or self report?. The latter will generally be higher although not necessarily very reliable. 2) What period does the estimate cover?. The findings covering a year or more will not be directly comparable to to those based on a single census day, or the previous month. Current prevalence is more likely to be valid than when prevalence data are collected over a period over which the subject's memory is unduly stretched. One-year prevalence will include a substantial proportion of cases that have cleared up by the time of examination, and so self-reports cannot be confirmed by

the investigator's direct observation of mood and behaviour.

It would be useful if we knew how the various diagnostic criteria compared. Some are clearly more stringent than others in their definition of caseness, and knowledge of their relative standing would enable one to better evaluate reported prevalence rates. Fortunately a recent study by Dean et al.,(1983) conducted a comparison of four common diagnostic schemes (I.D, RDC, Feighner Criteria, and Bedford College checklist) in one community sample of women aged between 18 years and 65 years. Based on a period prevalence of one month, Dean et al.,(1983) found that the highest rates of depression were recorded using the RDC (Major Depressive Disorder = 7%), compared with 5.9% for I.D. (threshold and definite), 3.8% for the Feighner Criteria (definite and probable depression), and 3.2% for the Bedford College Checklist (Case depression, and case depression and anxiety). This result suggests that the Bedford College Criteria for caseness are the most strict. A comparison of the I.D. and RDC showed only 56% agreement in classifying cases of depression. Since DSM III criteria were used in the present study it is noteworthy that the RDC criteria for 'definite major depressive disorder' differs from its DSM III counterpart 'major depression' only in that it requires one additional positive symptom for depressive caseness (Keller et al.,1982).

The prevalence of depression in the community

In their study of working-class women in Camberwell (aged between 18 years and 64 years), Brown and Harris (1978), reported a one-year prevalence for their category case depression of 14.8%. Brown et al.,(1977a), also report a study of 154 women living on the Hebridean Island of North Uist. Here the one-year prevalence of depression was lower at 8.4%. Duncan-Jones and Henderson (1978), described a two-phase design in a pilot population survey in Canberra. Their one-month prevalence rates indicate that 11% of the population would reach catego level 5 (borderline of the I.D.), and only 2% would reach level 6 (definite cases). Catego diagnoses in these subjects indicated a community prevalence of 10.8% for depression of all types.

Weissman and her co-workers (e.g. Weissman and Myers,1978; Weissman et al.,1978), published the results of a second follow-up survey of the New Haven Community survey involving 511 subjects. Using RDC criteria the 'current' rates for major depression (both definite and probable categories), was 4.3%. In a study of the social correlates of psychiatric disorder, Leaf et al.,(1984) interviewed 3058 randomly drawn subjects over the age of 18 years (20% of their sample was aged over 65 years). This study was the first attempt to utilize DSM III diagnostic criteria in a community survey, and the authors reported a six-month prevalence rate of 4.4% for

major depressive disorders. However this rate of depression was not weighted to take into account the effects of non-response which was 24% of the sample.

Murrell, Himmelfarb and Wright (1983), conducted a study of the point-prevalence of depression among a community sample of 2517 people aged 55 years and above. The authors used the Centre for Epidemiological Studies Depression (CES-D) scale which they described as "a pragmatic indicator of impairment rather than a highly sensitive indicator of depressive disorder. Using a cutting point of 20, they found that 13.7 percent of males and 18.2 percent of females were depressed. They also found that self-reported physical health was by far the strongest predictor of depression.

Cooper and Schwarz (1982), conducted a field study of mental disorders in a random sample of 312 elderly people living in Manheim. Using a standardized clinical interview the authors reported a point-prevalence rate (based on the two-week period before interview) of 4.2 percent for moderate to severe depression, and 12.2 percent for mild depression.

A number of studies are of particular interest in that they reported not only incidence and prevalence rates for depression but have also related the Bedford College measure of life stress to this outcome factor. Murphy's (1982) study of the elderly living in a London borough is of particular interest. Using the relatively

strict Bedford College critria for caseness, Murphy reported a one-year prevalence rate for case depression of 12.7%. The incidence of depression over the same period was 9.5%, which is remarkably high. A more recent study by Campbell et al.,(1983), of young working-class women in Oxford (mean age = 30 years), reported a 16% incidence of 'affective disorder' over a one year period. Regrettably these authors did not report prevalence rates, although we can reasonably infer that they would have been very high again. Costello (1982), carried out a study of Canadian women aged between 18 years and 65 years. Using the I.D., he reported a one-year prevalence rate for depression (at I.D. >=6, i.e. definite caseness), of 13.1%. The incidence of depression during this period was 11.4%.

Unfortunately many studies of elderly populations have tended not to employ standardized diagnostic criteria such as RDC and DSM III. This obviously complicates comparisons. Nevertheless certain trends can be observed. In a review of recently published studies Gurland and Toner (1982), stated that "the rates of clinically significant depression are in the region of 10 to 15 percent of the general elderly population", 2 to 3 percent of which would fit the criteria for major affective disorder or manic-depressive disorder (Gurland et al.,1980). Blazer and Williams (1980), applied the operational criteria of DSM III to reanalyze data from a

stratified random sample of 997 elderly people living in the community. Based on point prevalence data the authors reported "substantial depressive symptomatology among 14.7% of the sample; 4,5% were judged dysphoric; 6.5% had medically related depressive symptoms, and 3.7% met the DSM III criteria for a major depressive disorder".

Summary

Identifying cases of depressive illness among elderly people living in the community is fraught with difficulties. This is largely because depression is identified by the symptoms which people report, and these are continuously distributed in the population. Whilst there is consensus on the primary symptoms which characterize the syndrome, among the elderly somatic symptoms tend to be given more emphasis. Further problems arise because an underlying depression can be masked by a 'physical' illness, and physical illness or reactions to prescribed drugs can present as symptoms of depression.

Patient and criterion variance can be minimized by the adoption of standardized psychiatric interviews and diagnostic criteria. This has been the main development in psychiatric epidemiology in recent years. However, despite their use a recent study (Sashidharan, 1985) showed only 50% agreement between 4 popular diagnostic systems for cases of depression.

In view of the above, data concerning the incidence and prevalence of depression among the elderly in the

community must be treated with caution. With this in mind, studies suggest that approximately 5 to 10 percent of the elderly population suffer with depression.

CHAPTER FOUR

SOCIAL SUPPORT AND PSYCHOLOGICAL WELL-BEING

It is widely believed that social support offers protection against the debilitating effects of stress (e.g. Caplan, 1974; Gottlieb, 1983). Through some, as yet unclearly specified process, social ties to some combination of family, friends, neighbours, and others, are presumed to enable individuals to cope successfully with stressors.

Early enthusiasm for the social support hypothesis has been replaced by more guarded statements (e.g. DiMatteo and Hays,1981; Suls,1982). While these do not go so far as to refute the hypothesis that better coping occurs with higher levels of support they do suggest that the studies from which such conclusions are drawn are seriously flawed. These reservations acknowledge; (i) an increased awareness of the limitations of correlational data for causal interpretation, (ii) serious measurement problems due to the lack of independence between indices of social support and life events (Thoits,1982), (iii) a lack of consensus as to how social support ought to be conceptualized (Lin and Dean, 1984), and iv) evidence suggesting that social support, for some people, may have a negative impact (e.g. Belle, 1982).

In this chapter some representative findings from the research literature on the significance of social support for psychological well-being will be reviewed.

Then the conceptual, methodological, and theoretical issues surrounding social support will be examined.

The relevance of social support for mental health

Social support has been shown to positively influence psychological well-being among the ill and disabled (Davidson et al., 1981; Jamison et al., 1978; Lesser and Watt,1978). Dimond (1979), examined the influence of four measures of support on morale and social functioning among hemodialysis patients. All four measures were significantly related to morale, with family expressiveness showing the strongest relationship. Two of the four measures, family cohesiveness and availability of a confidant, were both significantly related to fewer changes in social functioning following the onset of dialysis.

There is some evidence to indicate that variable types of social networks are associated with psychological well-being. Hammer et al. (1978) reported that among a general population sample the primary network (i.e. family members and social intimates) usually consists of 25-40 people, and of these, 6-10 are well known. A similar network pattern among normals was reported by Pattison et al. (1975). However these researchers found different patterns among neurotics and psychotics. Primary networks of neurotics were smaller (10-12 people) and often included significant persons who were no longer living or who lived far away. There was

also a low level of interconnectedness among members, and personal relations with network members were often rated more negatively by neurotics than by normals. In their studies of the social networks of neurotics and normals Henderson et al. (1978b), and Brugha et al.(1982) also found that neurotics had smaller networks and experienced more negative interaction than normals.

The social networks of psychotics appear to be clearly differentiated from those of both neurotics and normals (Pattison et al.1975;Tolsdorf,1976). They are characterized by their small size, domination by kin, and the large proportion of dependent relationships.

The hypothesis that support may serve as a buffer against the effects of social stressors has generated considerable research, although with very mixed results.

Brown and Harris (1978) examined those factors which increase risk of depression in the face of life events. They found that women who had a close confiding relationship with a spouse or boyfriend were significantly less likely to become depressed following a severe life event or major difficulty. Paykel et al. (1980), have also produced evidence in support of the stress-buffering hypothesis. They interviewed 120 mothers from 5 to 8 weeks post partum, and found that three variables reflecting the quality of the marital relationship were associated with depression only in women who had experienced an undesireable event. Surtees

(1980), conducted a prospective study investigating the relationship between social support, residual adversity and symptom severity among 80 patients seven months after onset of depression. His results suggested that the "..presence of social support conferred partial immunity against the recurrence of symptoms in individuals suffering a high level of residual adversity".

Some other studies have suggested, contrary to the stress-buffering hypothesis, that social support can have a direct or main effect on mental health irrespective of the presence or absence of life events. For example, Aneshensel and Frerichs (1982) attempted to determine the causal inter-relationships among stressors, social support, and depression. Using a prospective design, social support was found to have direct negative effects on current depression and indirect effects on subsequent depression. Again in a longitudinal study, Holahan and Moos (1981) examined the relationship between social support and psychological maladjustment (depression and psychosomatic symptoms) controlling for initial malajustment and initial levels of life change and social support. Respondents were 245 male and 248 female adult family members. They found a negative relationship between social support and maladjustment. Williams, Ware, and Donald (1981) conducted a longitudinal study of the relationship between physical health, mental health, social support and life events using a general population

sample of 2,234 subjects. The authors found that social support led to improvements in mental health, but that the negative effects of life events did not vary according to amount of social support.

Yet other studies have reported findings indicating that social support has both main and interactive effects. For example, Murrell and Norris (1984) interviewed a sample of 1407 adults, aged 55 years and above, twice within a six month interval. Using a comprehensive measure of social resources (including social support, self-esteem, physical health, and education) they found that stronger resources reduced the extent to which both 'global stress' and depressive symptoms were reported. In addition to these main effects the authors reported an interactive effect of undesirable events and social support on depression. Similarly, in a recent panel study of the effects of social support on depression Lin and Dean (1984) concluded "..both social support and undesireable events exert direct effects on depression and social support exerts mediating effects as well".

A series of studies by Henderson and his colleagues provide additional evidence for a positive relationship between social support and psychological health (Henderson et al. 1978a; Henderson et al. 1978b; Henderson et al. 1980a; Henderson et al. 1980b). Although Henderson et al. (1980) found that attachment and social

integration were negatively associated with a point prevalence measure of neurosis, they subsequently found that lack of social relationships was not a causal factor in the onset of neurotic symptoms (Henderson et al.1981). Persons who developed symptoms did not differ from normals in the availability of either close or diffuse relationships, but they were characterized by viewing these as less adequate for their needs. Henderson and Moran (1983), in a prospective study of a community sample also found that the onset of neurotic symptoms was more associated with the perception of social relationships than with availability of support.

DiMatteo and Hays (1981) have reviewed a number of studies showing the benefits of social support for psychological adaptation to serious illness and injury. Social support has also been reported to lessen the anxiety caused by natural disasters (Bowlby, 1973), to aid the process of bereavement (Burch,1972), and to facilitate adjustment to ageing and retirement (Lowenthal and Haven,1968). It has also been recognized as the basis for such mutual-help organizations as Alcoholics Anonymous (Caplan and Killilea,1976) and self-help groups organized for ex-drug addicts (Dumont,1974).

In addition to these generally positive results, there have been studies which failed to find significant direct or interaction effects of social support measures. Hirsch (1980) did not find a significant zero-order

correlation between network size and several symptom measures. Similarly Harder et al.,(1980) reported non-significant correlations between a variety of psychopathology indicies and a composite measure of support which included information on marital status, presence of a confidant, and membership of social organizations.

This overview of research shows that despite conceptual and methodological variations across studies, there is a considerable amount of evidence to suggest that social support plays an important role in maintaining and promoting psychological health.

The origins of social support

It is acknowledged that the family is an important source of support for the elderly (e.g. Lowenthal and Robinson,1977; Shanas,1968). It provides companionship, affection, advice, financial assistance, and help in day-to-day activities, although it may not always be a source of satisfaction to the elderly (Conner et al.,1979). Within the family the marital dyad is of paramount importance: the spouse being named most often as an intimate and confidant, especially by men (Haas-Hawkings,1978; Lowenthal and Haven,1968). However as Chown (1981) notes, the choice of a confidant often "..depends upon who is available, who seems trustable, and is willing to undertake the role".

Research indicates that children are most frequently

identified as persons who could provide support when needed, more so than spouses, siblings, or other relatives and friends (e.g. Brody,1981; Shanas,1966). Cantor (1975), has shown that the elderly maintain close ties with children. In her sample of elderly New Yorkers, she found that 75 percent of parents helped their children and 87 percent of children helped their parents. However, a number of researchers (e.g. Kutner et al.,1956; Pihlblad and McNamara,1965; Kerchoff, 1966; Messer, 1968; Lee, 1979) found little or no correlation between frequency of contact with children and the subjective well-being of the elderly.

The role played by daughters is different from that of sons. Treas (1977), reports that "..devoted though sons may be, the major responsibility for the psychological sustenance and physical maintenance of the aged has fallen traditionally to female members". Findings on the relationships with other family members are less conclusive. Lopata's (1973) study of widowhood found that many widows maintained only minimal (if any) contact with in-laws and grandchildren. Lee and Ellithorpe (1982)report that sibling contact is much less frequent among married elderly and among elderly with living children. Lee and Ihinger-Tallman (1980) found that sibling interaction was not related to morale among the elderly. However Shanas (1979), has stated that siblings are especially important as a source of support

for widows and for those who have never married.

The importance of friendship in late life has been emphasized in a number of studies (Jonas,1979; Lebo,1953). For example, Blau (1973) has suggested that "since friendship rests on mutual choice and mutual need and involves a voluntary exchange of sociability between equals, it sustains a person's sense of usefulness and self-esteem more effectively than familial relationships". Lemon et al.(1972), likewise found that among a middle-class sample of retired married people, satisfaction with life was positively correlated with social activity with friends but not with the amount of interaction with neighbours, relatives, or formal organizations. One may reasonably question the extent to which these findings are confounded with health status. Chown (1981), for example, documented the effect of declining health on opportunities for social contact among the elderly. She notes that the elderly are placed under some pressure to move to live with or near to relatives. This "distances the elderly from existing friends without providing opportunities to meet congenial substitutes". Finally, bereavement is a common occurrence in old-age, further reducing the actual number of living friends.

A hierarchy of supporters thus seems to exist within the family network with the spouse coming first, the adult child second, and other relatives third. Friends

and neighbours assume importance only when family members are not available (Cantor,1975,1980).

Help-seeking and the provision of support

Gourash (1978) has reviewed the literature on the conditions under which people turn to others for support. Most people who report troublesome life events seek help for their problems (Gurin et al.,1960; Lowenthal et al.,1975). The key factors that differentiate those who do, and those who do not seek help are age and race, with helpseeking showing a consistent decline with age. People who look for help are usually seeking comfort, reassurance, and advice (Weiss,1974; Gurin et al.,1960). Initially they turn to family and friends. Professional organizations are contacted only as a last resort (Booth and Babchuck,1972; Croog et al.,1972). One might expect that those seeking help would have fewer personal resources than those who did not, but Brown (1978), found no evidence for this.

No one type of problem invariably triggers the search for assistance, although there does appear to be some commonality between certain types of problems and sources of help. The social network is the primary source for general worries and unhappiness, with spouses the focal source of help for worries, and friends the major resource for unhappy emotions (Gurin et al.,1960). Family, friends, and neighbours are the predominant source of aid in family crises (Croog et al.,1972).

Professional help is sought for problems ranging from severe emotional distress (Gurin et al.,1960), to discrete strains suffered under the pressure of work or family roles (Beck,1961; Lurie,1974).

It seems somewhat anomalous that theories of social support focus exclusively on the recipient. Nowhere does one find reference to the provider even though the motives for providing support may well have an important bearing on the possible uptake or success of the provision.

Schaeffer, Coyne and Lazarus (1981) have rightly noted that social support can impose considerable demands and constraints on the provider, and can also generate conflict. In view of these 'costs' one may well wonder what prompts individuals to provide support to others in need?. In most societies, the value of social responsibility (Berkowitz,1972), teaches people the value of helping others. When a family member or friend is in need of help, we are expected to, and willingly rally to their side. Neighbours, even strangers help each other in emergencies. Furthermore, we appear to hold an implicit belief that our presence, cheerfulness, or actions, can improve the morale and condition of those whom we help, with the result they will be better able to cope. For some, such behaviour may be a form of reciprocity (Walster et al.,1978) for prior help received, either from the person now helped, or from others.

Theories of helping (Latan and Darley,1970; Staub,1978) have identified pre-requisites for provision of help. Firstly, the recipient must have a problem that is amenable. If it is too mild it may appear that help is not required, but if it is too severe it may seem beyond the competence of the would-be provider. Secondly, unless a direct request for help is made, the would-be provider of support must detect a need. This analysis suggests a U-shaped relationship between the severity of the problem and the likelihood that social support will be offered without request. A would-be helper must feel responsible for the person, either out of compassion or because the predicament was somehow caused by him/her. Social support should be more likely, the greater the feeling of reponsibility. Similarly, problems which are seen as self-induced are hypothesized to elicit less support than ones which are not the 'fault' of the individual. Finally, Latane and Darley (1970), argue that the would-be helper must feel that success in rendering aid is likely. If this is correct, support is more likely to be given when it is not needed, and not given in cases where it is needed. This selectivity on the part of providers could contribute to the direct correlation between social support and health that can be interpreted as due to the stress-buffering effect of social support.

Conceptual and Theoretical Issues

The view that social bonds and supportive

interactions are important to a person's health and well-being is by no means a new one. In Genesis [2:18], God judges that "It is not good that man be alone", and philosophers from Aristotle to Martin Buber have emphasized that the essence of human existence is expressed in our relations with others.

Problems of definition

The concept of social support is, however, vague and poorly defined.(e.g. Leavy, 1983; Thoits, 1982). For example, Kaplan et al. (1977) suggest that "support is defined by the relative presence or absence of psychosocial support resources from significant others". However, the authors then fail to define 'support resources' with the consequence that their conceptualization is too imprecise to be useful. Lin et al. (1981) suggest that social support is, "support accessible to an individual through social ties to other individuals, groups, and the larger community ... Social support...identifies the resources available to the individual in a crisis". Again, 'support' and 'resources' remain undefined. To some extent this can be expected; it is a relatively new area of research and the issues are not yet well formulated.

The multi-dimensional nature of social support

The concept of social support has been used to refer to a disparate set of processes, including verbal praise, encouragement, mere presence, nonjudgemental acceptance,

and the provision of information and material resources.

Recent developments toward a more rigorous conceptual scheme have attempted to assess the influence of these different components. For example, Dean and Lin (1977) differentiated instrumental and expressive support, whereas both Pinneau (1976) and Schaeffer et al. (1981) distinguished tangible, informational, and emotional support. The impetus for this development (which owes much to Weiss,1974) appears to have been the recognition that different types of support are likely to have a differential effect depending on the type of problem and/or the stage of that problem. Thus a curable or treatable problem may call for different forms (or amounts) of social support than an incurable one. Similarly, whether a problem is largely self-induced or under voluntary control, or involves adverse consequences imposed on the individual from outside may make an important difference.

Empirical support for the above scheme comes from Schaeffer et al.(1981), who found that emotional and tangible forms of support were effective against depression whereas informational support was not. This suggests that it may be productive to consider specific stressors as they are affected by the different components of social support instead of focusing on global stress as measured by life event scales. A moments reflection, however, shows that the distinction between

these types of social support is not clear. For the recipient, tangible and/or informational support may equally be indicative of emotional support. Thus in the Schaeffer et al. study emotional and informational support were highly correlated, although neither was related to tangible support (the measure of which was unreliable). Lieberman (1984), pointed out that "one of the major confusions in social support research is the failure to make the distinction between data measurable by an external frame of reference and data that can be generated only through a phenomenological set. Different conclusions are possible depending on the approach taken".

Not only is the type of support important, but also the sources of support (e.g. spouse, friends, kin) and amount of support are also important. Amount of social support has often been equated, misleadingly, with the number of social contacts or the size of one's social network. The total magnitude of socially supportive behaviours, for example, time spent together or amount of material aid, may be influential irrespective of the actual number of individuals who provide it. Moreover, it is possible that there are lower and upper limits on the amount of support required for positive effects. Indeed having only one close confidant could be adequate (Leavy, 1983). There may be diminishing returns with each additional source beyond the first few. It is also likely

that the structure of the support network influences the flow of supportive resources to the individual. Some have suggested that the most important aspect of social support is how well a person is embedded in the social network; whether the person has extensive links (range), whether the links are extensively connected among themselves (connectedness), and how extensive these links provide help in multiple areas (multiplicity)(e.g. Hammer,1981; Mueller, 1980). According to this view, an individual well integrated in an extensive and strong network is likely to have sufficient support for his/her well-being. However, the concept of support is a much narrower one than social network (Lin and Dean,1984), although networks provide the framework within which social support can be explored.

The primacy of "emotional" support

There appears to be some agreement in the literature that emotional support (sometimes termed esteem support), consisting of empathy, love, and trust is the most important dimension. House (1981), for example, acknowledged that emotional support is the common element, and that is what most people mean when they speak of being supportive. The importance of emotional support is apparent in a number of findings; i) the spouse and close relatives provide better support than friends and acquaintances (e.g.Brown and Harris, 1978; Lin et al. 1981), ii) the intimacy, intensity,

frequency, and reciprocity between the helper (or confidant) and recipient has a bearing on the effectiveness of support, and iii) only when interactions are reciprocal and the participants share values and understandings can social support take place (Lin et al. 1983). Implicit in these observations is the assumption that emotional support is a core human requirement.

Main versus Interactive effects

Much of the recent interest in the concept of social support is associated with the notion that it may constitute a buffer or mediator of the effects of stressors. Whilst formulations of the stress buffering model differ in detail, they have in common the hypothesis that the association between life events and disorder is strongest in those groups which lack social support. This hypothesis is often stated in the complementary form, that the lack of social support is related to disorder only (or primarily) among those subjected to life stress.

An alternative hypothesis is that support has a more general or direct benefit regardless of the actual level of stress. According to this view, even when the influence of other factors such as sex and social class have been taken into account, social support should remain influential in predicting the variations in mental health among individuals. Because the evidence for this model derives from the demonstration of a statistical

main-effect of support with no stressor * support interaction, this is termed the "main-effect" model.

Both hypotheses have received some empirical support. Wheaton (1983), notes that in 22 recent studies, seven reported some evidence of buffering (Brown and Harris,1978; Eaton,1978; House,1981; House and Wells,1978; LaRocco et al.,1980; Thoits,1982a; Turner and Noh,1982), but the other 15 suggested that social support may have a main effect but no interactive effect (Andrews et al.,1978; Aneshensel and Frerichs,1982; Aneshensel and Stone, 1982; Bell et al.,1982; Billings and Moos,1981; Cohen et al,1982; Dean and Ensel, 1982; Husaini et al,1982; Lin et al,1979; Pearlin et al,1981; Tennant and Bebbington, 1978; Thoits, 1982; Turner, 1981; Williams et al.,1981).

A number of factors have to be considered in weighing this evidence. Firstly, both measures and conceptualizations of social support, life stress, and mental health vary considerably. In addition to these inconsistencies differing results are attributable to aspects of methodology and statistical techniques. Cohen and Wills (1985), have carried out a review of the conditions likely to result in favour of the alternate models of the support process. They suggest that two characteristics of support measures are influential; a) whether a measure assesses social network "structure" or "function", and b) whether it assesses a specific

structure/function or combines a number of structural/functional measures into an undifferentiated global index. When structural measures of support are used (i.e. those which assess the existence or number of supportive relationships), Cohen and Wills predict that only main effects will be observed. Functional measures, which assess the extent to which relationships provide particular functions such as increased esteem and information, are more likely to result in buffering effects.

The mechanisms of social support

The mechanisms through which social support is related to mental and physical health remain to be clarified.

A variety of mechanisims may be operative, either alone or in combination. The usefulness of tangible support such as financial help, the running of errands, childcare, and so forth while generally welcome at any time tend to be more highly valued when one is ill. Subjectively such support may reduce fatigue or worry. Emotional support may operate more subtly. Hope and faith may be generated in the individual by the encouragement of others. Social interaction may also distract the person from destructive cognitive ruminations or excessive dwelling on the problem or illness. The demonstration of concern from others may be a source of self-validation and boost the individual's feelings of

importance and self-esteem (Pearlin et al.,1981). Awareness that someone cares may motivate the individual to make efforts to overcome the problem. Social interaction also provides a means for the individual to engage in 'social comparisons' (Festinger, 1954). By looking at the reactions of others, individuals can judge the appropriateness of their own. They may learn from others how to define their own emotional arousal, and to assess the threatening quality of a situation based on the emotional expressions of others around them.

At times of crisis such as illness, a close social environment provides the individual with an opportunity to discuss feelings, develop intimacy by disclosing private information, and express emotion. A good deal of evidence suggests that self-disclosure to a few close persons is an important component of health personality adjustment (Chelune,1978; Cozby,1973).

In addition to effective-emotional processes, cognitive factors, such as transmitting specific information, knowledge, solutions, or advice may enable the recipient to cope with or solve problems which might otherwise seem intractable. Social support may assist the individual in making interpretations of a stressful event that make the situation less painful or more acceptable, a process which might be the same as the one often described in philosophical or religious terms as 'discovering meaning or purpose'. Social interaction may

also help the individual re-examine goals, values and priorities.

Methodological Issues

As with life events, studies of social support are concerned with naturally occurring behaviours. In laboratory studies variables can be assigned to, or withheld from randomly equated experimental and control groups. However, the variable of social support operates in the natural environment and in the more prevalent correlational design is confounded with other factors, so that groups differing in social support will differ on these variables. Such studies, as Cook and Campbell (1979) point out, whilst strong in terms of external validity tend to be weak on internal validity and prevent the drawing of strong causal inferences.

Another disadvantage of correlational designs is that social support is treated as a static event, whereas it actually entails a dynamic interactive process, which extends over a period (Eckenrode and Gore,1981). When an individual encounters a problem or becomes ill, others rally to provide assistance. While some individuals will seek or accept support, others may avoid or decline it. What happens then probably varies with the consequences of the initial encounter. If the person is seen to be coping, the sources of social support are gratified that their influence is so effective and the process is strengthened. On the other hand, if the person fails to

cope adequately, social support may eventually lessen. An example may be drawn from the situation of the problem drinker. Social support that fails to reduce the problem is eventually withdrawn as the course of the alcoholism worsens. Thus, original levels of social support do not remain fixed but shift up and down in response to consequences of the social interaction.

Ideally the relationship between social support and outcome should be measured within a prospective framework. This would not only clarify the temporal priority of support and illness (see below), but would also enable the effect of support on health problems to be examined during different phases, such as prevention of illness, coping, and recovery. Bankoff (1981), has done just this in a study of the efficacy of different types of social support following bereavement. During the early stages of bereavement Bankoff found that only emotional support correlated with well-being. However during the 'transition phase' amount of social contact assumed greater importance as widows began the process of re-engagement. It is also probable that the pattern of support that is desirable at different times may differ with the types of problem.

Alternative explanations for the effects of social support

A number of commentators have suggested that social support may be the consequence of health status rather

than its cause, as is generally assumed (e.g. Blazer,1983). Individuals who show an improvement in health will elicit more social reinforcement and praise and generate more social interaction reciprocally than those whose health deteriorates. Thus, for example, Blazer (1983) in a study of elderly depressives found that people with depression at the beginning of his study had more social supports than normals at follow-up 30 months later. The individual who fails to improve or even worsens, will find a gradual decline in social support because friends and relatives become discouraged and avoid the individual. Harker (1972), for example, suggested that when some people become depressed others, taking their cue, leave them alone, reduce conversation or become anxious or irritated. He concluded that some individuals tend to undermine their own support. These factors yield a positive correlation between amount of social support and health status, but for entirely different reasons from those assuming that social support is conducive to improved mental health.

Heller (1979), suggested that social competence might be one factor differentiating individuals who report differing levels of support. According to this argument competent persons are more likely to be able to withstand the adverse effects of stress and are more likely to have well-developed social networks due to interpersonal skills. Thus, the previously noted

restricted social networks found among neurotics and schizophrenics may be a consequence of their premorbid social skills rather than a cause of their illness.

Another explanation is that there are initial differences in problem severity or prognosis. Henderson and Byrne (1977) suggested that "..the seriousness and duration of a patients illness is one of the most important variables affecting his or her responses to various forms of social support". Thus, individuals with more severe or more numerous problems might elicit or seek less support. These would also be the cases least likely to show improvement in coping. Consequently, social support and well-being would show a positive correlation but not actually reflect any causal influence of the latter on the former.

There is an expectation in society that social support should be forthcoming when an individual encounters a problem. In light of this a recipient may occasionally question the sincerity of support offered (Suls,1982). This would attenuate some of the benefits. On the other hand, if one receives little or no social support, that knowledge in itself could be distressing because it disconfirms a cultural norm (Fiore et al.,1983). It is possible that for some it is not the lack of social support per se that accounts for the observed correlation between low support and poor psychological health but this unmet expectation. Failure

to recognize the ill created by unmet expectations (when support is absent) may result in an overestimation of the benefits provided by the presence of social support.

Another issue discussed at length in the literature (e.g. Schaeffer et al.1981; Thoits 1982), is the operational confounding of measures of support and social stressors. Many of the events included in life event questionaires to indicate the presence of stressors (e.g. death, divorce), also lead to decreases in support. Similarly, difficulties such as chronic illness lead to reduced support, attempts to elicit further support, or both. As a result of this confounding Thoits (1982) has argued that an effective assessment of the stress buffering hypothesis is not possible, especially for those studies with retrospective designs. In life events research, similar problems of confounding, such as the inclusion of events that are symptoms rather than causes of disorder, are dealt with by excluding such events from the relevant analyses. Such an approach does not provide a solution in this instance since the majority of events in such lists directly or indirectly involve social relationships. Removing such events when testing stress-support relationships would only result in event-lists of questionable validity.

An alternative approach to the problem of confounding would be to measure social support before the life events have occurred. Even this produces problems

because there is evidence that social support may affect the extent to which some life events occur in the first place (Bruhn et al.,1966; Langlie,1977; Lin et al.,1979). Thus a person with strong social support might take fewer risks or engage in better health practices. The interdependence of stress and support has led Thoits (1982) to argue that a longitudinal design is necessary to test the buffering hypothesis. "To disentangle the direct effects of life events on support level, and of support level on life events, from the interaction of these two variables, measures of support before and after the occurrence of events are required".

The measurement of social support

Thoits (1982) has pointed out that few investigators "..have attempted to develop valid or reliable indicators of the concept of social support". Some (e.g. Brown et al.1975; Sandler, 1980) have simply used variables such as availability of a confidant or marital status as a proxy for support. It is assumed, for example, that people who are married have more social support though such an assumption is questionable. It is also true that such indices do not examine or assess behavioural processes, and so fail to adequately reflect the mechanisms of support.

Set against the crudeness of the above measures, social-network analysis attempts to provide a comprehensive measure of the channels through which an

individual "..maintains his social identity and receives emotional support, material aid and services, information and new social contacts" (Walker et al.1977). It has been suggested that the network characteristics most relevant to personal support are; i) size: the number of persons with whom the individual maintains social contact, ii) strength of ties: including intimacy as well as time and intensity of involvement in the relationship, iii) density: connectedness in terms of the extent to which network members contact one another independently of the individual, iv) homogeneity of membership: the social and demographic similarity of network members, and v) dispersion of membership: the ease with which network members can get together. Although other characteristics have been considered, these five are the major dimensions along which social support networks have been described.

Despite the enthusiastic endorsement of social-network analysis by some (e.g. Gottlieb,1981; Wellman,1981), others have expressed reservations. For example, Lin and Dean (1984) argue that "..networks by themselves do not constitute the core of social support nor do they supersede the social support concept. Rather, networks provide the framework within which social support can be explicated". Others (e.g. Kessler,1982) have suggested that network analysis is but a proxy for social support which does not address a central and crucial aspect of social support, namely the extent to

which the individual experiences the support of others. In other words, the benefits of social support are assumed, not measured, in the social network concept. Now while it is likely that social network size and amount of social support are positively associated, the assumption ignores the demands, constraints and conflicts also associated with social relationships. Indeed, the problems generated from significant social relationships comprise a significant share of the stresses people experience in their daily lives. It is therefore important that the quality of social relationships as well as its availability is examined.

Subjective measures of social support that focus on the individuals perception of being supported have been an important recent development (e.g. House,1981; Henderson et al,1981). Events or circumstances in the real world affect the individual only to the extent and in the form in which they are perceived. Ausubel (1958), points out that, "this does not imply that the perceived world is the real world but that perceptual reality is psychological reality and is the actual (mediating) variable that influences behaviour and development". Thus, Henderson et al (1981), found perceived support from family members to be a better predictor of mental health status than objective measures.

Measures of perceived support acknowledge the importance of the satisfaction of the recipient with the

type, amount, source, and consequences of social support. Andrews et al. (1978) found that expectations of help in a crisis from friends, relatives or neighbours were negatively correlated with psychological impairment, but network-based measures of neighbourhood interaction and community participation were not. On the other hand, one cannot rely exclusively on subjective indices because they are not independent of the individual's psychological state and level of coping. Successful coping might lead to an overattribution of the importance of social support, while failure could possibly lead to placing retrospective blame on social support, even though some other factors may be at fault. Clearly it is necessary to include both structural and evaluative components in any measure of social support.

The consequences of providing social support

To date, most research on social support has focused on the consequences of receiving support; considerably less attention has been paid to the consequences of providing it. There is some evidence (Garrity,1973; Hyman,1971; Lewis,1966), however,to suggest that under some circumstances, or for certain individuals, the deleterious consequences of support provision may be considerable. In a sample of men recovering from congestive heart failure and myocardial infarction, Garrity (1973) found that the more worried the family was about a man's health, the fewer hours he worked after the

attack. Likewise, Lewis (1966) reported that patients from overprotective families were less likely to return to work. It has also been found that those supporting the chronically ill may become emotionally drained from the long-term provision of support (Cantor,1980; Belle,1982), and this can result in the erosion of family supports. Not surprisingly women are at particular risk in this situation; because they tend to marry men older than themselves and live longer the caregiver role tends to fall on them (Fengler and Goodrich,1979; Belle,1982).

Coates and Wortman (1980), have suggested that social support may aggravate depressive illness instead of alleviating it. These negative effects stem from the attempts of others to overcontrol the depressive individual, thus ironically adding to the plight of the individual. Similarly there is evidence that physical health can also be adversely influenced by social support under some conditions (DiMatteo and Hays,1981).

How could such negative effects be mediated?. If social support can be viewed as a type of social expectation or pressure from others to improve, it is possible that the expectations of improvement could be excessive, dooming the recipient to failure as well as possible self-blame. In some situations such as terminal illness, where improvement is not possible, social support could be counterproductive, leading to false hope, disappointment, and resentment. Further it may

prevent the recipient from persuing appropriate positive actions. Misinformation or the witholding of information by supporters could similarly have adverse effects.

As another example, social support may undermine the individual's self-esteem to the extent that it reflects his/her status as an 'impaired' person vis-a-vis the supportive others. In order to conceal their 'stigmatized' identity from others (Goffman,1963), some people may exhibit social detachment and not disclose information about themselves and their feelings. In this situation the cost of self-disclosure to a social support network may exceed the perceived benefits. A related point here is that people are often distressed by the 'burden' (emotional, physical, financial), they place on their loved ones as a result of their illness (Harker,1972; Schwartz, 1977). The recipient may not wish to incur obligations or indebtedness (Greenberg,1980) to the sources of social support or to inconvenience them, even though others may not perceive the provision of support in the same way. Conversely, if unwanted assistance is offered, there may be a reluctance to reject it for fear of offending or appearing ungrateful. This unwanted social support would then ironically add to the stress.

There is a tendency in the literature to overlook the fact that different sources of social support do not always agree in their appraisal and reactions to an

individual's problem. Consequently, conflict and divisions in loyalty may arise, adding to, rather than reducing the person's plight. Various sources of support may not provide an additive effect (as implied by indices of social support based entirely on the quantity of contacts).

Finally, there is likely to be a fine line between the positive and negative consequences of a specific behaviour. For example, an offer of support could be seen positively by some individuals or at some stages of a problem, while it could be viewed as meddling or insincere by other persons or at other stages. Perhaps the momentary mood of the recipient is also an important factor. How a supportive response is construed may depend on factors such as the context of time and place as well as the source and the timing. Indeed as Eckenrode and Gore (1981) noted, a source of support can also be a source of stress for the same individual at different times.

Why belief in social support is so strong

Amongst both psychologists and laypersons there appears to be a firm belief in the power of social support. Authors, actors, athletes and the like acknowledge the indispensable role of numerous sources of social support in helping them overcome obstacles. It is difficult to judge how valid these self-reports are since retrospective attributions can be distorted, either

unintentionally or for self-gain. In view of the commonly shared cultural belief that people should help those in need, it is likely that people attribute success in overcoming obstacles, at least in part, to the effectiveness of social support.

The increasing evidence (Monroe,1983; Henderson et al,1981), that perceived social support better predicts successful coping than objective indices is consistent with the hypothesis that perceptions of support place too much weight on the efforts of others for positive outcomes. Improvement leads the individual to mistakenly assume that the benefits were derived from social support, although the extent of individual effort is just as likely an explanation. Paradoxically, providers of support are more likely to regard the failures of others as stemming from lack of individual effort rather than from any failures in the support they provide. In explaining the behaviour of others, just as in accounting for our own behaviour, there is a preference to credit success to social support but a reluctance to blame failure on its absence.

Distortion of a more deliberate nature, in which impression management considerations are important, can also occur. According to this theory (Schlenker,1982), individuals are strongly motivated to create impressions of their character. The advantages of praising a source of social support may be considerable in terms of future

gains to the individual. People may thus be motivated to mouth false attributions in the expectation of future gain.

Summary

Despite differences in conceptualization and measurement, many studies indicate that people with spouses, family, and friends who provide psychological and material resources are in better health than those with fewer supportive social contacts.

Although the many correlational results do not by themselves permit causal interpretation, these data in combination with results from animal research, social-psychological analogue experiments, and prospective surveys suggest that social support is a causal contributor to well-being. However, not all supportive behaviour is beneficial for the recipient or provider, and it is possible that individuals place too much emphasis on the efforts of others for subjective improvements.

There are two views concerning the way support has a beneficial effect. The "buffering" model suggest that support is related to well-being only (or primarily) for persons who have experienced severe stressors. An alternative, "main effects" model proposes that social support has a beneficial effect irrespective of the presence or absence of stressors. Both conceptualizations of social support are evidently correct in some respects.

The mechanisms through which social support is related to mental health remain to be clarified. A generalized beneficial effect of support could occur because large social networks provide persons with regular positive experiences and a set of stable, socially rewarded roles. This kind of support could be related to well-being because it provides positive affect, a sense of predictability and stability in one's life situation, and a recognition of self-worth. Integration in a social network may also help one to avoid negative experiences (e.g. economic or legal problems) that otherwise would increase the probability of psychological disorder. Alternatively, support may alleviate the impact of stressors by attenuating or preventing a stress appraisal response. That is, the perception that others will help may redefine the potential for harm posed by a situation and/or bolster one's perceived ability to cope with the problem.

CHAPTER FIVE

METHODS AND PROCEDURES

It was Berkson (1946) who first suggested that there are subtle selection factors which operate in the referral of people to hospitals and which therefore limit the external validity of investigations based only on such samples. When one is looking for generalizable causal factors in depression it is necessary to generate an unselected sample from the general population, and it may be necessary to examine large numbers of people to produce a sizeable group of symptomatic indivduals. Even so, untreated people with symptoms may not be comparable with hospital cases in terms of phenomenology, personality, and degree of impairment (e.g. Brown et al,1985).

THE SAMPLES

Two geographically distinct samples of elderly people living in the community form the basis of this present investigation. In addition, a third sample of elderly hospital patients was interviewed. The term "elderly" refers to persons aged 65 years or over on the 1st. July 1982.

All subjects in the first sample lived in the borough of Crewe and Nantwich, one of eight boroughs forming the county of Cheshire. The second sample lived in four of the six boroughs of the county of Clwyd, and within a radius of 40 kilometers of the town of Denbigh.

The third, patient, sample consisted of subjects who were inpatients at the Royal Liverpool and the North Wales hospitals.

The choice of sampling areas was governed by the need for an economical detection of morbidity. The five medical practitioners (four psychiatrists and a geriatrician) who carried out the mental state assessments worked in hospitals serving the three communities.

Despite geographical separation, the two major sampling areas (i.e. Nantwich and Denbigh) shared an essentially rural character, with a higher than average proportion of tied accomodation, of car and telephone ownership, and working population engaged in agriculture (O.P.C.S.,1981 Census). These characteristics are in accord with what is generally understood by the term "rural" (Webber,1979). The most striking difference between the samples was linguistic; 29.4% of the population of Clwyd are Welsh speaking (O.P.C.S.,1981 Census). Of those interviewed in Denbigh, however, only a small proportion (4 from 147) had difficulty speaking English.

Selection of the community samples

All elderly people living in the community and registered with a general practitioner for purposes of health care defined the target population. A person was deemed to be living in the community if not in an

"institiutional" setting such as a Part III or Sheltered accomodation, or in a long-stay ward for the mentally or physically infirm.

The samples were selected on a probabilitic basis. Only in this way can selection and statistical biases be avoided, and statistical theory used to derive the properties of the survey estimators.

An essential requirement for a probability sample is the existence of a sampling frame from which the sampled elements are selected. An "age-sex" register (the file of a G.P.'s practice population cross-classified by age and sex) is particularly useful in this respect since almost all elderly people are registered with a doctor. Only if the register includes substantial numbers of people who have died does it cease to be representative.

All the general practitioners located in and around the towns of Nantwich and Denbigh were approached, and gave permission to sample from their registers. Four of the six practices in Nantwich, and two of the three in Denbigh had age-sex registers but sampling procedures were the same even when age-sex registers were not available.

The drawing of samples began by estimating, for each area, the total number of elderly people registered with the general practitioners. From these, a sampling fraction was chosen. In Nantwich it was 0.17, and in Denbigh it was 0.20. The procedure, which is termed

"systematic sampling", then takes every *K*th element according to the sampling fraction, after a random start. Like "simple random sampling" (SRS) the method gives each element in the population the same chance of being selected for the sample (i.e. it is an epsem design). It differs from SRS in that the probabilities of different sets of elements being included in the sample are not all equal. For example, with a 1-in-5 sampling fraction the probability that elements *k* and *k+1* are both in the sample is nil, while the probability that elements *k* and *k+6* are both in the sample is 1/5 or 0.2.

The Nantwich and Denbigh samples consisted of 853 and 546 subjects respectively. These were subsequently divided into a number of replicate, or interpenetrating, subsamples of n=50. This procedure permits flexibility in the size of the final sample and each subsample provides independent comparable estimates of population parameters.

Selection of the patient sample

This was a non-probability sample of convenience consisting of 29 subjects admitted to hospital following the recent onset of depressive illness. Twenty-two subjects were interviewed at the Royal Liverpool Hospital, and four subjects who previously had been inpatients at this hospital were interviewed in their own homes. A further three inpatients were interviewed at the North Wales Hospital, Denbigh.

STUDY DESIGN

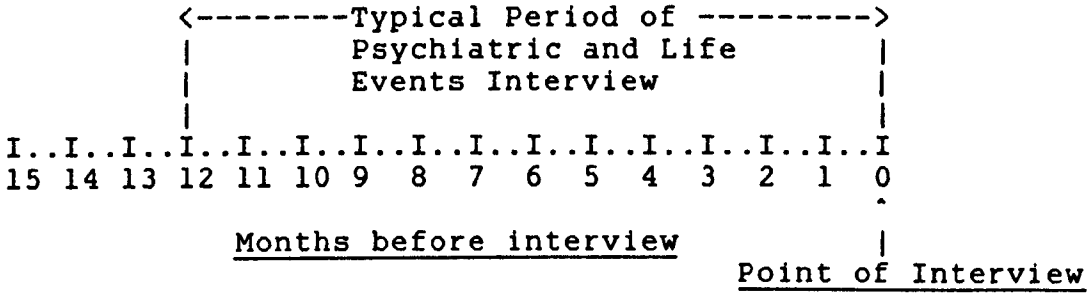
In the classical experimental design, subjects are randomly assigned to an "experimental" group, and the chosen explanatory variable(s) manipulated in order to observe its effects. However, many research problems in natural settings do not lend themselves to manipulation and direct control. This may be because the manifestations of the explanatory variable have already occurred or because they are inherently not capable of manipulation. In these situations a quasi-experimental design may be adopted.

As noted in Chapter 2, two types of quasi-experimental design (retrospective and prospective) have been used in studies of the aetiological role of life events. In prospective designs potential stressors (i.e. life events and difficulties) are measured prior to the onset of illness. This eliminates the problems of retrospectively dating events and illness to ensure that events were antecedent. Prospective studies provide potentially more powerful evidence for a causal association between life events and psychological illness. However, the design is more difficult to execute and more costly because it involves a minimum of two interviews at an interval of 4-to-6 months.

The time and manpower constraints of the present study meant that it was necessary to adopt a retrospective investigation. For purposes of exposition,

a "typical" retrospective design (taken from Brown and Harris, 1978) is illustrated in figure 5.1 below.

Figure 5.1 The retrospective measurement of life events and depression



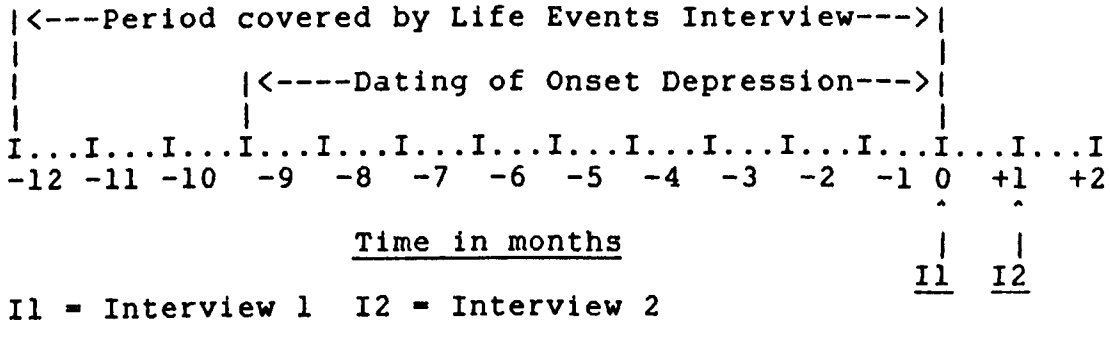
Two features of this design should be noted. First, the life events and difficulties (LEDS), and psychiatric interviews are conducted within a single session. Second, when an individual is judged to have had an illness onset in the nine-to-twelve month period before interview, the LEDS interviewing period is extended to cover the fifteen months in order to measure events which may be of aetiological importance. Interestingly, in the only study to have employed Brown and Harris's procedure with the elderly (Murphy,1982) the period of LEDS interviewing covered the twelve months preceeding any depressive illness onset. Thus for some onset cases, life events questioning (with its attendant problems of recall) could have covered a period of two years before interview.

It seems preferable to conduct the psychiatric and LEDS interviews separately for two reasons. Firstly, it is by no means a simple task to obtain relatively

mental status questionnaires such as the P.S.E. (Wing et al,1974), and the G.H.Q. (Goldberg,1972), confine their questionning to the three-to-four weeks preceeding interview. Our desire to maximize the accuracy of establishing depression onset led us to think that it would be better to reduce the period over which onset of depression would be dated from the 12 months used by previous workers. However, as noted in Chapter 2, the association between life events and illness onset is greatly attenuated if study is confined to currently active cases of depression. Faced with this dilemma, a compromise solution was adopted whereby the incidence of depression was measured over the nine months before interview, although the prevalence of depression was measured over a 12-month period to permit comparison with other studies.

The retrospective design adopted in this study is illustrated below.

Figure 5.2 Period over which life events and onset of depression are measured in this study



I1 = Interview 1 I2 = Interview 2

Comments on the study design

The actual benefits of separating the LEDS and

complicated information from the elderly, particularly from those suffering with severe chronic illness. A lengthy and demanding single interview, of approximately 3-to-4 hours duration, could jeopardize the quality of measurement. Secondly the interviewer has knowledge of both explanatory and response variables if a single interview is used. If life events and illness onset occur in close proximity (Brown and Harris found that depression onset usually followed within 6-to-9 weeks of a severe event), then whatever the true temporal sequence, the respondent, in an attempt to "explain" the illness, will almost certainly "date" the event to preceed the illness. It hardly serves the interests of objective measurement to place the interviewer in the position of resolving thorny problems of the timing of events and illness onset while at the same time providing knowledge of both variables. A better strategy is to conduct the psychiatric and LEDS interviews separately by persons who are "blind" to the data ascertained in the other interview.

Current evidence suggests that severe life events can be reliably recalled over a 12 month period (Paykel, 1980; Brown and Harris,1978). This was the period chosen for the recall of life events in the present study. However, it is also generally accepted that only a person's present psychiatric state can be established with reasonable reliability (Duncan-Jones,1981). Thus,

psychiatric interviews, and of selecting a different period over which life events and depression onset are measured, are closely allied to the time interval between the two interviews. If this interval is excessive (i.e. greater than one month), the "costs" of this strategy may outweigh the benefits.

For logistic reasons the psychiatric interview preceeded the LEDS interview in Nantwich, while the reverse was true in Denbigh. Brown and Harris (1978) found that depression onset frequently occurred within 6-to-9 weeks of a severe life event. Thus, in Nantwich it was important that the LEDS interview (i.e. I2) was conducted approximately a month after the psychiatric interview. With this time interval, one could be reasonably confident that a severe event preceeding an onset occurring eight months before psychiatric interview would be measured. If more than a month elapses between interviews, however, there is a risk of "missing" aetiologically relevant events. In Denbigh, the implications of temporal desynchrony are different. Because the psychiatric interview followed the life events interview any delay between the two results in a reduction of the period over which illness onset is measured. For example, if the psychiatric interview were conducted one month after the LEDS interview the onset period capable of study would be reduced to eight months. Further, an onset of depression occurring <u>after</u> the life

events interview might appear to have occurred in the absence of an event if an event also occurred after the LEDS interview. It was important therefore that the two interviews should occur in close proximity in Denbigh.

MEASURES

a). Demographic variables

The selection of demographic variables was governed by the need to provide biographical material for rating the potential threat of life events and difficulties, and to record those variables which might be associated with increased morbidity. They included:-

1. Age.
2. Sex.
3. Marital status.
4. Registrar General's social class.
5. Living arrangements.
6. Confidant status.
7. Number of children, age of children, where living, frequency of contact, satisfaction with contact.
8. Number of siblings, age of siblings, where living, frequency of Contact, satisfaction with contact.

b). The Life events and difficulties schedule (LEDS)

The schedule used in this study was a modified version of the London Life Events and Difficulties schedule developed by Brown and his co-workers (e.g. Brown and Harris, 1978). The LEDS has been used extensively by other research groups (e.g. Cooke, 1981; Bebbington et al., 1981), and is recognized as the most satisfactory method for investigating the complex link between life events and psychological illness (Henderson et al, 1981).

The LEDS was developed for use with an urban sample of women aged between 18 and 64 years of age. Modifications were therefore necessary to make it more sensitive to the problems of the elderly living in rural communities. For example, items concerning employment were reduced in number, while those covering finance were extended to include items on savings and pensions. The detailed section of the LEDS covering health was enlarged to include questions on incontinence and other age-related health problems. A copy of the LEDS schedule used in this study can be found in Appendix I.

Brown's procedure for assessing the subjective impact of life events and difficulties consists of two distinct stages, namely an "Interviewing" stage incorporating the LEDS and a "Rating" stage. It is helpful, for purposes of description, to consider these separately.

1.) The Interview stage

The LEDS is a semi-structured interview of approximately two hours duration, the purpose of which is to gather "as coherent and as full an account as possible of any incident which may be relevant to the research enquiry" (Brown,1985). Given that the processes reflected in the aetiology of psychological disorders are subtle, Brown and his colleagues have shifted the focus of measurement from the respondent to the interviewer. This is aimed at minimizing reporting biases such as

"effort after meaning", but it places a considerable onus on the interviewer. Training in the use of the instrument is essential (the writer underwent two weeks training by Brown and Harris at Bedford College).

There are a number of objectives in administering the LEDS. Firstly, to establish the occurrence of a life event or continuing difficulty in the 12 months before interview. Examples of life events are, the death of a spouse, or the burglary of one's home. Difficulties differ from events in that they are measures of ongoing threat of at least one month's duration. Examples are, a long-standing health problem such as osteoarthritis, or a non-health problem such as loneliness. A difficulty may or may not have a discrete event associated with it.

Not all events and difficulties occurring to the interviewee in the 12-month period are measured. Each event has to meet certain minimal criteria which have the effect of restricting measurement to non-trivial incidents involving the subject and his or her close relatives. For example, the death of a "distant" relative (e.g. a cousin), or relative by marriage will not be included unless the interviewee was personally involved in the incident. However, once passed this threshold an event is included whatever the respondent says he or she felt about it.

Once it is established that an event or difficulty is suitable for inclusion, a detailed set of probes is

employed to gather the full "objective" circumstances and consequences surrounding it. Such probes cover, for example, the expectedness of the event, its relevance for life's goals and the subject's state of preparedness for it.

The interviewer's next task is to establish the date of events and the duration of difficulties. Brown and Harris have suggested the use of "anchor dates" such as birthdays, bank holidays, etc., to act as aides-memoire. Great care is taken not to 'suggest' a date to the interviewee through leading or persistent questioning. In the present study a 'Diary of Significant Events' was compiled from The Times newspaper to help in the dating process. These 'significant events' covered incidents of local and national importance, and were regularly updated so that the 18 months before interview was covered (examples taken from this "Diary" are included in Appendix V).

Dating the duration of a chronic difficulty is inevitably more complex, particularly for those of a lesser severity and those which have continued several years. At first sight, this lack of precision would appear to be damaging. However, inaccuracies in the reported durations are attenuated during analysis by categorising each on the basis of duration and severity. Brown and Harris have used the broad categories of "major" or "non- major" and "marked health" or "non-

marked health" difficulties (see below for a definition of these terms).

2). The Rating stage

In rating, a panel judges the "meaning" (i.e. potential stressfulness) of events and difficulties to the individual. With Brown and Harris's procedure judgements are operationalized by means of a summary scale of "threat" for life events and a summary scale of "severity" for difficulties. Brown and his colleagues have also distinguished a variety of other rating scales the most important of which are described. Copies of the full rating scales used for events and difficulties are included in Appendix II.

Classification scale

No list of life events can hope to cover the universe of events which can happen to people. Brown and Harris's method confronts the problem of representative sampling by not sampling at all. Instead it attempts total coverage of all the salient recent experiences of the respondent within the broad domain of 40 areas of life. Some examples are given below.

Figure 5.3 Examples of the Life events classification scale

1. Loss of Job
2. Birth
3. Engagement
4. Marriage
5. Divorce/Separation
6. Illness
7. Hospital Admission
8. Death
9. Operation
10. Interaction Change
11. Residence Change
12. Police/Solicitor/Courts
13. Accidents
14. Burglaries
15. Loss/Damage/Theft
16. Forecast of Change
17. Revelation
18. Retirement

Each event is classified in one, or possibly two of 40 different ways depending on its dominant characteristics. For example, an event involving a person moving into Part III accommodation can be classified as (a) Residence change, and/or (b) Interaction Change, if it also resulted in diminished interaction with family or friends. For some events it will be sufficient to give only one classification. Difficulties are also classified on the basis of their dominant characteristics although the range of possible classificiations is smaller (n=10), and more general than for life events.

Independence scale

Here a judgement is made of the likelihood to which an event or difficulty is brought about by the insidious onset of psychological illness, rather than being a cause of the disorder. By distinguishing events which on logical grounds could not be the result of any onset, possible contamination is avoided. Although the scale consists of twelve separate points, in practice events and difficulties are categorized as being one of three types, namely "Independent", "Possibly Independent", or "Illness Related". These latter events (e.g. attempted suicide), are likely to be the result of psychological disorder, and consequently are excluded from all analyses of illness onset.

The first four points of the scale deal with "Independent" events and difficulties i.e. those whose

"immediate origin is unconnected with the subject and whose more distant origin it is difficult to attribut to him or her with any plausibility" (Brown and Harris, unpublished Life Events Manual). Point four includes all illness to the subject and is seen as the least independent of the four independent dimensions. According to Brown and Harris, it "allows for the possibility that somatic complaints to a person may be harbingers of their impending psychiatric breakdown". Presumably, although it is not explicit, when this is a possibility, somatic complaints (be they events or difficulties) must be regarded as "Illness-related". However, in practice it is extremely difficult to determine which "somatic complaints" are "causes" and which are "consequences" of psychological illness. For example, vegetative symptoms of depression (e.g. loss of appetite and libido) are not uncommon amongst sufferers of chronic pain, as is despair and hopelessness. This has led some investigators to suggest that chronic pain is a particular form of depressive illness, although others refute this (Roy et al,1984). The problem is more marked with elderly people because they frequently present with depression complaining of "physical" symptoms. Further there is considerable evidence to suggest that depression can mimic physical illness and that physical illness can mimic depressive illness (see Chapter 3).

In view of this complexity, Brown (1985) has

suggested that analyses be duplicated, classifying health events firstly as "independent", and then as "possibly independent". Although this is somewhat cumbersome, current knowledge concerning psychosomatic illness suggests this is not an unreasonable approach.

Point five is the most independent of the "Possibly Independent"' categories. Termed "consent"' it deals with events and difficulties where an incident from an external source forces the subject to make a decision. For example, a fall by an elderly woman forces her to take a living companion to avoid living in an institution, although she would not have chosen this prior to the fall. Point six is for intentional actions, such as moving house. Point seven describes events and difficulties which have clearly occurred as a result of the subject's probable negligence. The next two points describe incidents where contact with another person is broken-off, point eight after a row and point nine without. Points ten and eleven are for events and difficulties stemming from the subject's romantic susceptibilities, and point twelve for "illness-related" events.

The Focus scale

The focus scale specifies the person involved in the incident and is only completed in the rating of life events. Events in which the subject is the focus, or where the subject is equally involved with another person

(the latter are termed "joint" focus events) are collectively referred to as "S-focused" events. Events involving a household member, the subject's property or another person are referred to as "Other" or "O-focused" events. Brown and Harris (1978) have shown the focus rating to be of considerable importance in the study of depression onset. It appears that events which are only moderately threatening in the long-term but which are S-focused are capable of producing an onset of depression, whereas moderately threatening events which are O-focused are not.

"Threat" and "Severity" scales

It is with these rating scales that the potential threat of an event and severity of an ongoing difficulty are assigned. In arriving at a decision both scales lay emphasis on the context surrounding an event or difficulty. For example, in assessing the threat posed by a spouse's heart attack, raters take into account a person's biography and current circumstances but they are not told what the respondent said he/she felt about the incident. Thus each rating is an estimate of how most persons in such circumstances would be affected. Brown and Harris (1978) argue that it is only by ignoring self reports that potential sources of bias stemming from the respondent can be ruled out. Further, because the judgements of the investigator do not contibute to the consensus decision of the panel of raters, potential bias

stemming from the investigator is also brought under control.

For life events, a rating is made of both immediate and long-term impact. The former, short-term rating, is an assessment of the threat posed by an event in the 24 hours following its occurrence. The long-term threat rating concerns the outlook some seven to ten days after an event, when its consequences are likely to be clearer. Ratings for both the short and long-term threat of an event are made on a four-point scale running, from "marked" (scale-point 1) to "little or none" (scale-point 4). Events which are S-focused and rated 1 or 2 for long-term threat, or O-focused and rated 1 in long-term threat, are called severe events.

For difficulties, ratings are made both for the objective elements of the problem and the subjective elements (i.e. the subject's reactions to the situation). Objective aspects are those which, when divorced from S's feelings and experiences, would still constitute a difficulty in common sense terms" (Brown and Harris, Life Events Manual, p.222). Of course, in practice the distinction can be difficult to make and will sometimes have an arbitary element. Both the ratings of "objective" and "general", or subjective, severity are made on a six-point scale running from 'marked-high' (scale-point 1) to 'little or none' (scale-point 6). In addition to these ratings there are two other important

categories of difficulties, namely "Major difficulties" and "Marked health difficulties". The former are problems which fulfill the following three criteria; (1) a rating of three or higher on overall objective severity, (2) a duration of two or more years, and (3) do not involve health. Marked health difficulties on the other hand are those which fulfill criteria '1' and '2' and involve health of the respondent or of another.

Psychometric properties of the Bedford College metric

A discussion of the reliability of reporting events can be found in Chapter 2. Data on the inter-rater and test-retest reliability of the rating procedure can be found in Appendix VIII.

c) Mental state assessment

It is generally accepted that a high proportion of psychogeriatric disorders are recognized and referred for treatment only when they have reached a fairly advanced (often a crisis) stage. Thus Bergmann (1982) states that "..the elderly with early or less severe psychiatric disorder are 'invisible' to their family doctors; even when they are in contact for medical reasons their psychiatric illness escapes detection...". Set against this background, the need for a reliable and valid screening instrument and diagnosis is evident.

Two psychiatric assessment schedules were used in this study, namely the Comprehensive Assessment and Referal Evaluation, or CARE (Gurland et al,1977), and a

shortened version of the Geriatric Mental State, or GMS (Copeland et al,1976). All of the psychiatric assessments in Nantwich and approximately one-third (n=53) of those in Denbigh were by means of CARE. The shortened version of the GMS was used for 99 subject in Denbigh because of the need to increase the rate of psychiatric interviewing.

The CARE was devised for the U.K./U.S. Cross National Geriatric Community Study to assess a variety of health and social problems among community based elderly poplulations in New York and London. The schedule is wide-ranging in its questioning covering the presence and severity of specific psychiatric, physical, or social environmental problems, to their effects on the use of supports and services.

Of the 283 items contained in the version of CARE used in this study, our primary concern is with those item categories (referred to as 'Indicator Scales') that furnish a differential diagnosis of depression. In this respect the development of the CARE explicitly recognizes that the assessment of one problem (e.g. Depression) often involves its distinction from other problems (e.g. Dementia). This diagnostic separation calls for items that distinguish, for example, between symptoms of depression and those of physical illness, memory changes due to depression and those due to dementia, sleep disturbances due to depression and those due to physical

causes, and so on. In other words it calls for an adequate specification not only of the features of the targeted problem but also of those problems with overlapping features.

In accordance with psychiatric clinical practice, questions are directed at the characteristic symptoms of clinical conditions, thereby permitting an evaluation to be made when individuals are unaware of the labels for the conditions they have. Throughout the interview respondents are allowed to expand on their symptoms.

Particular attention was paid to the wording of depressive items because we wished to establish not only current psychiatric state (i.e. whether S was depressed at the time of interview), but also whether S had been depressed at any time in the 12 months before interview. Thus all depressive items were worded to determine a symptom's presence or absence over this period, its duration and, where applicable, the point of commencement in the previous nine months.

The cost of selecting, contacting and interviewing a probability sample ensures that one gathers as much data as possible. Thus on average it took two hours to administer the CARE. Experience indicates that most people will accept this without complaint.

Psychometric properties of CARE

Details of the psychometric properties of CARE are filed in Appendix VI.

The shortened GMS

This diagnostic instrument consisted of fifty-eight items drawn primarily from the full GMS (Copeland et al., 1976). All of the items measuring depressive illness and dementia were selected, and these were combined with a number of other items covering the subject's social activities (e.g. the number of clubs he/she attended), level of education and financial security. As with CARE, depressive items were so worded as to determine a symptom's presence or absence over the 12 months before interview, its duration, and point of inception.

Reasons for changing psychiatric assessment schedules

Changing the psychiatric assessment schedule after approximately one-third of the interviews had been completed in Denbigh was a radical, although necessary response to the problem of lack of progress in completing these interviews. The delays were a consequence of the limited time which the research psychiatrist was able to devote to the project, and this was compounded by the length of time it took to complete the CARE. If the delay had been allowed to continue there would have been insufficient psychiatric interviews to permit statistical analysis of the association between life events and depression. Further, as the delay between first and second interviews increased the likelihood of not measuring life events of possible aetiological importance also increased (see discussion above).

The decision to change instruments was not taken lightly. Initially we contemplated ceasing the LEDS interviewing to allow the psychiatrist to catch-up. However this was not possible. Interviewing only began in mid-April and the project was due to end in December. Further the research psychiatrist, by this time, had been offered another post in a different part of the country, so that the rate of interviewing needed to be increased if the project was to be completed. In light of this dilemma we were fortunate in being able to recruit some help from a second psychiatrist, though that was strictly limited and he too shortly moved to a new post in a different locality.

By replacing the very lengthy CARE schedule, which had been completed by 53 subjects in Denbigh, with a much shorter schedule, the research psychiatrist was able to catch-up. However the decision did have some undesirable consequences in that it meant working with a schedule of uncertain reliability and validity.

The diagnosis of a case of depression

In discussing case definition Barker and Rose (1976), note that "apart from a few inherited disorders...in the general population, disease behaves as a continuously distributed variable. The question is not so much 'has he got it?' as 'how much of it has he got?'". Psychiatric epidemiology faces an even more fundamental problem, namely deciding what "it" is. Thus

as Birtchnell (1974) points out, "there is no observable or measurable physical representation of mental illness so that its presence is largely a matter of the psychiatrist's opinion".

In Chapter 3, we discussed the considerable problems of defining a case of depression in the elderly. However, in recent years a number of operationalized diagnostic criteria have been developed to minimize diagnostic variance. One scheme, namely DSM III (American Psychiatric Association, 1980), was adopted in this study, and we defined a case of depression in accordance with DSM III criteria for a Major Depressive Episode only including those cases due to "uncomplicated bereavement". These criteria are listed below:

Figure 5.4 DSM III Diagnostic Criteria for a Major Depressive Episode

A. Dysphoric mood, or loss of interest or pleasure, in all or almost all usual activities and pastimes.

B. At least 4 of the following have been present nearly everyday for a period of nearly two weeks.

1. Poor appetite or significant weight loss (when not dieting) or increased appetite or significant weight gain.
2. Insomnia or hypersomnia.
3. Psychomotor agitation or retardation.
4. Loss of interest or pleasure in usual activities or decrease in sexual drive.
5. Loss of energy; fatigue.
6. Feelings of worthlessness, self reproach, or excessive or inappropriate guilt.
7. Complaints, or evidence of diminished ability to think or concentrate.
8. Recurrent thoughts of death, suicidal ideation, wishes to be dead.

d). Social support

Despite the growth of research on the nature and impact of social support there is little agreement on how the construct should be conceptualized or measured (e.g. Lin and Dean, 1984). Some generalizations can be reached however. For example, most workers would now agree that the measure of such variables as marital status, living arrangements or access to a confidant, as a proxy for social support (e.g Eaton, 1978; Berkman and Syme, 1979; Lin et al, 1979) fails to capture the multidimensional nature of the construct. Further, common to all the taxonomies of social support "is an acknowledgement of the relevance of emotional or perceived support on the one hand, and actual aid or its availability on the other" (Turner, 1983).

In this study a new measure of the availability of social support and satisfaction with it was piloted for use with elderly people. There were two reasons for this. At a practical level, any measure of support was to be used in conjunction with a battery of other questionnaires (LEDS, LSI-W and Demographic questions), and consequently would have to be relatively brief. Certain existing schedules (e.g. Interview Schedule for Social Interaction, Henderson et al, 1980b), were excluded from consideration because of their length. Other indices of social support (e.g. Surtess, 1980) were rejected because they equated social contact with social

support.

The second reason for developing a new instrument stemmed from dissatisfaction with some existing questionnaires, which purport to distinguish between different types of support such as "Emotional", "Instrumental", "Informational" and "Appraisal" support (e.g. Social Support Questionnaire; Schaefer, Coyne and Lazarus, 1984). In Chapter 4, it was sugested that such distinctions were conceptually unclear. A simple example illustrates this point. Suppose that Mrs. X does regular shopping for Mrs.Y, an elderly housebound widow. This provision of goods and services has been interpreted as evidence of Instrumental support, and indeed it may be. However, at another level, it may equally indicate emotional support and/or appraisal support, since it provides 'information' relevant to self-evaluation. One must also recognize that the type of support provided in the exchange may not be consonant for the two individuals concerned, i.e. for Mrs. X it is Instrumental support, but for Mrs. Y it is Emotional support.

Scale construction

The Index of Social Suport (ISS) consists of 10 two-part items which are listed in Appendix III.

The majority of these items (n=8), ask subjects to list all the individuals (e.g. family, friends, neighbours) who provide them with the type of support described, their relationship to S, and S's satisfaction

with the support provided. Weiss (1974), has suggested that the "opportunity for nurturing others", provides a sense of being needed, and is an important dimension of social support. It is possible that this may be particularly salient for some elderly people, who perhaps because of ill-health, living arrangements, or the misconceived views of family, have acquired what has been termed "a roleless role" (Branch and Jette,1983). Consequently an item was included asking subjects to list those people to whom they gave help or care. It has also been shown (e.g. Garrity,1973), that the receipt of social support entails tacit and/or explicit consequences and obligations for the recipient. For some individuals the "costs" of certain relationships may at times seem to exceed their benefits, so that they become a 'drain' on S's support system. For example, the support which a daughter provides to an elderly parent may, after the prolonged marital problems of the daughter (during which time the mother provides financial help and care for her children) be perceived negatively. The final item in the ISS therefore asked subjects to list those people who "asked too much of them".

This approach to the measurement of social support has been termed the 'socio-psychological or perceptual approach' (Turner, 1983), in that it focuses on the experience of being supported by others. The ISS combines both "structural" and "functional" elements in a global

index i.e it measures both the number of supporting relationships and the extent to which the relationships provide particular functions (e.g. emotional or instrumental support).

The ISS, in both format and content, was closely based on the Social Support Questionnaire (SSQ) developed by Sarason et al. (1983). The SSQ consists of 54 items, half of which concern the number of perceived social supports in S's life, and half the degree to which they are found personally satisfying. Close examination of the perceived support items show a high degree of repetition, and this redundancy is confirmed by the authors' reported Cronbach alpha coefficient of 0.97 for this half of the scale. Bearing in mind the time constraints on the proposed schedule, 5 items were selected from the SSQ which were thought to address the core human requirement of emotional support. The item wording was modified to make it more appropriate to a British population. A further two items were selected from the ISSI (Henderson et al., 1980b), although again their wording was modified slightly. Finally three new items concerning contact with neighbours, 'the opportunity for nurturance' and perceived 'drains' on resources were added. The remaining eight items of the scale concerned satisfaction with the available supports.

Scoring the ISS

Subjects were required to list all those people who

provided support, be they family, neighbours, friends or others. In asking subjects to name people, as opposed to listing the number of people (as with Henderson et al.'s ISSI), it was hoped that a more accurate assessment of support received would result. Often the same people were mentioned as providing support in response to more than one question. To avoid counting these people more than once, each subject's 'Total Availability of Support' score was calculated by summing the number of different people listed. Where a person was also listed as a "drain" on the subject's support resources, he or she was subtracted from S's total score. If a subject reported a person to be a drain on his/her resources but had not previously listed the same person as also providing support, no subtraction was made from the total score.

For those eight items where the subject was asked to indicate his/her satisfaction with the availability of suport, a score of '1' was given for 'satisfied' and '0' for 'not satisfied'. Thus a support would score eight.

The total ISS score was derived by summing the totals of the "availability" and "satisfaction" sub-scales.

Psychometric properties of the ISS

Details of the psychometric properties of the Index of Social support can be found in Appendix IV.

e). Life satisfaction

Life Satisfaction represents a subjective assessment

of the overall conditions of existence derived from a comparison of aspirations to actual achievements. Further "in that 'life as a whole' or 'life in general' is the referent, a long-range time perspective...and non-specific life conditions are implied" (George and Bearon, 1980).

Despite its popularity, the construct of life satisfaction is not without critics (e.g. Lawton, 1977; Rosow, 1963, 1977). A frequent criticism is that it lacks conceptual clarity and consistency in usage. For example, in the literature distinctions between life satisfaction, happiness and morale are obscure and difficult to recognize. In studies using the elderly as participants (e.g. Lohmann, 1977; Stock and Okun, 1982), product-moment correlations from 0.2 to 0.9 between the three constructs have been reported. This suggests that although life satisfaction, happiness and morale are related they are not identical.

A second difficulty concerns the level at which life satisfaction is assessed. Although intended to provide a more global index of satisfaction it is clear that evaluations can occur at a day-to-day, specific action level. Ideally a metric should be sensitive to both current and past conditions.

In this study the Life Satisfaction Index-W (Bigot, 1974) was chosen because it is the only scale which has been standardized for use with a British elderly

population. The scale was only used in Denbigh. The LSI-W consists of eight items which were derived from the 20-item Life Satisfaction Index-Achievement (LSI-A) (Neugarten, Havighurst and Tobin, 1961), by item and factor analysis. A copy of the LSI-W is reproduced below.

Figure 5.5 The Life Satisfaction Index-Wellbeing

Items	Agree	Disagree	Unsure
1. I am as happy as when I was younger.	X		
2. My life could be happier than it is now.		X	
3. These are the best years of my life.	X		
4. The things I do are as interesting to me as they ever were.	X		
5. I would not change my past life if I could.	X		
6. Compared with other people I've made a lot of foolish decisions in my life.		X	
7. When I think back on my life I didn't get most of the important things I wanted.		X	
8. Compared to other people I get down in the dumps too often.		X	

X signifies those responses indicative of high satisfaction

The full scale consists of two 4-item sub-scales, namely 'Acceptance-Contentment' (items 1-4) and 'Achievement-Fulfilment' (items 5-8), which assess the respondents current contentment and satisfaction with past achievement respectively. Taken together the sub-scales sum to provide an overall measure of well-being.

The LSI-W was scored on a 3-point Likert scale with subjects responding 'Agree', 'Disagree' or 'Unsure' to each of the eight items. For items 1,3,4 and 5 agreement

was scored 2 and disagreement was scored 0. Scoring was reversed for items 2, 6, 7 and 8; here disagreement was scored 2 and agreement 0. A response of 'unsure' to any item was scored 1. The maximum possible score was 16.

Psychometric properties of the LSI-W

This analysis was prompted by the fact that the LSI-W was developed on a male sample of convenience, not all of whom were elderly as usually defined (they ranged in age from 55-79 years). Further no cross-validations of the scale have been carried out. Details of the psychometric properties of the LSI-W are contained in Appendix VII.

Response rate and characteristics of the community samples

The response rate can be defined as the ratio of the number of interviews completed for eligible subjects to the number of eligible subjects in the sample. Failure to collect data from some sampled elements is a concern because nonrespondents may differ from respondents with regard to the variables of interest. In this case estimates based on respondents alone will be biased estimates of overall population parameters.

Details of the response rate of the Nantwich sample are given in Figure 5.6 overleaf.

Figure 5.6 Response rate for the Nantwich community sample

	SUBSAMPLES					
	S1	S2	S3	S4	S5	TOTAL
Number of S's mailed	50	50	50	50	21	221
Number dead	0	0	4	0	0	4
Number who had moved	5	3	0	0	0	8
Nonexistent address	6	6	4	0	4	20
Illness prevented interview	1	2	0	0	0	3
TRUE SIZE OF SUBSAMPLES	38	39	42	50	17	186
Completed Psych. interview	24	22	23	30	10	109
Refused L.E.D.S. interview	2	3	0	3	2	10
Confused/Dementia	3	1	1	3	1	9
Completed L.E.D.S. interv.	19	18	22	24	7	90
DID NOT PARTICIPATE	14	17	19	20	7	77
% Response rate FIRST interview	63	56	55	60	59	59
% Response rate LEDS interview	54	47	54	51	44	51
% RESPONSE RATE BOTH INTERVIEWS	54	47	54	51	44	51

A total of 221 people aged 65 years and over living in the Nantwich area were invited to take part in the study. Four subsamples of n=50 were completed. Interviewing of the fifth subsample could not be completed before the end of the study. Of the 186 subjects in the sample, 109 subjects or 59% of the sample agreed to the first, psychiatric, interview. Ten of these subsequently refused the life events interview and nine subjects were excluded from the second interview because of evidence of confusion and/or organic impairment. This produced an overall response rate of 51%.

Contacting subjects in the Nantwich sample was not a

problem. Few, (5%), of the potential subjects had moved or died, although a relatively high proportion (9%) of the sample could not be traced because of incomplete or erroneous addresses. Persuading subjects to take part in the study was a problem. Reference to figure 5.6 shows that 44% of the sample (n=77) did not agree to participate. The rate of non participation was uniformly poor across each of the five subsamples (a Kruskal-Wallis oneway ANOVA produced a chi-square of 0.26; df= 4, p>0.05). Could the response rate have been adversely affected by one or two "rogue" general practices? Table 5.7 examines this.

Figure 5.7 Nantwich response rate classified by General Practice

Practice	No.Accepting	No.Refusing	Ratio Accept/Refuse
A	23	13	1.80
B	39	29	1.30
C	21	18	1.20
D	9	3	3.00
E	7	8	0.90
F	10	6	1.70

With the exception of practice "D" the ratio of acceptance to refusal was consistently low. The poorest response came from practice "E" where non participants outnumbered accepters. There was no difference between practices in levels of response (Chi-square = 2.97, df = 5, p>0.05). Responders were compared with non-responders by age and sex to see if these variables were of utility in explaining refusal rates. These data are given in Figure 5.8 overleaf.

Figure 5.8 Nantwich subjects cross-classified by sex, age-group, and participation in the study

Sex	Age-Group	Did Participate	Did not participate
Male	65-69	13	15
Female	65-69	15	15
Male	70-74	17	9
Female	70-74	23	15
Male	75+	19	11
Female	75+	22	22
TOTAL		109	77

The contrasts for both variables did not reach statistical significance; Student's T for age was 0.18 (p=0.86), and the Chi-square for sex was 0.3 (df.=1, p=0.86).

The bias introduced by the level of non-response would be particularly damaging if those with depression were over represented in the nonresponders. To exclude this possibility a retrospective check of non-responders mental health was carried out by examining their medical records for the four years preceeding the study.

Figure 5.9 Psychiatric status of non-responders in the 12 month period before the study (G.P. diagnosis)

Onset Depression	Chronic Depression	Onset other psychiatric	Other psychiatric illness - chronic	Illness Free
0	6	0	2	69

Allowing for variation amongst G.P.'s in their diagnosis of depression, the data shows that the great majority of non-responders (90%) were psychologically well. Only 8% of those not interviewed were judged to be depressed, and these were all chronic cases. As it is only onset cases which are analysed for associations with

life events we should not be too pessimistic about their ommission.

The subject characteristics (age, sex, and psychiatric caseness) do not account for the low response rate in Nantwich. Scrutiny of the procedures used to contact subjects may be more helpful. Interestingly, Gurland et al (1983), report a response rate of 81% for their elderly "London sample" following procedures similar to those used in Nantwich. One possibly key difference was that in London subjects who failed to respond to the 'introductory' letter attempts were contacted by telephone. In Nantwich subjects who had not responded to an introductory letter were sent a reminder letter, and subsequent non response was equated with refusal. Personal contact is a more potent stimulus to participation than an impersonal letter, however well this is drafted. This hypothesis was subsequently tested in Denbigh where subjects were personally visited shortly after receipt of the introductory letter. As anticipated, face-to-face contact with the researcher boosted participation (see Figure 5.10 below).

Ten of the 109 subjects who had completed the psychiatric interview subsequently refused the life events interview, but no statistical differences were found between those who did and those who did not complete the second interview on a number of demographic variables (Age, T=0.6, p=0.56; Sex, Chi square=0.112,

df=1, p>0.05: Marital status, Chi square=1.29, df=3, p>0.05: Educational level, chi square=0.74, df=2, p>0.05: Social Class, Chi square=3.20, df=4, p>0.05). These "secondary" non-responders were not in poorer health than those completing both interviews; on the basis of a self-report index of health (Chi square=4.4, df=3, p>0.05), and number of drugs prescribed (Chi square=0.09, df=1, p>0.05), they did not significantly differ.

The Denbigh sample

A total of 233 people living in the Denbigh area were invited to take part in the study. As in Nantwich, interviewing of the fifth and final subsample of 50 subjects could not be completed before the end of the study. As a fairly large proportion (n=23) of this final subsample were men, this resulted in a bias in the proportion of elderly men in the overall sample.

Details of the overall response rate for the Denbigh sample are given in Figure 5.10 overleaf.

Figure 5.10 Response rate for the Denbigh community sample

	SUBSAMPLES					
	S1	S2	S3	S4	S5	TOTAL
Number of S's mailed	50	50	50	50	33	233
Number dead	3	3	2	2	1	11
Number who had moved	5	5	1	5	4	20
Nonexistent address	1	3	2	5	1	12
Illness prevented interview	1	0	0	1	0	2
TRUE SIZE OF SUBSAMPLES	40	39	45	37	27	188
Completed L.E.D.S interview	31	32	38	30	25	155
Refused Psychiatric interview	0	2	3	1	2	8
Confused/Dementia	0	1	0	3	1	5
Completed Psych. interview	31	31	35	32	23	152
DID NOT PARTICIPATE	9	6	7	4	2	28
% Response rate LEDS interview.	78	82	84	81	89	83
% Response rate psychiatric interview	78	80	78	87	85	81
% RESPONSE RATE BOTH INTERVIEWS	78	77	78	78	82	78

Of the 188 subjects who were eligible to take part in the study, 155 or 83% completed the first life events interview, and 147 subjects completed both the life events and psychiatric interviews. Eight subjects who completed the LEDS interview subsequently refused the second psychiatric interview and five subjects who were diagnosed as having senile dementia were not given the LEDS interview. As in Nantwich "secondary" refusers were compared with those who had completed both interviews. The two groups did not differ by sex (Chi Square= 0.79, df=1), marital status (Chi Square=1.91, df=3), social class (Chi Square=4.41, df=4, $p>0.05$), or age (T=1.71, $p=0.12$).

The level of non-response in Denbigh was 17%. Non-responders (n=28) did not differ from responders by age (T=1.13, p=0.20) or sex (Chi Square=0.87, p.0.05). Again the medical records of non-responders were scrutinized for evidence of psychiatric illness in the four years preceeding the interviews. The results of this retrospective check are given below.

Figure 5.11 Psychiatric status of non-responders in the 12 months before the study (G.P. diagnosis)

Onset Depression	Chronic Depression	Onset Other Psychiatric	Other Psychiatric Illness-Chronic	Illness Free
0	3	2	0	22

Eighty-two per cent of those who refused to take part were psychologically well. A small number (n=3) were diagnosed by their G.P.'s as long term depressives. There were no cases of depression which had onset in the previous twelve months.

Demographic characteristics of the community samples

Our concern with sample statistics is that they should yield 'good' estimates of the population parameters. Population parameters are usually unknown. However in 1981, the year preceeding the study, the government had carried out its decennial Census. Some sample statistics can therefore be compared with the population parameters provided by the Census. Occasionally, because of the way in which census data is published, the parameters are approximations.

The data described below is derived only from those

subjects who completed both the psychiatric and life events interviews (Nantwich, n=90; Denbigh, n=147).

Age

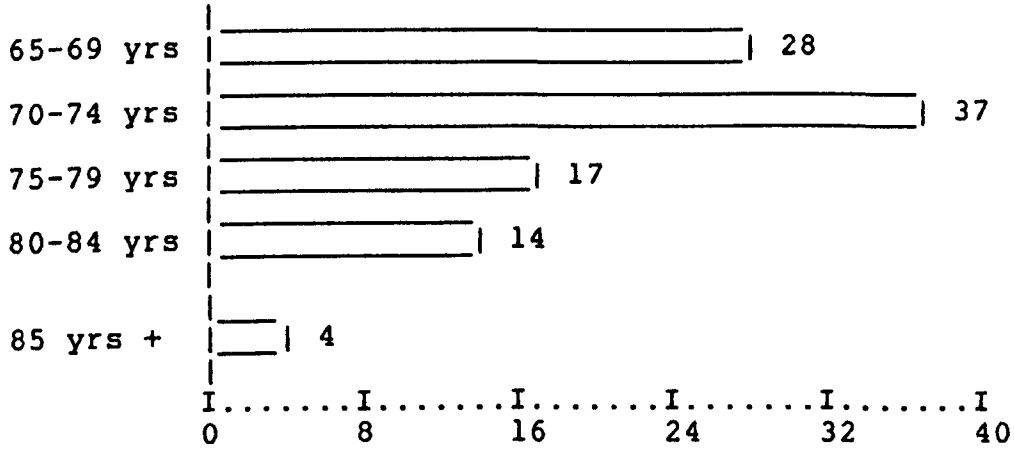
a) Nantwich

The 90 subjects ranged in age from 66 to 88 years (median = 72). The age distribution of the sample was slightly skewed toward higher values, a consequence of imposing a lower bound on the data, but no upper bound (see Figure 5.12 below).

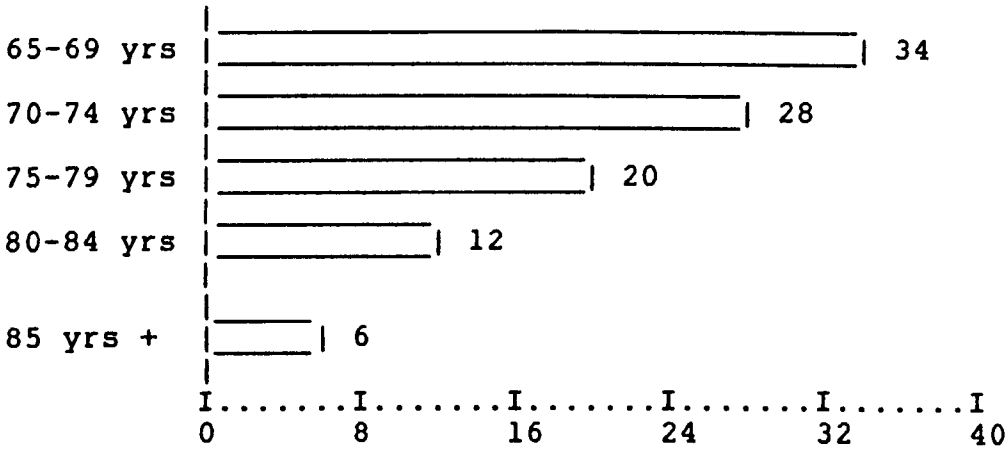
In light of the refusal rate the sample and population distributions in Nantwich were compared to determine if the former was biased. In Figure 5.12 'a' and 'b' the bar of the two histograms representing age 85+ has been slightly set apart because its class interval is not equal to that of the others.

Figure 5.12 Histogram comparison of Age for the Nantwich sample and population

(a) Sample



(b) Population



Percentage of Population (Census)

It can be seen from the histograms in Figure 5.12 that people in the 65-69 years class were under-represented in the sample (although not significantly so; $z=0.8$, $p>0.05$), and that people in the 70-74 years age range were over represented in comparison with the population (again not significantly different from the population parameter, $z=1.24$, $p>0.05$). Because census data is published in grouped form it is only possible to calculate an approximate mean and standard deviation for the population. These calculations yield a population mean of 73.8 years and standard deviation of 7.07 years. The equivalent sample statistics were, mean = 73.4 years and standard deviation = 5.49 years. Thus, despite the high levels of non-response in Nantwich it is clear that the age distribution of the sample is not biased.

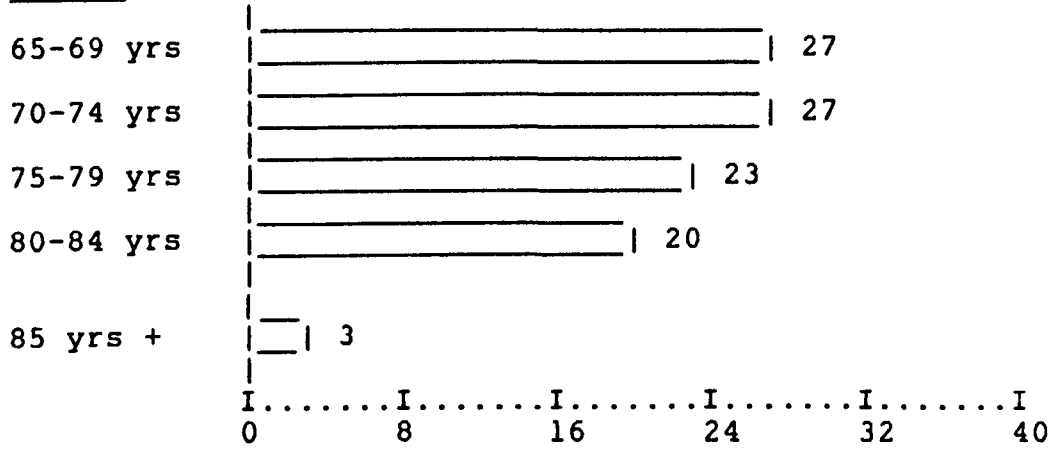
Denbigh

The Denbigh sample ranged in age from 65 to 89

years, (median = 73 years). The mean age was 74 years. As in Nantwich the distribution was slightly skewed to the right. A comparison of the sample and population age distribution is given below in Figures 5.13 'a' and 'b'.

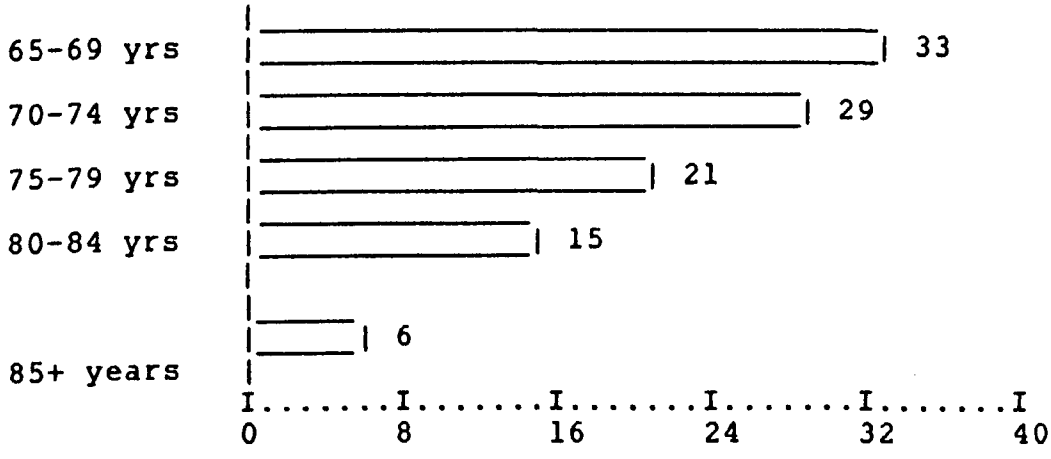
Figure 5.13 Histogram comparisons of age for the Denbigh sample and population

Sample



Percentage of Denbigh Sample

Population



Percentage of Population (Census)

Figure 5.13 shows that the Denbigh sample approximates the age of the population fairly well. There is some oversampling of the 80-84 years group

though this did not reach statistical significance ($z=1.12$, $p>0.05$). The population mean is 73.8 years (Sample mean=74 years), and the population standard deviation is 6.8 years (sample S.D.= 6.0 years).

The age distributions of the Nantwich and Denbigh samples are very similar ($T=0.23$, $p=0.82$). The biggest discrepancy lies in the proportion of people in the 70-74 years range. In Nantwich there were significantly more people in this category ($z=1.73$, $p<0.05$) than in Denbigh. Despite the response rate in Nantwich, the measures of location (Median, Mean and Standard Deviation) of the two samples did not differ by more than a year. The Denbigh sample was slightly older than that of Nantwich; 65% of the Nantwich sample was below the age of 75 years (c.f. 54% in Denbigh). A classification of samples into 'young-old' (i.e. 65-74 years) or 'old-old' (75 years +) shows that there were significantly more old-old people in the Denbigh sample ($z=2.60$, $p<0.005$).

Sex

Typically the average female to male ratio in an elderly population is reported as 2:1 (e.g. Hunt, 1978). However in more rural areas, because of the tendency for women to move into small towns, and the agricultural economic base, there tends to be a higher proportion of males (Wenger, 1982).

The number and ratio of males to females in the Nantwich and Denbigh samples, cross-classified by age, is

reported in figure 5.14. For comparison, the population parameter derived from the 1981 Census is also given.

Figure 5.14 Nantwich and Denbigh samples cross-classified by sex and age

	NANTWICH				DENBIGH			
Age Group	No. Men	No. Women	M-F Ratio	Census Ratio	No. Men	No. Women	M-F Ratio	Census Ratio
65-69	12	13	0.92	0.87	17	23	0.74	0.78
70-74	14	19	0.74	0.72	16	24	0.67	0.69
75-79	7	8	0.88	0.62	19	14	1.36	0.60
80-84	6	7	0.86	0.47	14	15	0.93	0.47
85+	0	4	0.00	0.37	0	5	0.00	0.31
TOTAL	39	51	0.77	0.65	66	81	0.82	0.65

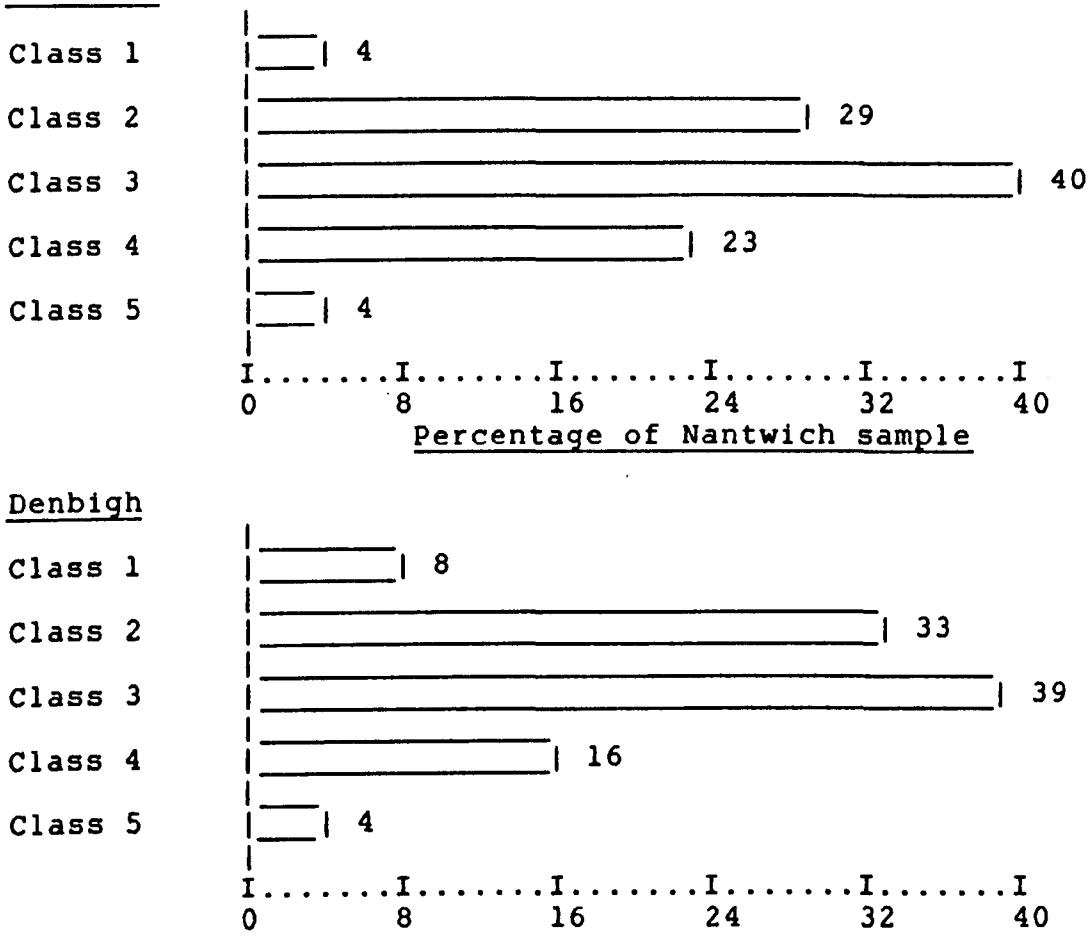
In both the Nantwich and Denbigh samples the ratio of men to women was greater than anticipated and significantly greater than the population parameters. In Nantwich the computed Z was 3.47 ($P<0.0005$), and in Denbigh Z was 8.35 ($p<0.0001$). From figure 5.14 it can be seen that the differences were confined to the over 75 years age category. For example, in Denbigh there were more than twice the anticipated number of men between the ages of 75 and 84 years, although there were no men in the over 85 years age category. The excess of males in Denbigh was most likely caused by the failure to complete interviewing of the fifth sub-sample of subjects. Comparing the Nantwich and Denbigh samples shows they were not statistically diferent in sex composition (chi-square = 0.06, df=1, $p>0.05$).

Registrar General's Social Class

The convention of allocating people to a class position on the basis of occupation is not very satisfactory when the majority of one's sample no longer work; indeed a high proportion of women in both samples had never worked. The position is even more unsatisfactory when dealing with a rural sample because of high rates of self-employment among a farming community. This can produce glaring anomalies in social class allocation. For example, a hillside farmer with no electricity in his house was allocated to Social Class II. Taylor and Ford (1981) note that, with an elderly population an allocation to class on some combination of income and education also raises problems because the great majority left school at an early age. In Nantwich and Denbigh, 86% and 87% respectively had left school by the time they were 14.

Whilst acknowledging these shortcomings, men and women who worked have nevertheless been classed in the conventional way according to their own main lifetime occupations, and women who have never worked according to their husband's main occupation.

Figure 5.15 Distribution of Social Class in Nantwich and Denbigh



The social class distribution of each sample is, as anticipated, slightly skewed toward the Registrar General's categories I and II. It is not possible to make a direct comparison of these statistics with the 1981 Census data because the O.P.C.S. assigns a social class only to those who are "economically active". Comparing samples it is clear that the Denbigh sample tends to be more "middle class": in Nantwich 46% of the sample had been employed in Non-Manual occupations,

whereas in Denbigh the figure was 54%. However, overall the two samples did not differ statistically in class composition (Chi Square=4.002, df=4, p>0.05).

Marital status

The marital status of the two samples, together with the respective population parameters are given below.

Figure 5.16 Marital status of the Nantwich and Denbigh samples and population parameter

	NANTWICH		DENBIGH	
Marital status	Sample	Population	Sample	Population
	%	%	%	%
Single	4	8	9	10
Married	53	53	54	55
Widowed	41	38	36	34
Divorced	2	1	1	1

In Nantwich there was a slight oversampling of "single" subjects and an undersampling of the widowed. In Denbigh there was an undersampling of widowed subjects, and married people were slightly over-represented. Overall the sample distributions were a good approximation of the respective population parameters, and the Nantwich and Denbigh samples were not statistically different in composition (X^2=2.1, df=3, p>0.05).

It appears that in terms of marital status, the Nantwich and Denbigh samples are typical of other elderly community samples. For example, Ford and Taylor's (1984) sample of elderly Aberdonians consisted of: 11% single persons; 52% married; 33% widowed; and 4% divorced.

Living arrangements

All subjects were classified in terms of their

living arrangements, and the data are presented in figure 5.17 below. The samples were very similar. Just over one third of each sample lived alone. This again closely mirrors the data reported by Ford and Taylor (1984); 35% of their elderly Scottish sample lived alone, 44% lived with a spouse, and 3% lived with a sibling. Thus we have no reason to believe that our samples were atypical in terms of living arrangements. Comparing the Nantwich and Denbigh samples shows that they did not differ in terms of living arrangements (X^2=1.09, df=3, p>0.05).

Figure 5.17 Nantwich and Denbigh samples classified by living arrangements

Household Composition	% Nantwich Sample	% Denbigh Sample
Living Alone	36	34
Living with Spouse	51	53
Living with a Child	10	8
Living with Another (e.g. Sib)	3	5

Comments on the demographic characteristics of the community samples

Having examined the demographic characteristics of the community samples, and compared them with the respective population parameters, it is clear that despite the low response rate in Nantwich the sample is not a biased one. Additionally, in terms of social class, marital status, and living arrangements, the samples are remarkably similar. In both, the proportion of men is greater than the census data gathered in the previous year. In Denbigh there were also significantly more old-old subjects than in Nantwich, although overall the

median ages of the two samples differed by only one year.

Demographic characteristics of the Patient sample

Age

The patient sample ranged in age from 65 to 85 years, (median 71 years; mean 72.97, standard deviation 5.8). Comparison of the patient and community samples showed that there were no significant age differences either for the Nantwich sample ($T = 0.70$, $p = 0.38$), or the Denbigh sample ($T = 0.90$, $p = 0.37$).

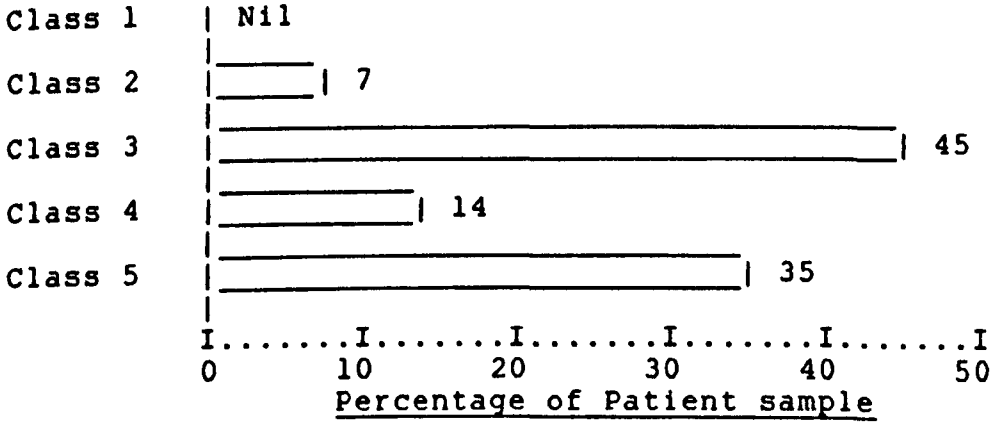
Sex

Twenty-eight percent ($n = 8$) of the patient sample were men and 72% ($n = 21$) women. The ratio of men to women was 0.38 compared with 0.77 in Nantwich and 0.82 in Denbigh. Thus the patient sample had significantly fewer men than Nantwich ($z = 2.88$, $p < 0.005$) or Denbigh ($z = 4.2$, $p<0.001$).

Social class

The social class distribution of the patient sample is given in Figure 5.18 below.

Figure 5.18 Histogram of social class for Patient sample



A Kruskal-Wallis one-way analysis of variance showed that the class composition of the patient sample differed significantly from both the Nantwich and Denbigh samples (chi-square= 5.69, p=0.02; chi-square=18.68, p=0.001 respectively). Forty-nine percent of the patient sample were from social classes 4 and 5, whereas in Nantwich and Denbigh the equivalent proportions were 27% and 20%. It is clear, therefore, that the patient sample, which was predominantly composed of people living in an inner-city area, were more "lower class" than the community samples.

Marital status

A breakdown of the patient sample by marital status is given in Figure 5.19.

Figure 5.19 Marital status of Inpatient sample

Marital status	Percentage of Sample
Single	3.5
Married	37.9
Widowed	44.8
Divorced/Separated	13.8

There are two notable differences between the patient and community samples. Firstly, the proportion of married subjects is far smaller than in Nantwich (53%) or Denbigh (52%). Secondly, the number of divorced and separated subjects is far greater. In Nantwich the equivalent figure was 2%, and in Denbigh it was only 1%. Overall, a chi-square analysis showed that, in terms of marital status, the inpatient sample were significantly different from both the Nantwich and Denbigh samples (chi-square=7.04, df=3, p=0.08; chi-square=13.55, df=3,

p=0.01 respectively).

Living arrangements

The living arrangements of the patient sample are tabulated in Figure 5.20 below.

Figure 5.20 Patient sample classified by living arrangements

Household Composition	% of Inpatient Sample
Living Alone	35
Living with Spouse	38
Living with a Child	20
Living with Another (e.g. Sib)	7

In comparison to the community samples it is notable that a smaller proportion of the patient sample lived with their spouses, and that a greater proportion lived with their children. Whereas over 50% of both community samples lived with a spouse, only 38% of the patient sample did so, and approximately twice the proportion of patients lived with their children. Overall, a Kruskal-Wallis oneway ANOVA showed that there were no significant differences between the patient and community samples in their living arrangements (Nantwich, chi-square=0.49, p=0.48; Denbigh, chi-square=0.80, p=0.37).

PROCEDURE

Contacting subjects in Nantwich and Denbigh

In the first instance each subject was contacted by a letter which had been signed by his or her G.P.. The letter, a). endorsed the study, b). introduced the research team, and c). gave assurances of anonymity and

confidentiality with regard to the responses. It was supported by an accompanying letter from the Institute of Human Ageing which outlined the purpose, and stressed the importance of the study. For the Denbigh sample the letters were written in both English and Welsh.

At this point the procedure for contacting subjects in Nantwich and Denbigh differed. The Nantwich subjects were asked to complete a slip of paper indicating willingness to take part and to specify convenient days for interview. A stamped-addressed envelope was included for replies. On the basis of this, an appointment was made for the first interview. The decision to conduct all interviewing on an appointments basis was made because of the N.H.S. commitments of the research psychiatrists. Non-responders were followed-up one month later by a "reminder" letter. No further attempt was made to contact subjects who failed to respond to this second letter because the research doctors who had negotiated the permission from the G.P.'s to interview their patients interpreted this "agreement" in this way. All refusals were accepted as final.

In Denbigh, subjects were informed in the first (and only) letter that a member of the research team would be calling on them "in the near future". No attempt was made to operate an appointments system because it had been found too cumbersome. All subjects were visited within two weeks of the introductory letter. Most people agreed

to be interviewed at the time of first contact, but when this was not possible an appointment was made. No effort was spared in trying to contact subjects. If there was no response at an address, then neighbours were contacted to ensure that the subject still lived there. If the address was confirmed as correct, then as many calls as were necessary (the maximum number was six) were made in order to contact the subject. If the subject had moved, neighbours were asked if they knew of the new address. If it was known, and within the study area, an attempt was made to contact the subject again. As in Nantwich, all refusals were accepted as final.

In both Nantwich and Denbigh no mention was made at the initial point of contact that subjects would be required to conduct two separate interviews. Interviewing in Nantwich began on August 4th, 1982, and in Denbigh on April 18th, 1983.

Interviewing in Nantwich

With the exception of one person (who for superstitious reasons refused to allow any doctors into his home), the psychiatric interviewing took place in the subject's own home. All the interviews were conducted with the CARE schedule. Before questioning, subjects were informed of the purpose of this "health survey", and told that the questions asked would cover all aspects of health and day-to-day functioning.

During the course of the interview, which on average

lasted two hours, the research psychiatrists determined; a) The presence and severity of specific psychiatric, physical and social/environmental problems, b) The availability of assets and supports to the subject, and c) The effect of problems on the use of supports and services. Considerable attention was paid to those items measuring depressive symptoms. Through semi-structured questioning the interviewer first established if a given symptom had been present at any time in the 12 months before interview. If so, efforts were made to determine if the symptom had begun in the previous 9 months, and also to date the onset to within one week. Where such accuracy was not possible, e.g. where S could only say with certainty that the symptom had begun in a particular month, then onset was taken to be the mid-point of this period. For symptoms present within the 12 months, but which had not begun in the 9 months prior to interview, the research psychiatrist recorded duration only. Subjects who had experienced an onset of depression were also asked if they had had any previous episodes. For those who had, the date of this episode of depression was also recorded.

On completion of the interview the psychiatrist made a clinical diagnosis for the subject in accordance with the DSM III criteria for major depression. Three diagnostic categories were used:-

(1) Case Onset. Where subjects had sufficient symptoms of case severity beginning in the 9 months before

interview.

If an onset case had also experienced an onset of depression in the 12 months preceeding the "current" episode then he or she was classified as a chronic and not onset case. This was necessary in order to rule out a possible sequential association between life events and depression (e.g. life events --> depression--> more life events--> another depression, etc.).

(2) Case Chronic. Where subjects had sufficient symptoms of case severity beginning outside the 9 months before interview, but present during the previous 12 months.

(3) Normal. Where subjects had no symptoms or an insufficient number to justify consideration of caseness.

Following the psychiatric interview each subject was asked if he or she would complete a second interview with a "research worker". Where the subject agreed an appointment for this interview was arranged. Irrespective of whether or not subjects agreed to a second interview, all were thanked for their assistance in the study.

The life events interviews were all carried out in the subject's home. The interviewer began by explaining the purpose of the interview, which was to examine the "stress and strains" which elderly people faced in their day-to-day lives. The interviewer emphasized that the questions would mainly concern "problems" which might have occurred in the previous 12 months. Subjects were informed that all replies would be treated in the strictest confidence. At many interviews it was clear

that the spouse of the subject was interested in the proposed interview. Whilst it was possible to conduct most interviews with the subject alone, for some this simply was not possible. On these occasions the spouse was tactfully asked not to answer, or comment on the subject's replies.

The interviewer began by gathering basic demographic information about the subject and his or her immediate family. Before commencing the LEDS interview subjects were asked if they would permit the interview to be tape-recorded as this would allow the interview to progress more smoothly and quickly. Of the first twenty-one people interviewed only one person objected. However despite this, it was decided to stop recording the LEDS interview. This decision was taken following an informal talk with one subject who suggested that some people from the same village had refused to be interviewed because they did not want personal details of their lives recorded. It was felt that no amount of reassurance would be likely to allay this fear, and so interviews were subsequently recorded by hand.

The LEDS seeks first to determine whether the subject has a confidant i.e. someone to whom he or she can talk openly and frankly about any problem. During the course of interviewing it sometimes became apparent however that, despite the initial reply, the degree of intimacy between the subject and his or her confidant was

less, or greater than initially suggested. The interview then proceeded to establish if the subject had experienced any of an extensive range of life events or ongoing difficulties in the twelve months before interview. Once the occurrence of an event or difficulty had been established the interviewer proceeded to probe in a systematic way in order to establish the surrounding circumstances. Extensive information was gathered to permit the following characteristics and ratings to be derived; 1) What the event/difficulty was e.g. death or hypertension, 2) The time of occurrence of the event or duration of the difficulty in relation to the date of interview, 3) The degree of independence of the event/difficulty, 4) The degree of control the subject had over the initiation of the event, 5) the subjective impact, and, 6) the objective impact of the event/difficulty. Considerable effort was made to date the occurrence of an event as accurately as possible both by reference to significant events within the subject's life e.g. birthdays, and by systematic use of the 'diary of significant events'.

Typically the LEDS interview lasted two hours. At the end of the interview the subject (and family) were thanked for participating. Our overriding impression was that, without exception, subjects greatly enjoyed the interviews and at times it was difficult to bring the interview to an end.

Interviewing in Denbigh

In Denbigh the LEDS interview was conducted first. The decision to reverse the order of interviewing was taken following the suggestion of a G.P. that the Welsh nationality of the life events interviewer might help to alleviate some of the fears of elderly people concerning the interview.

Approximately seven-to-ten days after sending the introductory letters, the research worker called on the subject to conduct the life events interview. The overwhelming majority of subjects agreed to be interviewed at this time.

The interviewer began by explaining the purposes of the interview. These were; a) To examine the stresses and strains which elderly people faced in their day to day lives over the previous twelve months, b) their satisfaction with life both past and present, and, c) to examine the levels of support which they had available to them in their everyday lives. At the outset it was emphasized that it would be necessary to complete two interviews, and that the second interview would be a 'health' survey to be conducted by a doctor. At this first interview not one subject objected to a second interview. Refusals occurred only later when the psychiatrist called to conduct the second interview. As in Nantwich there were a few occasions when it was not possible to conduct the life events interview with the

subject alone. Again, in these situations the spouse was asked not to answer any of the questions or comment on the subject's replies.

Interviewing in Denbigh began with the gathering of demographic information. The subject was then given the LSI-W (Bigot, 1974), and this was followed by the ISS. Finally the LEDS was administered in the way described for Nantwich. No attempt was made to tape-record the LEDS interview. On completion of interviewing the respondent was reminded that the research doctor would be calling on them in the near future. Each subject was asked if there was any particular day that interviewing would be inconvenient or not possible (interviewing in Denbigh coincided with the Summer holiday period). This information was then passed to the psychiatrist. Each visit ended with the subject (and his/her family) being thanked for their assistance.

The second, psychiatric, interview followed as soon after the first as possible. Interviewing proceeded in exactly the same manner as in Nantwich. Four of the subjects in Denbigh were monoglot Welsh speakers. On each of these occasions the psychiatrist conducted his interview by means of an interpreter (spouse or child). After completing fifty-three interviews with the CARE schedule a shortened version of the GMS was used as the psychiatric interview schedule. This had the effect of reducing the duration of the interview from two hours to

approximately twenty-five minutes. Again at the end of the interview the psychiatrist recorded a diagnosis in accordance with DSM III criteria.

Interviewing the Patient sample

Shortly after their admission to hospital, these subjects were given a full mental state examination by a psychiatrist. Only those who had a clear onset of depression of sufficient severity to meet DSM III criteria, and who had not had an episode of depression in the 12 months prior to the current episode were subsequently given the LEDS interview.

The LEDS interview followed only when, in the psychiatrists opinion, the subjects were capable of undergoing a detailed interview. The interview procedure was identical to that followed in Denbigh; after gathering demographic information, the LSI-W was administered, followed by the ISS. Finally, subjects were given the LEDS.

The contextual rating of life events and difficulties

Shortly after interviewing commenced in Nantwich, a group of four psychologists met weekly to carry out the rating of events and difficulties. Two had been trained in these techniques at Bedford College by Brown and his colleagues. Before rating began they trained two novice raters to a standard suggested by Tennant et al. (1979), which has been shown to produce high inter-rater reliability between experienced and novice raters.

Training consisted of initial familiarization with the technique using sections of the rating manual defining the short-and-long-term threat and severity of events and difficulties, and providing relevant examples. The novice raters then observed two rating sessions, and finally listened to two tape-recorded interviews.

Until sufficient data had been generated to determine the levels of inter-rater reliability between experienced and novice raters it was decided to exclude the judgements of the latter from the consensus ratings of threat and severity. Thus in the first three months of rating only the two experienced raters contributed to the consensus ratings. This marks a departure from the procedure recommended by Brown and Harris (1978) where in an attempt to minimize reporting bias, the interviewer does not form part of the rating team. At the end of this three month period the ratings were analyzed to determine levels of agreement between all four raters. The results of this study are reported in Appendix VIII.

Having established high levels of inter-rater reliability for both events and difficulties, the group of four psychologists split into two groups comprising of an experienced and novice rater. This was necessary to ensure that all events and difficulties were rated before completion of the study. Thus the great majority of ratings were carried out by two groups of two raters; the interviewer (i.e. experienced rater) and a 'novice'

rater. Again this marks a departure from the procedures recommended by Brown and his colleagues.

Rating sessions began with the interviewer firstly describing in detail the biographical circumstances of the subject and the objective circumstances of the event/difficulty, whilst witholding information concerning the subject's reactions and feelings. The group of raters carefully considered this evidence, and each then made a judgement of the likely meaning of the event for "most people" given the particular set of circumstances. For events, two ratings are made, namely those for short and long-term threat. For difficulties only one rating is made for objective severity. After individual ratings had been made there followed a discussion about any discrepancies, and a final consensus rating was agreed. During the rating process reference was made to an extensive "dictionary" of rating precedents compiled by Brown and his colleagues (although in this study these were found to be of limited use). Other rating scales, for example the Independence and Focus scales, were completed by the interviewer alone.

Nine months after all the rating had been completed the group of four psychologists reconvened to carry out a study of the test-retest reliability of their ratings. This was seen as an essential step in the continuing development and evaluation of the rating procedure, as there had been no studies to show that ratings were

stable over time. The results of this study, are reported in Appendix VIII.

CHAPTER SIX

TYPES AND SEVERITY OF STRESSORS EXPERIENCED BY THE RURAL ELDERLY

For almost a century, it has been suggested that time in some way passes differently for the elderly. One view (e.g. James,1890; Janet, 1928), is that time passes more quickly because life is uneventful. There is indeed some empirical evidence to suggest that life is relatively uneventful for the elderly (e.g. Goldberg and Comstock, 1980). In comparison to younger groups, the elderly experience fewer life events when standard events lists are used. However, this is not particularly surprising given that the lists are heavily weighted with events most likely to occur to younger persons.

The main thrust of research on life-events has been in exploring the links between events and psychiatric, or physical morbidity. In many studies explanatory variables are correlated with the chosen outcome variable using categorical scales (e.g. severe versus no severe event with depresson or no depression). These procedures result in the loss of a great deal of information about the nature of the explanatory measures. Questions about the types of life events and difficulties experienced, how often they occur, and to whom, are left unanswered. These data might contribute to greater understanding of stressor-illness models.

Two reasons suggest that analysis of the types and

frequencies of life events and difficulties experienced, and their ascribed levels of threat and severity, would be useful. First, this would help establish whether life for the rural elderly is relatively uneventful. Second, identifying classes of events and difficulties which are numerically and by reason of severity ratings important, provides a context for subsequent analysis of the relationship between these variables and depression. To facilitate comparison and discussion, the Nantwich and Denbigh data will be analysed separately. The data is derived from subjects completing both the psychiatric and LEDS interviews.

The nature and distribution of life events in Nantwich and Denbigh

In the 12 months before interview, a total of 132 life events were reported by the 90 subjects interviewed in Nantwich (median 1.0). Twenty-eight percent of the sample (n=25) had no events. In Denbigh, 158 life events were elicited from 147 subjects (median 1.0). Thirty-seven percent (n=55) of this sample reported no events. The numbers of events reported is given in Figure 6.1.

Figure 6.1 Frequencies of life events reported in Nantwich and Denbigh

	NANTWICH		DENBIGH	
Total number of events	132.0		158.0	
Median events reported	1.0		1.0	
Number of events	No. S's	%	No. S's	%
0	25	27.8	55	37.4
1	35	38.9	52	35.4
2	9	10.0	23	15.6
3	14	15.6	11	7.5
4	2	2.2	4	2.7
5	3	3.3	1	0.7
6	1	1.1	1	0.7
7	0	0.0	0	0.0
8	1	1.1	0	0.0
Totals	90		147	

Comparing samples shows that more people in Denbigh were without an event, though this difference was not significant (X^2=2.34, df=1,p>0.05). Another interesting feature of the data is the number of people reporting multiple events. In Nantwich 6% of the sample reported 5 or more events compared with 1% in Denbigh. These subjects can exert statistical leverage when comparing samples by nonresistant statistics (i.e. those which show undue sensitivity to outlying values) such as Student's T. A measure termed the fourth-spread (Hoaglin et al., 1983, and Appendix X) shows that two subjects in Nantwich (with 6 and 8 events), and two in Denbigh (with 5 and 6 events) are statistical outliers. To "insulate" between-sample comparison of the numbers of reported events from their effects, the four subjects were temporarily excluded. Calculating Student's T on this reduced N showed that significantly more events were

reported in Nantwich (T=2.01, p=0.05).

Following Brown and Harris (1978), a useful summary of reported life events is produced by classifying each on the basis of its dominant characteristics and focus. There are two principal subdivisions of focus: 'subject-focus' and 'other-focus' events. In the former the interviewee is the focus of the event or is involved equally with another. In the latter a household member, his or her property, or another person is the focus of the event. The summary data are tabulated in Figure 6.2.

Figure 6.2 Frequency of life events in Nantwich and Denbigh by type and focus

CLASSIFICATION	SUBJECT-FOCUS				OTHER-FOCUS			
	Nantwich		Denbigh		Nantwich		Denbigh	
	f	%	f	%	f	%	f	%
Loss of Job	0	-	0	-	0	-	2	1
Births	0	-	0	-	0	-	5	3.2
Engagement	0	-	0	-	4	3	0	-
Marriage	0	-	0	-	5	4	0	-
Divorce/Separation	0	-	0	-	2	1	3	2
Illness	8	6	14	9	8	6	13	8
Hospital Admission	8	6	19	12	10	8	6	4
Hospital Discharge	2	2	1	0.6	1	0.8	0	-
Death	9	7	6	4	10	8	18	11
Miscarriage	0	-	0	-	1	0.8	0	-
Operation	5	4	7	4	8	6	10	6.3
Interaction Change	1	0.8	0	-	4	3	7	4.4
Residence Change	2	1	2	1	0	-	0	-
Police/Sol./Court	2	1	0	-	0	-	0	-
Accidents	5	4	7	4	2	1	5	3.2
Burglaries	0	-	1	0.6	0	-	0	-
Loss/Damage/Theft	3	2	3	2	1	0.8	0	-
Misc. Crises	4	3	2	1	3	2	2	1.3
Forecast of Change	1	0.8	0	-	0	-	0	-
News of Imp. Event	1	0.8	6	4	4	3	2	1.3
Distant Change	2	1	0	-	0	-	1	0.6
Valued Achievement	7	5	5	3	0	-	2	1.3
Revelation	0	-	1	0.6	0	-	0	-
Important Decision	8	6	7	4	0	-	0	-
Breaking Bad News	1	0.8	0	-	0	-	0	-
Retirement	0	-	1	0.6	0	-	0	-
TOTAL	69	52%	82	52%	63	48%	76	48%

Figure 6.2 shows that the proportions of subject-and other-focus events were identical for the samples. S-focus events were marginally more frequent in both areas, though this is probably a measurement artifact arising from the way in which events are recorded. The LEDS is primarily designed to elicit, in order of importance, events concerning the interviewee and his or her close relatives. Those concerning more distant relatives, friends, and neighbours are excluded unless the subject is extensively involved. This, however, may not be appropriate when dealing with the elderly. Evidence suggests that *friends and neighbours are* an important source of caregiving particularly in the absence of family. For example, in her study of the rural elderly in North Wales, Wenger (1982) concluded that they "...have higher levels of contact with neighbours.." and "..dependency on family..appears to be lower."

In spite of the LEDS bias towards the recording of s-focus events, the observed frequency of o-focus events, tabulated in Figure 6.2, shows that these constitute an important source of threat. Lowenthal, Thurnher and Chiriboga (1975), have suggested that the events which happen to significant others may be particularly important for women.

Death Events

Murrell et al. (1984), found in a sample of elderly Americans, that death events concerning family members

were judged the most undesirable. In Nantwich and Denbigh the overall proportion of death events was identical but those of s-focus were more frequent in Nantwich ($z=1.30$, $p>0.05$). O-focus death events outnumbered those of s-focus in both samples, and particularly in Denbigh where they were approximately three times more frequent. The reasons for these differences are unclear; perhaps they are a function of the sample response rates, or due to interviewer differences. Parkes (1964, 1965), and Clayton et. al. (1973) have drawn attention to the consequences of death of a family member in terms of distress and increased morbidity.

Health events

Reference to Figure 6.2 shows that life events involving health predominate. In both areas, hospital admission, illness, and death were those most frequently reported. Among the Denbigh sample hospital admissions formed approximately one in six of all events, three-quarters of them occuring to the subject. These s-focused health events were significantly more prevalent in Denbigh ($z=2.85$, $p<0.005$). Illness events were also more frequent in Denbigh (but not significantly so; $z = 1.8$, $p>0.05$). They formed 17% of all events (compared with 12% in Nantwich). By combining the categories of illness, hospital admission and discharge, death, operations, and accidents, it is possible to create an overall class of "Health Events". These form over half

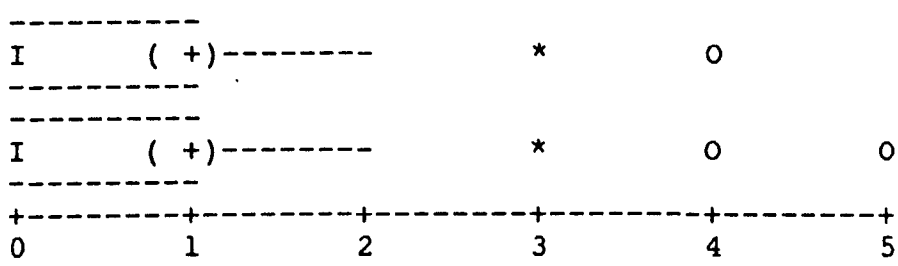
(58%) of all events reported in Nantwich and approximately two-thirds (67%) of those in Denbigh; 49% of all the health events in Nantwich were s-focused (n=37). The comparable figure for Denbigh is 51% (n=54).

The relatively large number of health events reported by the rural elderly is consistent with, although less extreme than data from elderly respondents in the U.S.A.. Murrell et al. (1984) state, for instance, that over half of their respondents reported that "either they, or a close member of their families had needed to go into hospital for medical care...(and)..over 20% experienced a new illness or injury".

Although health events were more numerous in Denbigh, the median number of these events was 1.0 for both samples. An informative way of comparing the two samples in this respect is by means of a notched box plot (McGill, Tukey, and Larsen, 1978), as in Figure 6.3 below. A boxplot shows the middle of a batch of data from hinge to hinge as a box with '+' indicating the median, and it runs a "whisker" out from each hinge to the corresponding extreme. By drawing a boxplot for each batch of data and arranging them in parallel we can compare the batches with repect to location and spread, and perhaps also skewness and tail heaviness. The notches are marked with "( )" and they provide us with an approximate measure of the significance of differences among the medians i.e. where the notches for two boxplots

do not overlap we may regard the difference between the two medians as statistically significant at the 0.05 level. Outliers are marked with an asterisk (*), and far outliers "O".

Figure 6.3 Notched boxplots comparing the numbers of health events reported in Nantwich and Denbigh



Comparing the notched boxplots shows there is no significant difference between the samples in the number of health events reported at the 0.05 level (T=0.93, p=0.35). Both batches of data were similar showing evidence of asymmetry and outlying values. Those subjects reporting 3 or more health events are clearly outliers, and atypical of the majority of subjects who (if they had such an event) reported only one.

Number of subjects reporting health events

Comparing samples solely on the basis of frequencies of reported health events conveys no information about the numbers of people affected. Estimation of this, necessitates examining the numbers of subjects reporting only non-health events, those reporting one health event, and those with mutiple health events. This data is presented in Figures 6.4 and 6.5.

Figure 6.4 Histogram of the number of health events per person

Nantwich

```
N°   Nos.
S's  Events

32   1.00   ************************
 7   2.00   ****
 4   3.00   **
 2   4.00   *
 2   5.00   *
          I.....I.....I.....I.....I.....I.....I
          0     10     20     30     40     50     60

                    Histogram Frequency
```

Denbigh

```
N°   Nos.
S's  Events

52   1.00   ************************************
14   2.00   *********
 6   3.00   ***
 2   4.00   *
          I.....I.....I.....I.....I.....I.....I
          0     10     20     30     40     50     60

                    Histogram Frequency
```

Approximately half the subjects in each sample reported a health event, though the positivly skewed histograms show that of those people, the majority had just one event (either S or O-focus) in the preceeding 12 months. In Nantwich, one in six subjects had multiple health events, and in Denbigh this figure was slightly lower at one in seven. Therefore, although more health events were reported in Denbigh (+9%), marginally more people in Nantwich (+2%) reported one of these events. Confirmation of this conclusion is provided in Figure 6.5, where in addition, the numbers of people with no

events and non-health events only are tabulated.

Figure 6.5 Number of subjects reporting no events, non-health events, single, and multiple health events, by focus

a.Nantwich

	Number Subjects		Number Events		S-Focus Events		O-Focus Events	
	F	%	F	%	F	%	F	%
Nil Events	25	28	--	--	--	--	--	--
Non-Health Events	18	20	56	42	32	24	24	18
One Health Event	32	36	32	24	18	14	14	10
Multiple Health Events	15	16	44	33	19	14	25	19

b.Denbigh

	Number Subjects		Number Events		S-Focus Events		O-Focus Events	
	F	%	F	%	F	%	F	%
Nil Events	55	37	--	--	--	--	--	--
Non-Health Events	18	12	52	33	28	8	24	15
One Health Event	52	35	52	33	23	15	29	18
Multiple Health Events	22	15	54	33	31	20	23	15

Examination of Figure 6.5 shows that the proportions of s-focus and o-focus events are quite different in Nantwich and Denbigh. Subjects in Nantwich with non-health and single health events reported proportionatly more s-focus events, whereas in Denbigh more o-focused events were reported. In contrast, for multiple health events, there were more o-focused events in Nantwich, but more s-focused events in Denbigh. Thus although marginally more people in Nantwich reported a health event, when the focus of those events is taken into account there were more people in Denbigh with personal (i.e. s-focused) health events.

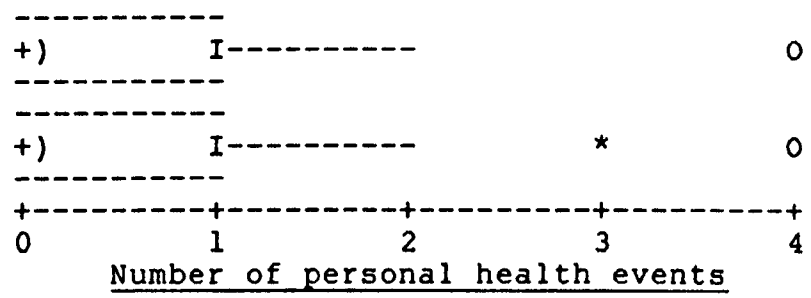
Analysis of the data in Figure 6.5 shows that at the 5% level there were no significant differences between the samples in the numbers of elderly subjects with no

events (X^2=2.34,df=1), non-health events (X^2=2.61,df=1), one (X^2=0.001,df=1), and multiple health events (X^2=0.12, df=1). However, the adjusted standardised residuals (Haberman, 1973) did show a near significant ($p<0.10$) trend for people in Nantwich to report more non-health events.

Personal health events

Subject-focus health events were important, accounting for approximately one-quarter and one-third of the life events in Nantwich and Denbigh respectively. A comparison of their distributions is given in figure 6.6.

Figure 6.6 Comparison of number of personal health events



The distributions of personal health events was very similar in both Nantwich and Denbigh (T=0.29, p=0.77). The location of the medians (+) and H-spreads (I) shows that approximately two-thirds of the subjects in each sample had not experienced a personal health event in the 12 months prior to interview. Those with more than two of these events were atypical. Thus, although relatively large numbers of health events were reported, only about one in three people had personally experienced such an event, and they on average had only one of these events.

Approximately half the health events reported had occurred to 'significant others' (i.e. spouses, siblings, and children).

Non-health events

In view of their frequent occurrence the distribution of health events has been considered at some length. What then of other life events reported? Overall it would appear that life for the rural elderly is quite tranquil (see figure 6.2). Contact with the police and courts is minimal and burglaries were almost totally absent; Loss and damage to property was usually minor although could assume considerable subjective importance, as when neighbours quarrelled over the sawing-down of a boundary hedge. Among both samples there were few residence changes, and those which were reported generally involved children moving away on account of their work. A number of people had decided to move into Part III accommodation, or accommodation better located in terms of amenities (see Figure 6.2 "Important Decisions"), but in the 12 months before interview very few had actually moved. Some evidence suggests that relocation has negative consequences for the elderly (e.g. Killian,1970). However, outcome appears to depend on whether relocation was voluntary, with better adjustment associated with voluntary change (Smith and Brand 1975). Events involving marital disharmony concerned children exclusively and in three of these five

events, the outcome (separation or divorce) was welcomed by the subject. There was only one event involving shortage of money and that followed the payment of a child's fine after a court appearance.

Apart from health events, life for many elderly people in Nantwich and Denbigh does appear to be relatively uneventful. This conclusion, however, remains tentative until the potential threat of these events is considered.

Long-term threat ratings for life events

The distributions of long-term threat ratings for the life events reported in Nantwich and Denbigh are summarized in Figure 6.7.

Figure 6.7 Frequency of life events by long-term threat and focus

	Nantwich				Denbigh			
	S-focus		O-focus		S-focus		O-focus	
Threat level	f	%	f	%	f	%	f	%
1. Marked threat	11	8.3	2	1.5	8	5.1	1	0.6
2. Moderate threat	12	9.1	8	6.1	13	8.2	12	7.6
3. Some threat	23	17.4	27	20.5	27	17.1	25	15.8
4. Little/No threat	23	17.4	26	19.7	34	21.5	38	24.1

Three-quarters of the life events reported were judged to be of "minor" threat (i.e. levels 3 and 4), thus confirming the suggestion that life is uneventful for most people. Four percent more markedly threatening events were reported in Nantwich than in Denbigh, though this difference was not significant at the 5% level ($z=1.88$). Comparing samples shows that they did not differ by the threat levels of life events ($X^2=3.39$,

df=3, p>0.05).

The median level of long-term threat for events in both Nantwich and Denbigh was level 3.

Figure 6.8 shows the distribution of long-term threat based on the most threatening event reported by a subject. This provides an approximate picture of the extent to which subjects are differentially affected by the threat of life events.

Figure 6.8 Distribution of long-term threat by subjects' most threatening life event

Threat level	Nantwich No.S's	%	Denbigh No.S's	%
1. Marked threat	9	10.0	8	5.4
2. Moderate threat	11	12.2	20	13.6
3. Some threat	30	33.3	31	21.1
4. Little or no threat	15	16.7	33	22.5
5. No Event	25	27.8	55	37.4

Proportionately there were approximately twice as many people in Nantwich with markedly threatening events, although this difference was not quite significant at the 5% level (z=1.91, p>0.05). Approximately one in five subjects in both samples had events of potentially moderate or marked long-term threat.

The long-term threat posed by health events

Numerically, health events were important in both Nantwich and Denbigh. Of considerable interest is the potential long-term threat posed by these events. This data is shown in Figure 6.9 overleaf.

Figure 6.9 Distribution of long-term threat for health events by focus

	Nantwich				Denbigh			
	S-focus		O-focus		S-focus		O-focus	
Threat level	f	%	f	%	f	%	f	%
1. Marked threat	10	13.2	2	2.6	8	7.6	1	0.9
2. Moderate threat	5	6.6	9	11.8	8	7.6	11	10.4
3. Some threat	12	15.8	22	28.9	19	17.9	20	18.9
4. Little/No threat	7	9.2	9	11.8	18	16.9	21	19.8

Whilst there were more markedly threatening health events in Nantwich, this was not statistically significant at the 5% level (X^2=2.31, df=1, p>0.05). The median level of threat for health events in both areas was level three. Approximately two-thirds of the health events reported by both samples were judged to pose only minor threat in the long-term. Nevertheless, health events account for virtually all of the markedly threatening events reported; in Nantwich they formed 12 of the 13 events, and in Denbigh they accounted for all 9 markedly threatening events. Health events also accounted for at least 70% of those events judged to be of moderate threat. Most of the events which were considered to be particularly threatening, therefore, were health events, although as noted, the majority of people in both samples did not have a health event.

The effect of demographic variables on the distribution of life events

The effects of age, sex, social class, and marital status, on the distribution of life events are summarized in Figure 6.10. In both Nantwich and Denbigh the median number of events for each group was 1.0. However, in

Nantwich women had significantly more events than men, and in Denbigh manual subjects had significantly more events than non-manual subjects. Both significant comparisons result from the influence of a small number of outlying subjects on a non-resistant statistic.

Figure 6.10 The effect of demographic variables on the distribution of life events

Variable	Groups	Median Events		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	1	1	T=0.53 p=0.60	T=0.38 p=0.89
	Old-old	1	1		
SEX	Male	1	1	T=2.42 p=0.02	T=0.63 p=0.49
	Female	1	1		
SOCIAL CLASS	Non-manual	1	1	T=0.70 p=0.49	T=2.84 p=0.01
	Manual	1	1		
MARITAL STATUS	Currently Single	1	1	X^2=0.89	X^2=1.02
	Married	1	1	p=0.64	p=0.60
	Widowed	1	1		

Health events

The effects of demographic variables on the distribution of reported health events are summarised in Figure 6.11. The statistical comparisons are based on a series of multiple notched boxplots, computed with the Minitab algorithm (Ryan et al,1981), and were selected because they are resistant to outlying values. These graphical comparisons are given in Appendix XI (Table 1, 'A' and 'B').

Figure 6.11 The effect of demographic variables on the distribution of health events

Variable	Groups	Median Events		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	1	1	p<0.05	p<0.05
	Old-old	0	0		
SEX	Male	0	1	p<0.05	p<0.05
	Female	1	0		
SOCIAL CLASS	Non-manual	0	0	p<0.05	p<0.05
	Manual	1	1		
MARITAL STATUS	Currently Single	0	0	p>0.05	p<0.05
	Married	1	1		
	Widowed	1	0		

Considering all health events (i.e. irrespective of their focus), we can see, somewhat surprisingly, that in both samples the young-old had significantly more events than the old-old. In Nantwich, women had significantly more health events than men, although in Denbigh the reverse was true. This is most likely due to the large numbers of elderly men in that sample. Male subjects in Denbigh had significantly more health events than their counterparts in Nantwich (the T-ratio for this comparison was, however, nonsignificant, T=1.14, p=0.26). This is because proportionately more men in Nantwich have no health events and this tends to 'suppress' the sample mean and standard deviation on which the T-ratio is calculated). Predictably, those who had non-manual occupations had significantly less health events than

those with manual occupations in both samples. In Nantwich, marital status did not have a differential effect on the distribution of health events, although married and widowed subjects did have a higher median number of these events. However, in Denbigh, married subjects did have significantly higher numbers of health events in comparison to widowed and single subjects. Further, widowed subjects in Nantwich had significantly more events than their counterparts in Denbigh.

Personal health events

The effect of demographic variables on the distribution of personal (i.e. s-focused) health events is summarised in figure 6.12 below. As above, the statistical comparisons are based on a series of multiple notched boxplots (see Appendix XI, Table 2, 'A' and 'B').

Figure 6.12 The effect of demographic variables on the distribution of personal health events

Variable	Groups	Median Events		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	0	0	p>0.05	p>0.05
	Old-old	0	0		
SEX	Male	0	0	p>0.05	p>0.05
	Female	0	0		
SOCIAL CLASS	Non-manual	0	0	p>0.05	p>0.05
	Manual	0	0		
MARITAL STATUS	Currently Single	1	0	p<0.05	p>0.05
	Married	0	0		
	Widowed	0	0		

Approximately two-thirds of subjects in Nantwich and Denbigh did not have a personal health event. Hence the median number of events for virtually every group was 0. Subjects in Nantwich who were "currently single" (i.e. single, divorced or separate) were exceptional in that they had a median of one personal health event. A statistical test based on the median therefore shows they had significantly more personal health events than the married and widowed ($p<0.05$). However, a Kruskal-Wallis oneway ANOVA, which compares the three marital groups simultaneously, did not confirm this (chi square=4.72, df=2, p=0.19).

Examination of the notched box-plots (Appendix XI, Table 2) is more informative. These show that in Nantwich the old-old, women, working-class, single and widowed subjects had proportionately more of these events (although even within these groups three-quarters of the subjects were without a personal health event). Further discrepant results were evident when using the nonresistant T-ratio for the comparison between men and women. Because of the slightly larger spread of data among the women (i.e. more women than men had 1 event), and the influence of outliers (2 women had 4 events), the resulting T ratio (T=2.53, p=0.014) shows that women had significantly more personal health events.

In Denbigh there was no significant effect of age, sex, social class or marital status on the distribution

of personal health events ($p>0.05$). However, examination of the boxplots (Appendix XI, table 2b) shows that the old-old had more events than the young-old, manual subjects had more events than non-manual subjects, and single and widowed subjects had more events than married subjects.

Some of the findings appear to be at variance with previously established findings. The absence of an effect due to age in both samples is perhaps explicable by the fact that illness events would be expected to arise less often in elderly groups suffering with chronic conditions. The lack of an effect due to sex is also at first sight puzzling. A consistent finding in the literature is that women have more contact with their G.P.'s than men (Banks et. al., 1975). It is also well established that in the general population women have more symptoms, or at least admit to having more and to having them more severely on average than men. However the excess of men in the Denbigh sample, particularly among the old-old, would probably mask any effect due to sex.

There does not appear to be a straightforward relationship between disease and social class. For example, whilst some diseases such as heart disease, stroke and peptic ulcer have a clear inverse relationship with class, others such as diabetes and glaucoma have no clear relationship (Peach and Heller, 1984). Of course

the problem is compounded when dealing with the elderly because of the difficulty of assigning subjects to a social class unambiguously.

The observation that single people have more personal health events than the married and widowed in Nantwich is probably due to the fact that because of very small numbers, divorced and separated people are included in this group. Whilst the literature (e.g. Kasl and Berkman, 1981) shows that the separated and divorced have higher rates of mortality and psychological disorder, there is no evidence that they also have higher rates of physical disorders.

It is necessary, of course, to bear in mind that life-event data describes only part of the overall picture of health. A person reporting no health events or only non-health events may well be suffering with one or more chronic health difficulties. Thus as Wadsworth and Ingham (1981) point out there has been a fundamental shift in the prevailing pattern of disease where "infectious disease has given way to conditions which are generally less striking in onset, longer in duration, and often less certain in their cause".

Demographic differences in the distribution of long-term threat

Differences in the distributions of long-term threat were confined to single people in Denbigh, and compared to married and widowed subjects they had significantly

greater numbers of less-threatening events. Figure 6.13 shows that the median level of threat for events experienced by all other demographic groups was level three (i.e. some threat).

Figure 6.13 The effect of demographic variables on the distribution of long-term threat of events

Variable	Groups	Median Threat		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	3	3	p>0.05	p>0.05
	Old-old	3	3		
SEX	Male	3	3	p>0.05	p>0.05
	Female	3	3		
SOCIAL CLASS	Non-manual	3	3	p>0.05	p>0.05
	Manual	3	3		
MARITAL STATUS	Currently Single	3	4	p>0.05	p<0.05
	Married	3	3		
	Widowed	3	3		

Examination of the graphical distributions of long-term threat (Appendix XI, table 3, 'A' and 'B') shows that in Nantwich the young-old tend to have less threatening events than the old-old, and that women, the widowed, and those from manual occupations experienced more threatening events compared with men, non-manual workers, and married subjects respectively. In Denbigh, however, the young-old had more threatening events than the old-old, and widowed subjects had more threatening events compared with single and married subjects.

CHRONIC DIFFICULTIES

Ongoing difficulties of one month duration and longer were extremely frequent in both Nantwich and Denbigh. A total of 296 were reported in Nantwich, with a median of 3.0 difficulties. Of the 90 subjects, only 5 (6%) reported no difficulties. In Denbigh a total of 354 difficulties were reported by the 147 subjects, with a median of 2.0 difficulties per person. Again only a small number of subjects (5%) reported no difficulties. The frequencies of difficulties reported is presented in Figure 6.14.

Figure 6.14 Frequencies of chronic difficulties reported in Nantwich and Denbigh

	NANTWICH		DENBIGH	
Total Difficulties	296.0		354.0	
Median Difficulties per S	3.0		2.0	
Number of Difficulties	Subjects	%	Subjects	%
0	5	5.6	8	5.4
1	12	13.3	32	21.8
2	25	27.8	44	29.9
3	10	11.1	35	23.8
4	16	17.8	17	11.6
5	3	3.3	9	6.1
6	11	12.2	0	0.0
7	6	6.7	0	0.0
8	1	1.1	2	1.4
9	1	1.1	0	0.0
TOTAL	90		147	

A comparison of the samples shows that significantly more difficulties were reported in Nantwich ($T=3.51$, $p=0.001$). Those subjects with more than 7 difficulties are (according to the procedures of Hoaglin et al,1983) statistical outliers. Disregarding the 4 outlying subjects from the between samples comparison served only

to increase the value of T, which remained highly significant (T=3.95, p=0.001). Approximately half the people in Nantwich had between 2 and 4 difficulties, and in Denbigh the equivalent proportion had between 1 and 3 difficulties.

Nature of difficulties reported in Nantwich and Denbigh

A content analysis of the difficulties reported suggests the existence of 3 broad clusters. First, and by far the most important numerically, were difficulties concerning the subject's health. In Nantwich, chronic personal health problems accounted for 61% of difficulties reported, and in Denbigh the proportion was slightly higher at 70%. Chronic health problems of spouses, children, and siblings form the second cluster. These "other-health" difficulties were also relatively frequent accounting for 28% and 19% of difficulties in Nantwich and Denbigh respectively. Finally there are "non-health" difficulties involving such diverse problems as housing, finance, and loneliness. These formed 11% of the difficulties in Nantwich, and 12% in Denbigh. Details of the number, and types of difficulties reported are summarized in Figure 6.15 overleaf.

Figure 6.15 Frequencies and types of difficulties reported in Nantwich and Denbigh

DIFFICULTY TYPE	NANTWICH	%	DENBIGH	%
Health of subject	179	61	249	70
Health of others				
Spouse's health	29	10	44	12
Child's health	24	8	9	3
Siblings/Other's health	30	10	12	4
Totals	83	28	65	19
Non-health				
Housing problems	11	3.7	6	2
Neighbourhood	3	1	2	0.6
Financial	4	1	5	1
Loss	1	0.3	2	0.6
Loneliness	4	1	10	3
Neighbours/Acquaintances	5	1.6	3	0.8
Children	3	1	8	2
Spouse	1	0.3	1	0.3
Siblings	1	0.3	1	0.3
Grandchildren	1	0.3	0	0.0
Miscellaneous	0	0.0	2	0.6
Totals	34	11.0	40	11.0

Non-health difficulties

The distributions of non-health difficulties were quite similar in both samples. The most prevalent difficulty of this type in Nantwich involved housing problems and they were significantly more frequent than in Denbigh ($z=2.35$, $p<0.02$). Eight of these 11 difficulties concerned lack of repairs of property by a landlord. Financial problems were rarely in evidence in either sample forming only 1% of all difficulties. This figure was based on the presence of "objective" evidence of hardship, as opposed to complaints of money worries. The distinction is not an easy one to make in practice and undoubtedly under-estimates the frequency of these problems.

Loneliness was significantly more prevalent in Denbigh ($z=2.29$, $p<0.025$). Half of these 10 difficulties were the result of subjects moving to live with or near to family members, with the consequent reduction in interaction with friends. Those studies which have addressed the issue of loneliness among the elderly (Revenson and Johnson, 1984; Kivett, 1979), have suggested that its extent may be greatly exaggerated. This was certainly the impression gained from interviewing in both Nantwich and Denbigh. Difficulties involving children were more frequent in Denbigh although their content lacked a discernible pattern.

Health difficulties of important others

The health difficulties of important others were, overall, significantly more prevalent in Nantwich ($T=2.36$, $p=0.02$). Differences between samples were, however, confined to those health difficulties involving children ($z=5.33$, $p<0.01$), and sib's and other's health ($z=7.56$, $p<0.001$).

Personal health difficulties

At least six out of every ten difficulties reported were chronic personal health problems. Many could be described as the typical health problems of old age e.g. arthritis, deafness, and poor eyesight. A summary of the type and frequency of health problems reported is given in Figure 6.16.

Figure 6.16 Frequencies and examples of the personal health difficulties reported in Nantwich and Denbigh

Difficulty	Examples	NANTWICH F	NANTWICH %	DENBIGH F	DENBIGH %
Respiratory	Asthma, Emphysema.	13	7	15	6
Neurological	Parkinsonism, M.S.	5	3	6	2
Cardiovascular	Hypertension, Angina	31	17	53	21
E.N.T.	Deafness	19	11	31	13
Eyesight	Poor Vision, Cataracts	14	8	23	9
Abdominal	Ulcers, Piles, Gallstones	20	11	15	6
Metabolic	Diabetes, Thyrotoxicosis	5	3	11	4
Rheumatic	Osteoarthritis	47	26	50	20
Genito-urinary	Incontience, prostate	12	7	15	6
Cancer		2	1	1	1
Miscellaneous	Gout, Cirrhosis of Liver	11	6	29	12
TOTALS		179		249	

Arthritis and cardio-vascular complaints were the most frequent types of personal health problems reported. Together they accounted for forty percent of these difficulties. Failing hearing and eyesight were also common, forming 1 in 5 of all reported health difficulties. Comparing specific health problems across samples, certain anomalies were evident; for example, significantly more difficulties concerning arthritis were recorded in Nantwich ($z=2.85$, $p<0.005$). This can be explained by the greater ratio of males in the Denbigh sample, as epidemiological studies suggest that for both rheumatoid and osteoarthritis females are affected more frequently than males (Peach and Heller, 1984).

It is worth bearing in mind that the data in Figure 6.16 represents respondents' articulations of their health problems and these will vary in quality and veracity. One would not expect an exact correspondance

between reported health problems and epidemiological data for the same health problems. Also, variation between interviewers in their questioning of subjects and recording of particular health problems will contribute to variability in prevalence rates.

Despite differences in classification it is interesting to compare the extent of specific health problems in Nantwich and Denbigh with that reported in other studies. In both Abram's (1978), and Hunt's (1978) surveys of the elderly, arthritis and rheumatism were the most frequently reported ailments. In the former study, over half (54%) of the sample suffered with arthritis whereas in Hunt's study the figure was 19.4%, which is almost exactly that reported in Denbigh. Poor eyesight afflicted 32% of Abram's sample and 6.4% of the elderly in Hunt's sample. Figure 6.16 shows that the frequency of this problem in Nantwich (8%) and Denbigh (9%) was again similar to that found by Hunt. Pulmonary conditions affected 9.4% of Hunt's sample compared with 7% and 6% in Nantwich and Denbigh respectively. The similarity with Hunt's findings continue with respect to cardiovascular conditions; 19.2% of Hunt's sample suffered with these conditions compared with 17% in Nantwich and 21% in Denbigh.

Sir John Brotherston (1981) remarked that "old people disobey the rule which doctors have invented that a person is entitled to only one disease at a time".

Evidence of this fact was present in both Nantwich and Denbigh.

Figure 6.17 Number of subjects reporting one or more personal health difficulties

Number of health difficulties	NANTWICH	%	DENBIGH	%
S's reporting 1 Condition	24	27	52	35
S's reporting 2 Conditions	23	26	39	26
S's reporting 3 Conditions	15	16	26	18
S's reporting 4 Conditions	9	10	9	6
S's reporting 5 Conditions	2	2	1	1
S's reporting 6 Conditions	3	3	0	0
% with 1 or more conditions	84%		86%	

Sixty-eight percent of those in Nantwich with chronic health problems had more than one ailment, and in Denbigh the figure was 59%. In general, inadequate 'biological resources' predict some form of impairment of the individual's adaptive capacity (although the converse is not always true i.e. adequate resources do not necessarily predict successful adaptation). Comparing samples shows that significantly more personal health difficulties were reported in Nantwich ($T=2.42$, $p=0.02$).

The duration of personal health difficulties

The duration of a health problem is thought to be an important dimension in illness and disease, the assumption being that enduring problems wear the person down psychologically. The idea of a linear relationship between the two variables is, however, too simplistic because duration is not independent of the problem's severity. Severe health difficulties such as cancer are likely to be of relatively short duration, and less likely to permit the development of adequte coping.

Less severe health problems such as mild arthritis, or hypertension, may impact on the individual for many years, either intermittently or persistently, allowing the development of adequate coping mechansisms. Taking into account the severity of the problem therefore suggests an inverted U-shaped relationship between duration and psychological health. The distributions of the length of personal health difficulties in Nantwich and Denbigh are given below.

Figure 6.18 Duration of personal health difficulties reported in Nantwich and Denbigh

	NANTWICH		DENBIGH	
Duration	f	%	f	%
Less than 1 year	23	12.8	26	10.4
1 year	8	4.5	27	10.8
2 years	9	5.0	33	13.3
3 years	14	7.8	27	10.8
4 years	5	2.8	14	5.6
5 years	20	11.2	25	10.0
6 to 9 years	17	9.5	28	11.2
10 to 14 years	73	40.8	62	24.9
15 years plus	10	5.6	7	2.8
Totals	179		249	

In Nantwich the median duration of a personal health difficulty was 5 years, and significantly ($T=2.30$, $p<0.05$) longer than in Denbigh (median 4 years). Approximately 75% of the difficulties reported in Nantwich were of 3 years duration or longer, whereas in Denbigh approximately half of the difficulties were of less than 4 years duration.

The severity of chronic difficulties in Nantwich and Denbigh.

For most elderly people ongoing difficulties were a

fact of life. Thus the median number of difficulties reported in Nantwich and Denbigh were 3.0 and 2.0 respectively. Interest now centres on the severity of these difficulties.

Figure 6.20 Distribution of severity of chronic dificulties in Nantwich and Denbigh

	NANTWICH		DENBIGH	
Levels of Severity	F	%	F	%
Severity 1-Marked High	12	4.1	7	2.0
Severity 2-Marked Low	31	10.5	22	6.2
Severity 3-Moderate High	31	10.5	41	11.6
Severity 4-Moderate Low	53	17.9	59	16.7
Severity 5-Little High	94	31.8	127	35.8
Severity 6-Little Low	75	25.2	98	27.7

Over half the difficulties reported in Nantwich and Denbigh were judged to be of "little" severity (i.e. severity 5 & 6). Comparing samples shows there was no overall difference in the severity of the difficulties (X^2=8.49,df=5, p>0.05). However, there were significantly more (z=3.40, p<0.001) difficulties of marked severity in Nantwich.

The severity of personal health difficulties

Chronic personal health problems were the most frequently reported difficulty in Nantwich and Denbigh. The distributions of their severity is tabulated below.

Figure 6.21 Distribution of severity of personal health difficulties in Nantwich and Denbigh

Levels of severity	F	%	F	%
Severity 1-Marked High	6	3.4	7	2.8
Severity 2-Marked Low	19	10.6	16	6.4
Severity 3-Moderate High	23	12.8	34	13.7
Severity 4-Moderate Low	32	17.9	40	16.1
Severity 5-Little High	57	31.8	93	37.3
Severity 6-Little Low	42	23.5	59	23.7

Over half the personal health difficulties in Nantwich and Denbigh were of "little" severity. Comparing figures 6.20 and 6.21 shows that of the 43 markedly severe difficulties reported in Nantwich, over half (n=25) were health difficulties. In Denbigh this proportion rises to 0.79 (n=23). Thus although markedly severe difficulties were not particularly common overall (they formed less than 1-in-10 of all difficulties), if present, they were very likely to be a health problem.

The effect of demographic variables in the distribution of personal health difficulties

In both Nantwich and Denbigh the median number of personal health difficulties reported for nearly all demographic categories was 2.0. Figure 6.22 shows that single people in Nantwich were exceptional, with a median of 4.0 difficulties, and significantly more ($p<0.05$) than the married and widowed.

The data in Figure 6.22 have also been plotted in the form of multiple notched boxplots (Appendix XI, table 4, 'A' and 'B'). These show the distributions of personal health difficulties were very similar in Nantwich and Denbigh, and relatively unaffected by demographic variables. In Denbigh the young-old and men had fewer difficulties compared with the old-old and women respectively. The great majority of subjects in both Nantwich and Denbigh had between 1 and 3 personal health difficulties.

Figure 6.22 The effect of demographic variables on the distribution of personal health difficulties

Variable	Groups	Median Difficulties		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	2	2	p>0.05	p>0.05
	Old-old	2	2		
SEX	Male	2	2	p>0.05	p>0.05
	Female	2	2		
SOCIAL CLASS	Non-manual	2	2	p>0.05	p>0.05
	Manual	2	2		
MARITAL STATUS	Currently Single	4	2	p<0.05	p>0.05
	Married	2	2		
	Widowed	2	2		

Demographic differences in the severity of difficulties

Figure 6.23 shows that in Nantwich the median severity rating of difficulties was higher (i.e. less severe) for the young-old compared with the old-old, women compared with men, manual class subjects compared with non-manual subjects, and both single and widowed subjects compared with those who were married. Not one of the differences was, however, significant at the 5% level. Examination of the notched boxplots in Appendix XI (Table 5a), clearly shows the differences in the distributions of severity ratings. For example, the majority of ratings for the young-old were between severity 2 and 4, whereas those for the old-old were between severity 2 and severity 5.

In Denbigh, non-manual subjects had significantly

less-severe difficulties than manual subjects (T=2.06, p=0.04), although their overall distributions of ratings were very similar (see Appendix XI, table 5b). Single people had a lower (i.e. less severe) median rating of severity than those who were married or widowed although the difference was not significant at the 5% level.

Figure 6.23 The effect of demographic variables on the distribution of the severity of difficulties

Variable	Groups	Median severity		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	3	4	p>0.05	p>0.05
	Old-old	4	4		
SEX	Male	4	4	p>0.05	p>0.05
	Female	3	4		
SOCIAL CLASS	Non-manual	4	5	p>0.05	p<0.05
	Manual	3	4		
MARITAL STATUS	Currently Single	3	5	p>0.05	p>0.05
	Married	4	4		
	Widowed	3	4		

Comparing the ratings for Nantwich and Denbigh shows greater severity levels for difficulties in Nantwich. Specific comparisons of like groups show that the young-old (T=2.62, p=0.01), non-manual (T=3.10, p=0.001), and women (T=3.27, p=0.001), in Nantwich all had significantly more severe difficulties than their counterparts in Denbigh.

Demographic differences in the severity of personal health difficulties

For most of the demographic categories in Nantwich (see Fig. 6.24), the median level of severity for personal health difficulties was low-moderate (i.e. severity 4). Men had significantly less severe difficulties than women ($p<0.05$); Table 6a (Appendix XI) shows that three-quarters of their health difficulties were rated severity 4 or higher (i.e. less severe). In contrast half the health difficulties of women were of severity 1-3. Age, social class, and marital status had little impact on the severity of personal health difficulties. However, whilst single people had a more severe median rating than married and widowed subjects, more severe difficulties were experienced by those who were married (see Table 6a, Appendix XI).

Figure 6.24 The effect of demographic variables on the severity of personal health difficulties

Variable	Groups	Median severity		Significance	
		Nantwich	Denbigh	Nantwich	Denbigh
AGE	Young-old	4	5	p>0.05	p<0.05
	Old-old	4	4		
SEX	Male	4.5	4.5	p<0.05	p>0.05
	Female	3	5		
SOCIAL CLASS	Non-manual	4	5	p>0.05	p<0.05
	Manual	4	4		
MARITAL STATUS	Currently Single	3	5	p>0.05	p<0.05
	Married	4	4		
	Widowed	4	5		

Age, social class, and marital status all had a significant effect on the severity of personal health difficulties in Denbigh. Table 6b (Apendix XI) shows that the old-old, manual, and married had significantly more severe personal health difficulties in comparison to the young-old, non-manual, and married respectively.

Summary

This chapter has discussed the types and frequencies of life events and difficulties reported by two samples of elderly people in rural communities.

Approximately a third of the subjects in Nantwich and Denbigh had no life events in the 12 months before interview. Only 5%, however, were without a difficulty. Significantly more events and difficulties were reported in Nantwich, though the nature of the problems was similar in both communities. In particular, the analyses highlights the salience of ill health for elderly people, and chronic health difficulties such as arthritis and cardiovascular complaints were most common. However, only about a third of the subjects in both samples had personally experienced a health related event, and predictably, the old-old, women, manual workers, single and widowed subjects experienced more personal health events. The most frequently reported non-health events involved "important decisions" about residence change such as moving into Part III accomodation.

Ongoing chronic difficulties were widespread and

outnumbered events by two to one. Approximately 90 percent of the difficulties reported involved the health of the subject or a close family relative. Personal health difficulties accounted for approximately two-thirds of all the difficulties reported. Most subjects with chronic health difficulties reported more than one such health problem and typically of long standing. The median duration of a personal health difficulty in Nantwich was 5 years, and they were of significantly longer duration than in Denbigh (median 4 years).

Perhaps the most important finding is that three-quarters of the events and difficulties were rated on the bottom half of the scales i.e. most were judged to be not particularly threatening or problematic. Where markedly threatening or severe consequences were found they were associated with health problems. Health events accounted for nearly all the markedly threatening events in Nantwich and Denbigh, and personal health difficulties accounted for over half the markedly severe difficulties in Nantwich and 79 percent of those in Denbigh. There were more markedly threatening events and more people with these events in Nantwich than in Denbigh though these differences did not reach significance at the 5 percent level. Analysis of the effect of demographic variables on the distribution of long-term threat showed that although the data suggested the expected patterns of threat (i.e. the old-old, female, working-class, single

and widowed had more of the threatening events), the differences between the groups were seldom significant.

Overall, the median severity level for difficulties was 3.0 in Nantwich and 4.0 in Denbigh. In Nantwich the young-old, women, working class, single and widowed tended to have more severe difficulties. In Denbigh, the demographic variables had minimal impact on the distribtuion of severity. Although frequently reported, less than one in ten personal health difficulties were judged to be markedly severe. Demographic variables had more of an effect on the distribution of severity of personal health difficulties in Denbigh; the young-old, manual workers, single, and widowed subjects had significantly more severe personal health difficulties.

For most elderly people living in rural communities life is relatively uneventful. In her discussion of ageing in rural communities Wenger (1982) notes that "the image of the rural community as a haven of peace and neighbourliness and an escape from the physical and social excesses of urban life, contines to have a subjective appeal". Apart from the inevitable decline in physical health, for most subjects life did approximate the image of Ambridge.

CHAPTER SEVEN

CROSS-SECTIONAL ASSOCIATIONS BETWEEN LIFE EVENTS, DIFFICULTIES AND DEPRESSION AMONG THE ELDERLY

I. Incidence and prevalence of depression in the community samples

Before analysing the association between life events, difficulties, and depressive illness, data on the incidence and period prevalence of depression in both community samples will be presented (Figure 7.1).

Figure 7.1 Twelve-month prevalence and Nine-month incidence rates for depressive illness

	NANTWICH		DENBIGH	
	n	%	n	%
Number psychiatric interviews	109	-	152	-
Number Chronic cases of depression	2	1.8	8	5.3
Number Incident cases of depression	2	1.8	3	1.9
Prevalence (12 months) of depression	4	3.7	11	7.2

The table reveals two points of interest. First, the proportion of incident cases in Nantwich and Denbigh is virtually identical. Secondly, there are approximately three times as many chronic cases in Denbigh, although the prevalence rate for the two samples is not statistically different (X^2=2.2, df=1, p>0.05).

II. Factors influencing analysis of the life events and depression data

1. The samples

Of the 109 subjects in Nantwich who completed a psychiatric interview, nine (8%) were excluded from analysis because they showed evidence of dementia or confusional states at time of interview. In addition, ten

subjects (including one onset and one chronic case of depression) refused the second, LEDS, interview. Thus in Nantwich complete data, covering both mental state and life events, is available for 90 subjects. In Denbigh five subjects (3.3%), were excluded from subsequent analysis because of dementia. Complete data is therefore available for 147 subjects.

2. The choice of statistical models

We are concerned with the effects of a dichotomous risk factor (presence or absence of a severe event) on a dichotomous outcome factor (presence or absence of an onset of depression in the nine months before interview). A Chi-square test is appropriate for analyzing independence of the effects. Fourfold tables can also be analyzed using log-linear models, though in the two dimensional case with dichotomous variables a log-linear analysis will tell us no more than the technique of chi-square (Fienberg,1980). This chapter presents the results of the chi-square analysis. The more complex analyses investigating social support, stressors and depression are presented in Chapter eight.

3. Low expected frequencies and the chi-square test of independence

From figure 7.1 it is apparent that the small number of observed onset cases in Nantwich and Denbigh presents problems for chi-square analysis because of the associated low expected frequencies. Everitt (1977), states that "in the majority of cases the chi-square

criterion may be used for tables with expectations in excess of 0.5 in the smallest cell". When this is not so Fisher's exact test is recommended. However, this is very conservative, and large samples are needed to detect even moderately large differences between the two proportions of interest (Bennett and Hsu, 1960; Gail and Gart, 1973).

4. Combining samples in the face of low expected frequencies

One way of minimizing the problem of small expected frequencies is to combine the Nantwich and Denbigh samples. Although this is at first sight an attractive option, the procedure is legitimate only "if the corresponding proportions in the various tables are alike" (Everitt,1977). Further, the numerical value of chi-square is proportional to sample size. Combining samples thus increases the risk of a Type I error. i.e. falsely rejecting the null hypothesis. Increasing sample size has the effect of increasing the power of statistical tests. This is advantageous if there is reason to belive that individual samples are too small to detect an effect. In their review of the life events literature Cochrane and Sobol (1980) reported a consistent 'medium' sized effect of around 0.35, between life events and psychological disorder. Following Cohen and Cohen (1975,pp.55), it is possible on the basis of this effect size to calculate the power of the tests

given the sample sizes of 90 in Nantwich and 147 in Denbigh. Corresponding statisical power values are 0.85, and 0.95, so it is not necessary to combine samples in order to stand a reasonable chance of rejecting the null hypothesis.

In the light of the above discussion it was decided to analyse the data in two ways, separately and in combination.

5. Independent and possibly independent events and difficulties

There has recently been disagreement among investigators who have utilized the Bedford College metric over whether to include 'possibly independent' events and difficulties as risk factors in the aetiology of psychological disorder. Murphy (1982), and Campbell et al.,(1983) include only 'independent' events and difficulties in their analyses, whereas Costello (1982) includes both 'independent' and 'possibly independent' events and difficulties. More recently Brown (1985), argues for the inclusion of both classes of events and difficulties stating that "..it hardly makes sense that any measure of adversity should ignore a bankruptcy or a marital separation just because the subject has played a part in bringing them about".

In practice the exclusion of 'possibly independent' events and difficulties is unlikely to have much effect providing they occur to onset cases and to normals with equal likelihood. Proportionately, there are few of these

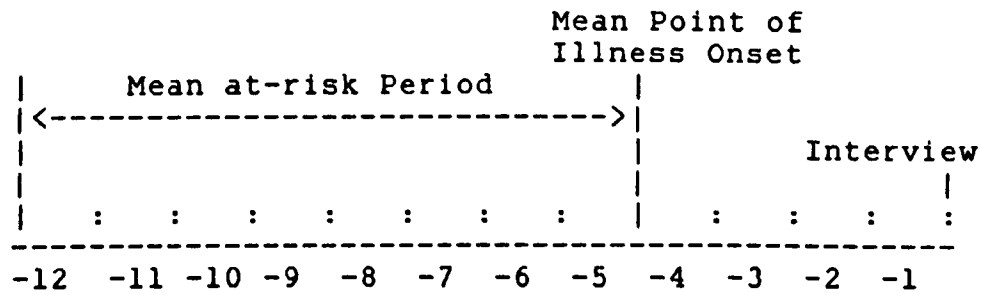
events and in a fourfold table their exclusion will influence the outcome of analysis only if the independent event is severe, and then only if the subject has no other events, or has no other severe events. A more important reason for analysing only independent events and difficulties is that it provides a safeguard against attributing causal significance to those which are a consequence of insidious onset.

6. Equating cases and non-cases by causal period in recording rates of life events

If a particular life event is to be construed as causing a particular episode of depression then it must occur before illness onset. Similarly, if a comparison between onset cases and control subjects for rate of adverse life events is to be made, the comparison must be based on an equivalent time period.

For purposes of exposition the period preceeding illness onset (or time of interview) can be considered as an 'at-risk' period in which events may or may not occurr. Examining the distributions of onsets it is possible to derive a mean at-risk period as shown in Figure 7.2 overleaf.

Figure 7.2 Mean at-risk period for the recording of life events preceeding illness



Based on the mean point of illness onset for all their onset cases Brown and Harris (1978), reported an average at-risk period of 38 weeks. Their comparison of the rate of life events experienced by onset cases and normals was therefore based on this time period. Murphy (1982), had no need to carry out this calculation because she recorded life events data for onset cases for a full 12 months preceeding onset. The disadvantage of her design is that it increases the probability of inaccuracies in the recall and dating of events (in some cases elderly people could be asked about events occurring 23 months before interview). Further, the design is feasible only if the investigator knows the respondent's psychiatric state. If the life events investigator is kept blind to the subject's psychiatric state (avoiding contamination of explanatory and response variables) it is necessary to compute an individual at-risk period post hoc for each case and to compute an appropriate comparison period for normals.

Costello (1982), in replicating Brown and Harris's

study calculated a mean at-risk period of 28 weeks for his onset depressives and chose the 28 weeks preceeding interview for the control group as the period over which to compare the groups for life events. This method has the advantage that recall of events is less subject to decay and telescoping (Duncan-Jones, 1981). The choice of comparison periods is also, however, governed by pragmatic considerations. By choosing the longer period (i.e. weeks 1-28 instead of weeks 29-52) one minimizes the risk of "excluding" severe events of causal significance. For example, in the present study the mean at-risk period for the four onset cases in Nantwich and Denbigh (adjusted for the delay between first and second interviews) was 29 weeks. Comparisons with control groups are therefore based on the rate of events reported between weeks 1 to 29 in the 12 months before interview. If, instead, weeks 30 to 52 are chosen, an onset case in Denbigh with a severe event at week 18 would be "scored" as not having a severe event.

III. The association between life events and depression

If life events play a 'causal' role in the onset of depression then proportionately more depressed elderly people will have experienced events in a comparable interval than will normal elderly subjects. In making this comparison it is of course necessary to 'exclude' those persons suffering with chronic depressive illness since their inclusion would confound the testing of the

aetiological hypothesis. Only events judged to be 'independent' (in Brown and Harris's terminology) were included in the analysis.

Figure 7.3 Number of elderly with/without an onset by whether they had/had not experienced a severe event

	NANTWICH		DENBIGH	
	Onset Cases (n = 1)	Normals (n = 88)	Onset Cases (n = 3)	Normals (n = 136)
Severe Event	1	7	1	10
No Severe Event	0	81	2	126

In Nantwich the only onset case had experienced a severe life event, although seven normal subjects had also experienced such an event. Everitt (1977), has suggested a procedure for analyzing contingency tables where a cell has a zero observed frequency. It consists of increasing "...all cell frequencies by addition of a small constant, generally 0.5..". Following this recommendation the chi-square statistic with Yates' (1934) correction for continuity for the Nantwich data in Figure 7.3 was 3.69, which was not significant the 5% level. As one of the cells (a1) has an expected frequency of less than 0.5 the chi-square distribution may not be accurate. Using Fisher's exact test the resulting probability of obtaining the observed result in Nantwich is 0.09. This does not support the hypothesis that onset cases and normals differ with respect to the rate of severe events experienced.

In Denbigh, one of three onset cases had experienced a severe life event. A chi-square analysis of this data, again with Yates' correction for continuity, showed no significant association between events and depression (chi-square=0.28,df=1) at the 5 percent level of probability. As in Nantwich one of the cells (a1) had an expected frequency of less than 0.5 and so a Fisher's exact test is more appropriate. The probability associated with the Fisher test was 0.2.

In both Nantwich and Denbigh, analysis by chi-square and Fisher's exact test shows that there is no association between experiencing severe life events and becoming depressed. However, it should be recorded that the single onset case in Nantwich and one of the onset cases in Denbigh had been bereaved shortly before interview. According to DSM III criteria these subjects should <u>not</u> be diagnosed as cases of major depression. Their inclusion in the present analysis serves only to inflate the association between events and depression onset. A stricter application of the DSM III criteria would reduce the strength of an already weak association.

<u>Yates's continuity correction</u>

The practice of using Yates' correction for continuity is generally recommended (e.g. Everitt,1977) in order to make the tail areas of the chi-square distribution correspond to those of the hypergeometric distribution. If, however, the aim is to correct the

statistic so that it more closely adheres to the large-sample chi-square distribution, rather than to the hypergeometric distribution, the correction may not be appropriate (Fienberg,1980). Studies (e.g. Plackett, 1964; Grizzle, 1967; and Conover, 1974) have shown that using the corrected chi-square results in an overly conservative test, one that rejects the null hypothesis too rarely relative to the nominal level of significance. However, Mantel and Greenhouse (1968), and Fleiss (1981) have pointed out the inappropriateness of these analyses, and refute the arguments against the use of Yates' correction. In this study the correction was used.

The aetiological importance of life events

Although chi-square is excellent as a measure of the significance of an association it is not at all useful as a measure of the degree of association between two variables. The reason for this is that the obtained value of chi-square is a function both of the proportions in the various cells and of the total number of subjects studied. The degree of association present in a contingency table is a function of cell proportions only.

A number of suitable measures of 'causal' impact are available (e.g. the 'brought-forward time',Brown et al, 1973; the 'population attributable risk percent', Lilienfeld and Lilienfeld, 1980; and 'relative risk' Paykel, 1978). Of these measures the concept of relative risk, defined as the ratio of the rate of depression in

the treatment group to that in the control group, is particularly useful because it highlights the relationship between the risk factor (severe events), and the outcome factor (depression). By calculating the relative risk from other studies which have utilized the Bedford College metric we can compare the importance of severe events across studies. These data are presented below.

Figure 7.4 A comparison of relative risk estimators for severe life events accross studies

Diagnosis	Study	Event Types	Time Period	Relative Risk
Depression	Murphy,1982. urban elderly.	severe	1 year	6.25
Depression	Costello,1982. Canadian women.	severe	7 months	7.40
Depression	Campbell et al, 1983. working class women.	provoking agents	1 year	6.20
Psychiatric Disorder	Bebbington et al,1984. community sample	Events rated 1 or 2	3 months	3.10
Depression	Denbigh sample. rural elderly.	severe	7 months	4.50
Depression	Nantwich sample rural elderly	severe	7 months	0.13**

** a measure of 'attributable risk' not relative risk

Despite differences in the composition of samples and the criteria for diagnosis, there is a surprising degree of correspondence between the studies concerning the risk of becoming depressed following a severe event. Interestingly the risk of depression is greater among

Murphy's sample of urban elderly than among young working class women in Oxford (Campbell et al.,1983). In Denbigh the risk of depression is 4.5 times greater for those who had a severe event when compared to those who had no severe event. However, compared with studies covering a similar period the risk of depression is noteably lower.

In Nantwich it is not possible to calculate relative risk because of the sampling zero in the contingency table. Instead we calculate the 'attributable risk' (i.e. the difference in depression rates between those with a severe event and those without). This shows that the risk of depression is 0.13 greater in the 'severe event' group. In Denbigh the attributable risk is 0.07. Hence it appears that there is twice the risk of depression following a severe event in Nantwich compared to Denbigh.

Combining data from Nantwich and Denbigh

We have already warned that combining data from the two samples into a single fourfold table from which a chi-square statistic can then be computed "is legitimate only if corresponding proportions in the tables are alike" (Everitt,1977). In Nantwich the proportion of subjects experiencing an onset following a severe event (1/8 = 0.13) is higher than in Denbigh (1/11 = 0.09), so that combining the data in the above way may not accurately reflect the information contained in the original tables. Fortunately other methods are available; one of the simplest, described by Everitt

(op.cit), involves calculating the chi-square for each 2*2 table separately, suming the square root of these values, and dividing this figure by the square root of *g* (i.e. the number of tables to be combined). Using this method the z statistic for the combined samples was 2.45, which when refered to the tables of the standard normal distribution is found to be significant ($p < 0.02$).

When the Nantwich and Denbigh samples are combined to increase the number of onset cases analyzed, life events appear as 'causal' agents of depression among the elderly.

Comparison with patients

The mean week of illness onset for the 29 patients was 19. Comparisons with the normal subjects from Nantwich and Denbigh are therefore based on the rate of events reported between weeks 20 to 52 in the 12 months before interview.

Forty-five percent of the patient sample had experienced a severe life event as compared with 9 percent of the community normals. Comparing patients with all normals from Nantwich and Denbigh there is a highly signficant association between severe events and onset of depression for the patient sample (Chi-square = 27.50, df=1, $p<0.001$).

Figure 7.5 Number of elderly with/without an onset by whether they had/had not experienced a severe event

	Patients (n=29)	Community onsets (4)	Normals (n=224)
Severe event	13	2	19
No severe event	16	2	205

* comparison for the patient group and normals is based on weeks 20-52 before interview.
* the rate of severe events for community onsets is based on weeks 1-29 before interview.

It is interesting to compare the above data with that reported by Brown and Harris (1978), and Murphy (1982). The former authors found that 61% of their patient sample had a severe event in the thirty-eight weeks before interview compared with 68% for their community onsets, and 20% for normals. Murphy reports that 48% of her patient sample had a severe event in the previous 12 months, compared with 68% of the community onsets and 23% of the normals. In comparison to these studies, the rate of severe events experienced by patients and the combined community onset cases in this study is very similar. However, the rate of severe events for normals is much lower.

Chronic ongoing difficulties

In their Camberwell studies Brown and Harris (1978), identified 'major' difficulties as increasing the risk of depression among working-class women. These difficulties required a severity rating of 1-3, and a duration of two or more years before onset or interview, but excluded

difficulties relating to the health either of the subject or of other close ties. Although Brown and Harris found no evidence of poor health as a risk factor in depression onset, Murphy (1982) subsequently showed that among the elderly, poor physical health is strongly associated with onset. However, it is notable that Murphy's criteria for a 'marked' health difficulty was more lax than Brown's in that it included difficulties of 12 months duration or longer. Brown and Harris (1978), only included physical health difficulties which had lasted a minimum of two years, and consequently those difficulties which arise as a result of a severe event are excluded from analysis.

Brown (1985), has recently criticized the way in which various workers "...have pruned the number of dimensions of difficulties collected and changed the basic ratings so radically that they cannot be said to have undertaken a replication". In this study we have adhered to the Bedford College definitions for major non-health and marked health difficulties. Thus for example, all difficulties of severity one-to-three, of two years duration and longer, and involving the health of the subject or his/her close family were classified as marked health difficulties. This definition can be contrasted with that of Murphy (1982) who classified difficulties concerning the 'health of others' as 'major' difficulties.

Figure 7.6 Number of people with/without an onset by whether they had/had not experienced a major difficulty

	NANTWICH		DENBIGH	
	Onset cases (n = 1)	Normals (n = 88)	Onset cases (n = 3)	Normals (n = 136)
Major Difficulty	0	4	0	5
No Major Diffi.	1	84	3	131

Murphy (1982), found that two-thirds (8/12) of her community onset cases had experienced a major difficulty. Among the rural elderly major difficulties were infrequent. Only nine subjects reported such a difficulty and approximately half of these (n=4) were 'bereavement/ loneliness' difficulties. Of the 237 subjects who completed the life events interview from both samples there were no major difficulties involving housing or finance and only one involving marriage. Not one onset case in either Nantwich or Denbigh had experienced a major difficulty. Among normal subjects only 5 percent in Nantwich and 4 percent in Denbigh had experienced such difficulties.

Analysis of the data in figure 7.6 shows that major difficulties are not a significant factor for depression onset for either sample alone, or in combination. In Nantwich the probability of obtaining the observed result by Fisher's exact test was $p=0.96$, and in Denbigh the resulting probability was $p=0.90$. The z statistic for the combined samples was 1.48 ($p>0.05$)

Comparison with patients

Seventeen percent of the patient sample had experienced a major difficulty, (compared with 4 percent of community normals). It is impossible to say to what extent this difference is due to locale (i.e. urban versus rural). Murphy (1982), found that 42% of her patient sample and 19% of urban normals had a major difficuly. In Camberwell Brown and Harris report a figure of 47% for their patient sample and 17% for their normals.

Figure 7.7 Number of elderly with/without an onset by whether they had/had not experienced a major difficulty

	Patients (n = 29)	Community cases (n = 4)	Normals (n = 224)
Major Difficulty	5	0	9
No Major Difficulty	24	4	215

Despite the relatively low rate of major difficulties in the present study compared with others there was a raised rate of major difficulties among the inpatient sample relative to normals (X^2=6.25, df=1, p<0.02).

Marked health difficulties

It is well documented that large numbers of elderly people suffer concurrently from significant depression and one or more major chronic diseases. It was noted in Chapter 3 that among the elderly depression can trigger or amplify physical illness and that physical illness can

in turn trigger or amplify depression. In their Camberwell studies Brown and Harris (1978), found that health difficulties however unpleasant, did not increase the risk of becoming depressed. They argued that subjects accommodated to the threat posed by a chronic health problem so that only a crisis (i.e. an event), "forcing a change of perspective" brought about depression. However Brown and Harris did find a raised rate of marked health difficulties among chronic depressives and also found that marked health difficulties "increased with life stage". It is perhaps not surprising therefore that Murphy's (1982) study of the urban elderly found that poor physical health was a significant risk factor in depression onset. The risk of becoming depressed following a marked health difficulty was 4 times higher in her community cases than for subjects without such a difficulty.

Figure 7.8 Number of people with/without an onset by whether they had/ had not experienced a marked health difficulty

	NANTWICH		DENBIGH	
	Onset cases (n = 1)	Normals (n = 88)	Onset cases (n = 3)	Normals (n = 136)
Marked Difficulty	1	32	2	26
No Marked Difficulty	0	56	1	110

In Nantwich, a Fisher's exact test showed that there was no significant association between the experience of a marked health difficulty and depression onset (p=0.37).

In Denbigh a chi-square test is appropriate because the smallest cell in the contingency table (b1) has an expected frequency greater than 0.5. This analysis produced a chi-square of 1.70 (df=1), which is not significant at the 5 percent level.

Despite the non-significant results for onset cases in both samples it is notable that chronic depression is associated with the experience of a marked health difficulty. Of the ten chronic depressives in Nantwich and Denbigh for whom life event data is available, eight had a marked health difficulty, whereas only 37 percent of normal subjects reported such a difficulty. The probability of becoming depressed in Nantwich following a marked health difficulty was 0.03, and in Denbigh, 0.07.

Combining data from Nantwich and Denbigh

The resulting z statistic for the combined samples was 2.2, which when referred to the tables of the standard normal distribution is significant at the 5 percent level. Thus, when the samples are combined we find that marked health difficulties are a significant risk factor in depression onset in the rural elderly.

Comparison with patients

Twenty-eight percent of patients (8/29) had experienced a marked health difficulty, compared with 27% of all normals from Nantwich and Denbigh. In her urban sample Murphy (1982) found that 39% of patients and 26% of normals had a marked health difficulty.

Figure 7.9 Number of elderly with/without an onset by whether they had/had not experienced a marked health difficulty

	Patients (n = 29)	Community cases (n = 4)	Normals (n = 224)
Marked Difficulty	8	3	60
No Marked Difficulty	21	1	164

Analysis of the data in figure 7.9 shows that marked health difficulties are not a significant risk factor for depression among the patient sample (X^2=0.02, p>0.05).

V. The association between provoking agents and depressive onset

Brown and Harris (1978) found that only severe events and major difficulties were significantly associated with onset. Subjects who had both of these 'provoking agents' were not at increased risk of depression compared to those with only a severe event. However, Brown and Harris found that subjects with either provoking agent were at increased risk of depression. Murphy (1982), found that subjects with either a severe event, major difficulty, or marked personal health difficulty were significantly more likely to become depressed compared to those with no provoking agents. Following Murphy, the term "provoking agent" in this study represents a summary measure reflecting the presence of a severe event, major difficulty, or marked health difficulty. Are subjects with a provoking agent more likely to become depressed? These data are given in

Figure 7.10.

Figure 7.10 Number of people with/without an onset by whether they had/had not experienced a provoking agent

	NANTWICH		DENBIGH	
	Onset cases (n = 1)	Normals (n = 88)	Onset cases (n = 3)	Normals (n = 136)
Provoking Agent	1	42	3	34
No Prov. Agent	0	46	0	102

* Data shows proportion with at least one provoking agent before onset for cases and before interview for normals.

All four onset cases had experienced a provoking agent. In Nantwich the risk of depression following a provoking agent (1/43) was substantially less than in Denbigh (3/37). Thus, while there was no association between the experience of a provoking agent and depression onset in Nantwich (X^2=0.002, df=1, p>0.05), there was a significant association in Denbigh (X^2=4.8, df=1, p<0.05).

Combining data from Nantwich and Denbigh

The resulting z statistic for the combined samples was 1.586, which when referred to the tables of the standard normal distribution is not significant at the five percent level. Thus, when the samples are combined we find that provoking agents are not a significant risk factor in depression onset.

Comparison with patients

Sixty-six percent of the patient sample experienced a provoking agent, compared with 34% of normals and 100%

of community onsets. Compared with the combined normals of Nantwich and Denbigh there was an increased risk of depression for patients following a provoking agent (Chi-square =9.60, df=1, p>0.001)

Figure 7.11 Number of elderly with/without an onset by whether they had/had not experienced a provoking agent

	Patients (n = 29)	Community cases (n = 4)	Normals (n = 224)
Provoking agent	19	4	76
No provoking agent	10	0	148

* Data shows proportion with at least one provoking agent before onset for cases and before interview for normals.

Summary

The main tenet of Brown's model of depression is that adversity, in the form of severe life events and major non-health difficulties, is a causal factor in depression. The analyses provides partial support for this model when applied to the rural elderly, but only when the Nantwich and Denbigh samples are combined.

When each sample is considered alone, neither life events nor major difficulties are significantly associated with depression. Measures of relative and attributable risk do, however, suggest that life events increase the risk of depression. In contrast, for the rural elderly, major difficulties were of no importance. The analyses are in agreement with Brown's model in so far as marked health difficulties did not increase risk of onset. This is somewhat surprising given that Murphy (1982) has shown that marked health difficulties are

important predictors of depression among the urban elderly. However, as discussed, her definition of a marked health difficulty differed from Brown and Harris's and ours in important ways. Finally, additional support for Brown's model derives from the finding that provoking agents, which in this study was a combined measure of severe events, major and marked difficulties, were significant predictors of depression, but only in Denbigh.

When samples are combined a different picture emerges; severe life events and marked health difficulties are a significant risk factor for depression. However, major non-health difficulties are once again unimportant. Provoking agents also were not significantly associated with onset.

Interestingly, when data from the the patient sample are compared with normal subjects from Nantwich and Denbigh the results are entirely in accord with Brown's model of depression. Both severe life events and major difficulties are significant predictors of depression, while marked health difficulties are not. When all three risk factors are combined and the patient sample is compared with the total normal sample provoking agents were significantly associated with onset.

Sample size clearly has an important effect on the results for community subjects. Whereas analyses of the individual samples provide only limited support for

Brown's model of depression, when samples are combined the results are more supportive. The question that arises, therefore, is which of the two sets of results best describes the data? The principal argument against accepting the results of the combined samples is that the effect of severe events and marked health difficulties in Nantwich and Denbigh may be significantly different. In this case combining the samples may be misleading.

The proportion of normal elderly subjects with a severe event in the 12 months before interview was 17% in Nantwich and 11% in Denbigh. Comparing these proportions shows they are not significantly different ($z=1.64$, $p>0.05$). For normals and onset cases 18% of the Nantwich sample and 12% of the Denbigh sample had a severe event in the previous 12 months. Again, comparing samples shows the the proportions are not significantly different ($z=1.57$, $p>0.05$). The proportion of subjects with an onset following a severe event in Nantwich was 0.13, and in Denbigh it was 0.09. Comparing the samples shows that the effect of severe events in Nantwich and Denbigh was not statistically different ($z=1.13$, $p>0.05$). For severe events, therefore, there is no reason to reject the conclusion of the combined samples, namely that events are aetiologically important for depression among the rural elderly.

In Nantwich 36% of normals had a marked health difficulty compared with 19% in Denbigh. Thus, the

proportion of normals with a marked health difficulty was significantly higher in Nantwich ($z=3.96$, $p<0.001$). For normals and onset cases 37% of the Nantwich sample had a marked health difficulty compared with 20% in Denbigh. This proportion was again significantly different ($z=3.589$, $p<0.001$). Although more subjects had a marked health difficulty in Nantwich, the proportion of subjects with an onset and a marked health difficulty was higher in Denbigh (0.07) compared with Nantwich (0.03). However, the proportions were not statistically different ($z=1.53$, $p<0.05$), i.e. the effect of marked health difficulties in Nantwich and Denbigh was not statistically different. Thus, there is no reason to reject the findings derived from the combined samples, namely that marked health difficulties are aetiologically important for onset among the rural elderly.

Overall, the chi-square analyses provide only partial support for Brown and Harris's model of depression when applied to the rural elderly. We concur that severe events significantly increase the likelihood of becoming depressed. In contrast to Brown and Harris's (1978) findings, marked health difficulties, as shown by Murphy (1982), were also aetiologically important for depression, although there was no evidence to suggest that major difficulties are of causal importance for onset of depression.

Though the question concerning which set of results

best describes our data has been resolved, our discussion has not yet clarified why severe events, major, and marked health difficulties did not significantly increase the risk of onset in Nantwich and Denbigh when the samples were analysed separately. There are three possible reasons for this. First, the DSM III diagnostic criteria for caseness may have been too strict. If correct then the proportion of normal subjects with a severe event would be 'increased' relative to the proportion of onset cases and a non-significant association would result.

The incidence of depression in Nantwich and Denbigh was less than 2 percent and much lower than the 9.5 percent reported by Murphy (1982) who used the Bedford College criteria for caseness (Finlay-Jones et al.,1980). However, a study by Dean et al. (1983), shows the latter criteria are more strict in their definition of caseness. It is therefore unlikely that the "negative" findings in Nantwich and Denbigh are due to overly strict case criteria.

A second possibility is that ratings of the threat of events and difficulties, which were made by a non-elderly group of psychologists, underestimate their "true" threat for the elderly. According to this hypothesis a non-significant association between events and onset, for example, resulted because the "true" number of severe events was underestimated. However, the

value of a chi-square statistic depends on the proportions of subjects in the cells of a fourfold table. Thus, the outcome of our analyses would only have differed if the ratings of onset cases had been underestimated with no comparable bias in the ratings of normals. This is most unlikely particularly as the ratings in Nantwich and Denbigh were carried out by two independent groups.

A third possibile explanation for the absence of a significant association between stressors and onset among the individual rural samples is that the rate of severe events and difficulties may have been very low compared with similar studies. This comparison is however constrained by the amount of published data available (e.g. data for chronic depressives is invariably excluded), the way in which it is presented (e.g. Murphy reports data for onsets and patients combined), and because the non-resistant rate is influenced by outlying data values. Nevertheless, comparing the rate of severe events and difficulties in Nantwich and Denbigh with those reported by Murphy (1982) and Brown and Harris (1978) will enable us to assess the relative importance of these stressors for the individual samples.

The rate of <u>all</u> events per 100 <u>normal</u> elderly subjects in Murphy's (1982) study was 81, and in Brown and Harris's (1978) study of working-class women it was 218. In Nantwich the comparable rate was 136, and in

Denbigh the rate was 105. Thus, more life events were reported by the normal rural elderly in comparison to their urban counterparts, though the rate was much lower compared to that reported by working class women. This, however, may in part be due to interviewer differences. The rate of non-severe events for normals in Murphy's study was 55, and in Brown and Harris's study it was 191. In Nantwich the comparable rate was 113, and in Denbigh the rate was 93. Again, normal elderly people in Nantwich and Denbigh reported more non-severe life events than those from urban communities.

In Murphy's study the rate of severe events for normals was 26, and among Brown's sample of women it was 27. For the normal rural elderly the rate of severe events was 24 in Nantwich, and in Denbigh it was 13. From her published data it is possible to calculate the approximate rate of severe events in Murphy's study for normals and onset cases and this was 31. This calculation assumes that each of Murphy's onset cases had only one severe event, and is therefore likely to be an underestimate of the true rate. The comparable rate in Brown's study was 43, in Nantwich it was 25, and in Denbigh it was 14. These data clearly show that for most subjects (i.e. normals and onsets) the rate of severe events is lower for the rural elderly compared to the urban elderly, and much lower in comparison to working-class women. This is particularly so in Denbigh where the

rate of severe events was less than half that reported by Murphy's urban elderly and only a third of that reported by Brown and Harris.

The above comparisons clearly show why severe life events did not significantly increase the risk of depression in Nantwich and Denbigh. The low rate of severe events reported by the rural samples also suggests that the non-significant results in Nantwich and Denbigh do not refute Brown and Harris's hypothesis that severe events provoke depressive illness. A fair test of the hypothesis would require the rate of severe events in Nantwich and Denbigh to be roughly comparable to that found in other studies. This was not so. Only by combining samples was the power of our statistical tests sufficient to detect the modest effect of severe events in Nantwich and Denbigh.

For severe difficulties (i.e. marked health and major non-health difficulties) the comparison between this study and those of Murphy (1982) and Brown and Harris (1978) is confined to proportions of subjects with severe difficulties because this is the only data published by Murphy. The comparison is, however, complicated because Murphy's definition of a marked health difficulty differs from that used in the present study.

The proportion of urban elderly subjects (excluding chronic cases) with a major difficulty was 21%. These

difficulties were much less prevalent in rural areas, and in Nantwich and Denbigh only 4.5% and 3.6% of the subjects respectively had a major difficulty. Among Brown's sample of women (excluding chronic cases) 20% had a major difficulty. Therefore, as with severe events, while the proportions of subjects with a major difficulty accounts for the absence of a statistical association between major difficulties and onset among both the rural elderly samples our findings do not necessarily refute the hypothesis that major difficuties are of aetiological importance for depression.

Murphy (1982) found that marked personal health difficulties were significantly associated with onset, and 30% of her subjects (excluding chronic cases) had one of these difficulties. In Nantwich 37% of normals and onset cases had a marked difficulty concerning personal or other's-health, and in Denbigh 20% had one of these difficulties. The proportion of subjects with a marked health difficulty in Nantwich compared with that reported by Murphy (1982) was not significantly different ($z=1.28, p>0.05$), although compared with Denbigh the urban elderly had significantly more marked health difficulties ($z=2.6, p<0.01$). In Murphy's (1982) study, the probability of becoming depressed following a marked health difficulty was 0.63. In Nantwich the comparable figure was 0.03, and in Denbigh it was 0.07. Th effect of marked health difficulties was, therefore, far greater among the

urban elderly compared to that in Nantwich and Denbigh. Only when the rural samples were combined were our statistical tests sufficiently powerful to detect the modest effect of marked health difficulties in the individual samples.

CHAPTER EIGHT

STRESSORS, SOCIAL SUPPORT, LIFE SATISFACTION AND DEPRESSION

In community-based epidemiological studies, recent attention has focused on variables which mediate the impact of stressors on the individual. Research suggests that social support may be one of the most important of these variables.

Although many studies (e.g. Broadhead et al.,1983; Leavy,1983) have shown evidence of a positive correlation between support and psychological well-being, in theory this could occur through two different processes. The "buffering" model proposes that there is an interaction in which social support is related to well-being primarily for persons who experience high levels of stressors. An alternative model is that support has direct, positive effects on well-being by fulfilling a persons needs for affiliation, respect, belonging, social recognition, affection, and nurturance (Williams et al.,1982). By implication, the frustration of these needs (lack of support) may itself constitute a source of stress. Thus, in addition to or instead of buffering the effects of stressors, social support may have an independent effect on psychological well-being.

Combining the Denbigh and Patient samples

Data on social support was gathered for the Denbigh and Patient samples only. Due to the small number of

onset cases in Denbigh, no significant association was found between severe life events and depression, although severe events did increase the relative risk of depression. This finding has considerable implications because, as Cohen and Wills (1985) point out "..a requirement for testing a buffering model is a significant relation between stress and symptomatology".

There are two ways of overcoming this problem and both will be adopted in this chapter. First, one can combine the 29 onset cases from the Patient sample with the community onset cases. Analysis has shown that there is a significant association between severe events and depression among the Patient sample. Combing the samples will therefore permit a test of the buffering hypothesis.

Secondly, one can assess the influence of stressors and social support on an alternative response variable such as life satisfaction. Although research (e.g. Gilleard et al, 1981), indicates that the LSI-W (Bigot,1974) is sensitive to clinical depression the two measures are not synonymous. The LSI-W, which was only used in Denbigh, is an index of current contentment and past achievement. It therefore provides one with the opportunity to examine the influence of stressors and social support on the morale of elderly people.

The operational measurement of social support

In our analysis to date (see Appendix IV), social support has been operationally defined in terms of

subjects' scores on the availability and satisfaction scales of the ISS. The total availability score is the sum of the number of different people mentioned by the respondent on the availability of support items, and the total satisfaction score is the sum of the 'satisfied' responses to the perceived available levels of support.

Cohen and Wills (1985) have argued that functional measures of social support (i.e those which assess the extent to which relationships provide particular functions such as emotional support) are particularly appropriate for testing the buffering model. The ISS provides a global measure of both structure (i.e the number of relationships) and function. They further point out that measures which "index the presence of a significant interpersonal relationship" are also sensitive to the buffering effect. Brown and Harris's (1978) measure of "confidant status", which was utilised in this study, is therefore combined with the measures of availability and satisfaction to create the following categorical operational measures of social support.

Satisfaction with support: Subjects who reported being satisfied on three-quarters of the 8 satisfaction items of the ISS (i.e. those scoring 6 and above), were deemed to be satisfied with their levels of support.

Dissatisfaction with support: Subjects scoring 5 and below on the satisfaction scale of the ISS were deemed to be dissatisfied with their support.

High social support: Subjects scoring above the median on the availability scale (i.e. 7 and above), who were satisfied with their perceived support, and who also had a confidant, were deemed to have high social support.

Low social support: Subjects scoring below the median on the availability scale (i.e. 6 and below), who were dissatisfied with their perceived support, and who did not have a confidant, were deemed to have low social support.

The operational measurement of life satisfaction

Gilleard et al., (1981) report a mean score of 6.50 for elderly depressives on the LSI-W. In the following analysis this defined the boundary for a dichotomous measure of life satisfaction. Subjects scoring 7 or above on the LSI-W were deemed to have "high" life satisfaction, and those scoring 6 or below were deemed to have "low" life satisfaction.

Statistical analysis

When one wishes to explore the relationship of a binary response variable to one or more explanatory variables the appropriate method of analysis is the linear logistic model. In this model, the logit, or log-odds, that the response variable has a specified value is a linear function of the explanatory variables. Logit analysis is therefore analagous to multiple linear regression analysis in which the expected value of a continuous response variable is a linear function of one or more explanatory variables.

Problems in examining the relationship between stressors, social support, depression and life satisfaction

A particular problem in cross-sectional studies is the potential confounding of measures of stressors and social support (Thoits,1982). For example, among the

elderly low levels of support may be the product of life events and difficulties involving death, interaction change, and loss of health. Further, by adopting the Bedford College rating procedure for life events and difficulties which is sensitive to social context, the problem is undoubtedly exacerbated (Parry and Shapiro,1985).

There are a number of ways to deal with this potential confounding. One method is to eliminate from analysis subjects with both low social support and events involving inter-personal loss or marked personal health problems. This loss of data would, however, result in some bias in the sample to be analysed. An alternative and preferable method is to re-classify these subjects as having high social support. This procedure carries with it the following assumption; prior to experiencing the loss event (e.g. death of a confidant), the subject probably had high support, and by virtue of the event (and the way in which the categorical variable "high" and "low" support is operationally defined), now has low support.

Using the operational definition of support outlined above a subject can be classified as having "low" social support by virtue of his/her score on availability, satisfaction, or confidant status. Re-classification thus requires careful scrutiny of each subject with low social support to determine which of these criteria is

responsible for his/her score. It is then necessary to determine if the subject experienced a life event (or marked personal health difficulty) and if the event was likely to be a factor in the scoring of low support. For example, if the subject is scored as having low support simply because he/she did not have a confidant, and if he/she had also been bereaved, then he/she would be re-classified as having high social support. However, if the same subject had only a marked personal health difficulty we reasoned that this was unlikely to have a significant bearing on his/her confidant status. Consequently, he/she would continue to be scored as having low support.

The buffering hypothesis predicts that persons with severe events and low support will show disproportionately elevated symptomatology. Thus, re-classifying subjects from low to high support cells in a contingency table provides a stringent test of the hypothesis. Consequently it was decided to repeat analyses without re-classifying subjects.

An additional problem concerns the confounding of support with prior disorder. Where onset depression is the outcome variable this problem can be dealt with by eliminating chronic cases from the analyses. Some confounding will also exist between long-term low morale and support. Within a cross-sectional framework a single "snap-shot" measure of life satisfaction offers little scope for eliminating this confounding. However, if one

assumes that a low score on the past achievement sub-scale of the LSI-W is indicative of long-term low morale then one way of dealing with this would be to eliminate those with low scores on this scale. However, reliability analysis (appendix VII) shows that the LSI-W is not a good measure of past achievemnet. There is, therefore, no suitable method of eliminating this possible confounding.

Equating cases and non-cases for causal time period in recording rates of life events

In comparing depressed and non-depressed subjects it is important to ensure that the period of risk in which events may have been experienced is equal. The median date of onset of depression for the patient and onset cases in Denbigh was 15.50 weeks. Thus, on average, events occuring between weeks 52-16 before interview are eligible for inclusion in the analysis for the onset cases, and this was also taken as the comparison period for the non-depressed controls. This is a different time period from that used in Chapter 7, which was based on the 29 weeks before interview.

The relation between depression, life events and social support

The purpose of building a model is to provide the simplest description of the population being studied that is consistent with the data. A saturated model (i.e. one containing as many parameters as observations), reproduces the data exactly, but without any simplification of interpretation. It does not therefore

result in a parsimonius description of the relationship between the variables, although it may serve as a good starting point for exploring other models that could be used to represent the data. In the following analysis both the saturated and unsaturated logit model (i.e. one that does not contain all possible parameters) will be fitted to the data.

The analyses were performed using the SAS procedure "Catmod" (Version 5,1985). This uses a multiplicative definition of no interaction. Some authors (e.g. Brown and Harris,1978) infer support for the buffering hypothesis from an additive model (i.e. one suggesting a combined effect of lack of support and stressors greater than the sum of their separate effects). A multiplicative model requires that the combined effect exceeds the product of their separate effects. There is currently little agreement as to which is the 'correct' model. Thus, Cleary and Kessler (1982) state "There is no way to determine empirically which of the two formulations..more accurately describes the causal processes at work in observed data".

RESULTS

A. Model adjusted for confounding between events and social support

Figure 8.1 Onset cases of depression by severe life event and social support

	With severe event		No severe event	
	Low Support	High Support	Low Support	High Support
	9/12	6/14	15/66	2/76
Probabilty	0.75	0.43	0.23	0.03

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.005	12.12	0.0005
Severe Event	-1.411	23.86	0.0001
Social Support	-0.943	10.66	0.0011
Severe * Support	-0.250	0.75	0.3865
Residual		0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.479	11.88	0.0006	-0.385
Severe Event	-1.074	23.13	0.0001	0.065
Social Support	-1.259	11.36	0.0007	0.219
Residual		0.75	0.3865	-0.333

Fitting a saturated model to the adjusted data reveals significant main effects of both life events and social support, and a non-significant interaction term. Deleting the interaction term from the analysis (i.e. the unsaturated model) also supports an independent effects model, with the small residuals indicating an extremely good fit.

Fifty-eight percent of subjects with a severe event became depressed, compared with 31% of those with low social support. For subjects with both a severe event and

low support, 75% susequently became depressed. It appears that severe events are, therefore, more important predictors of depression, and that the effect of severe events is greater in the low support cells.

B. Model not adjusted for confounding between life events and social support

Figure 8.2 Onset cases of depression by severe life event and social support

	With severe event		No severe event	
	Low Support	High Support	Low Support	High Support
	13/18	2/8	15/66	2/76
Probability	0.72	0.25	0.23	0.03

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.245	16.05	0.0001
Severe Event	-1.173	14.26	0.0002
Social Support	-1.110	12.78	0.0004
Severe * Support	-0.083	0.07	0.7887
Residual		0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.242	16.01	0.0001	-0.111
Severe Event	-1.129	18.35	0.0001	0.019
Social Support	-1.129	13.90	0.0002	0.144
Residual		0.07	0.7887	-0.060

Figure 8.2 shows a contingency table for onset cases by severe life events and social support unadjusted for the possible confounding between the latter two variables. As with the adjusted data, the unsaturated logit model supports an independent effects model; both severe events and low support are significantly associated with onset of depression.

Comparing figures 8.1 and 8.2 shows that in adjusting for possible confounding between events and support, four subjects were moved from the severe event/high support to the severe event/low support cell. This has made no difference to the overall outcome of the analysis, although it has marginally increased the influence of support on depression relative to events. In the adjusted model 31% of the low support group became depressed compared with 33% in the unadjusted model.

The relation between depression, major difficulties and social support

Previous analysis has shown that major difficulties are infrequent, and are not a significant risk factor for depression when the Nantwich and Denbigh samples are analysed separately. Combining the Denbigh and patient samples shows that only 6% (n=10) of subjects had a major difficulty, and half of these subsequently became depressed. Of those subjects with a major difficulty and low social support only 38% became depressed. Thus the risk of depression was greatest for those with only a major difficulty (P=0.5), least for those with only low support (P=0.31), and intermediate for those with both a major difficulty and low support (P=0.39).

The results of a logit analysis of the relationship between major difficulties, social support, and depression is reported below. For this analysis no adjustment is required for confounding.

Figure 8.3 Onset cases of depression by major difficulty and social support

	With major difficulty		No major difficulty	
	Low Support	High Support	Low Support	High Support
	3/8	2/2	24/77	3/81
Probability	0.38	1.00	0.31	0.04

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-0.794	2.93	0.0869
Major Diff.	1.232	7.05	0.0079
Social Support	-0.142	0.09	0.7591
Major * Support	1.091	5.53	0.0187
Residual		0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.327	10.76	0.0010
Major Diff.	0.517	2.18	0.1399
Social Support	-0.975	10.60	0.0011
Residual		5.53	0.0187

Looking first at the unsaturated model, in which the interaction term has been deleted, we find a significant goodness of fit statistic (i.e. residual X^2). Consequently, this model does not provide a good fit to the data. The saturated model shows that a major difficulty, but not social support, is a significant risk factor for depression. Further, there is a highly significant interaction between the two variables. However, contrary to the buffering hypothesis, which predicts an interaction between low support and major difficulties, the analysis shows an interaction between high support and major difficulties. This is because the two subjects with a major dificulty and high social

support were both depressed. Thus, whereas the probability of becoming depressed with only a major difficulty is 0.5, and with high social support is 0.06, the probability of becoming depressed with both 'risk factors' is 1.001.

In the absence of a sensible explanation for this finding, one can only surmise that it is attributable to the small number of subjects with a major difficulty. Of the 266 people who completed both interviews in Nantwich, Denbigh, and Patient samples, only 5% reported a major difficulty.

The relation between depression, marked health difficulties and social support

Marked health, unlike major difficulties, are relatively common, occuring to 1-in-5 subjects in the combined Denbigh and Patient samples. Of the 36 subjects with a marked health difficulty 28% were depressed.

In the first analysis presented (figure 8.4), each subject's data was scrutinized and, if necessary, adjusted to account for possible confounding between personal health difficulties and levels of social support. For example, a subject with a severe cardiac problem who was scored as having low social support by virtue of his/her level of available support on the ISS, was re-classified as having high support.

A. Model adjusted for confounding between marked personal health difficulties and social support

Figure 8.4 Onset cases of depression by marked health difficulty and social support

	With Marked Difficulty		No Marked Difficulty	
	Low Support	High Support	Low Support	High Support
	6/16	4/20	20/61	2/71
Probability	0.38	0.20	0.33	0.03

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.539	32.44	0.0001
Marked Diff.	0.590	4.78	0.0289
Social Support	-0.925	11.71	0.0006
Marked * Support	0.487	3.25	0.0715
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.375	29.21	0.0001	0.521
Marked Diff.	0.388	2.49	0.1144	-0.445
Social Support	-0.921	11.61	0.0007	-0.858
Residual		3.25	0.0715	0.124

Fitting a saturated model to the data sustains the independent effects model. Both marked health difficulties and low social support are significant predictors of depression, and the interaction term just fails to reach significance at the 5% level. The probability of becoming depressed with a marked health difficulty is 0.28; with low social support it is 0.34; and with both risk factors present it is 0.38.

Deleting the interaction term results in an unsaturated model in which marked health difficulties are no longer significant. However, the nearly significant

goodness of fit statistic suggest that the model only just fits the data, and that the saturated model might represent a better description of the data.

B. Model not adjusted for confounding between marked personal health difficulties and social support

Figure 8.5 Onset cases of depression by marked health difficulty and social support

	With Marked Difficulty		No Marked Difficulty	
	Low Support	High Support	Low Support	High Support
	9/24	1/12	20/61	2/71
Probability	0.38	0.08	0.33	0.03

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.792	27.66	0.0001
Marked Diff.	0.338	0.98	0.3219
Social Support	-1.178	11.94	0.0005
Marked * Support	0.234	0.47	0.4922
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.852	31.57	0.0001	0.550
Marked Diff.	0.167	0.51	0.4742	-0.090
Social Support	-1.263	15.87	0.0001	-0.259
Residual		0.47	0.4922	0.038

Comparing figures 8.4 and 8.5, shows that in adjusting the data 8 people with a marked personal health difficulty were re-classified as having high social support. Fitting the simplified (unsaturated) model to the data shows that low social support is a significant risk factor in depression but that a marked health difficulty is not. The probability of depression with low support, 0.34, and with a marked health difficulty, 0.28, is quite high. However, the probability of depression

without a marked health difficulty, 0.17, is also quite high, and this accounts for the non-significant effect of marked health difficulties.

The relation between depression, provoking agents, and social support

Approximately 1-in-3 subjects, (36%), had experienced a severe acute or ongoing stressor and of these 40% were depressed. In comparison, only 7% of subjects with no provoking agent were depressed.

For the analysis presented in figure 8.6 the data have once again been adjusted to eliminate possible confounding between provoking agents and levels of social support.

A. Model adjusted for confounding between provoking agents, and social support

Figure 8.6 Onset cases of depression by provoking agent and social support

	With Provoking Agent		No Provoking Agent	
	Low Support	High Support	Low Support	High Support
	15/27	9/33	7/45	1/63
Probability	0.56	0.27	0.16	0.02

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.644	29.06	0.0001
Provoking Ag.	-1.265	17.21	0.0001
Social Support	-0.910	8.90	0.0029
P.A. * Support	-0.308	1.02	0.3127
Residual		0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.470	34.24	0.0001	-0.841
Provoking Ag.	-1.090	18.94	0.0001	0.140
Social Support	-0.727	8.77	0.0031	0.126
Residual		1.02	0.3127	-0.124

Both saturated and unsaturated logit models of the adjusted data again support an independent effects model; both provoking agents and social support have strong main effects and the interaction term is not significant. Whereas the probability of becoming depressed with a provoking agent alone is 0.4, this increases to 0.56 when a subject also has low social support. Further the probability of depression with low support alone is 0.31, so that provoking agents pose a greater risk for depression than low support.

B. Model not adjusted for confounding between provoking agents and social support

As a result of adjusting the data for confounding between provoking agents and social support, 13 subjects with low support were re-classified as having high support.

Figure 8.7 Onset cases of depression by provoking agent and social support

	With Provoking Agent		No Provoking Agent	
	Low Support	High Support	Low Support	High Support
	22/40	2/20	7/45	1/63
Probability	0.55	0.10	0.16	0.02

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.954	33.16	0.0001
Provoking Ag.	-0.956	7.93	0.0049
Social Support	-1.208	12.68	0.0004
P.A. * Support	-0.009	0.00	0.9779
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.952	34.67	0.0001	-0.021
Provoking Ag.	-0.950	15.62	0.0001	0.004
Social Support	-1.206	13.76	0.0002	0.011
Residual		0.00	0.9779	-0.002

Repeating the analysis on the unadjusted data also sustains an independent effects model with no significant interaction between low support and provoking agents. Looking at the simplified (unsaturated) model shows that the adverse effect of low support is slightly greater in the unadjusted data set; the probability of depression with low social support has increased marginally from 0.31 to 0.34.

Comment

The balance of evidence supports the view that stressors and social support each have a significant independent effect on depression. Of the three types of stressors examined (i.e. severe events, marked health,

and major difficulties), only marked health dificulties did not significantly increase the risk of depression. This is entirely consistent with Brown's model of depression, although does not support Murphy's (1982) findings from an urban elderly sample. It has been suggested elsewhere that Murphy's observation concerning the significance of marked health difficulties for depression is likely to be due to the way in which she defined this measure.

On only one occasion was a significant interaction found, and that was for major difficulties and social support. However, this was in the opposite direction to that suggested by the buffering hypothesis, and was most likely due to the small numbers of subjects with a major difficulty.

Overall, we have found a striking absence of significant interaction effects once the main effects of stressors and social support have been taken into account. Using a multiplicative model of no interaction shows that social support does not act as a "buffer" against the adverse effects of stressors.

The relation between life satisfaction severe life events and social support

One of the most important subjective assessments of life quality that an individual can report is his/her relative satisfaction with life in general.

Although many studies (e.g. Mussen et al.,1982) have examined the predictors of life satisfaction among the

elderly their interpretation is often constrained by the use of cross-sectional designs. For example, the frequently reported positive correlation between social contact and well-being (e.g. Edwards and Klemmack,1973) may indicate a positive influence of contact on well-being, well-being on contact, or the influence of a third variable such as health status.

Similar problems of direction of causality apply in this study. With depression as the response variable, this can be clarified by accurately dating events and changed psychiatric status (i.e. onset). Further, the confounding between support and prior disorder is overcome by eliminating the eight chronic community cases from analyses. Within a retrospective framework, a single "snapshot" measure of life satisfaction provides no measure of change. Thus the direction of causality between stressors, support, and morale remains ambiguous. In addition, there is no suitable method of eliminating the confounding between long-term low morale and levels of support.

To permit a test of the buffering hypothesis with regard to depression it has been necessary to combine the Denbigh and patient samples. Previous analyses, however, have shown that the two samples are significantly different in sex composition, social class, and living arrangements. Specifically, the patient sample had relatively more women, was of lower social class, and

tended to live more often with children.

Murphy (1982) found that the urban working-class elderly had significantly higher rates of major difficulties, severe personal health events, and marked personal health difficulties compared with middle-class subjects. The predominantly urban Patient sample also had a higher rate of severe events than the Denbigh sample. Further evidence suggests that women have more contact with their G.P.'s, more symptoms, and more severe symptoms, on average, than men (Banks et al.,1975). These observations cause concern because they suggest that the relationship between stressors and depression demonstrated above may have been contaminated by sex and class differences in the composition of the Denbigh and patient samples. Although the influence of these variables on subjective well-being appears to be quite small when other factors are controlled (e.g. Liang, 1982; Diener, 1984), the foregoing evidence argues against combining the Denbigh and patient samples when considering the effects of stressors and social support on life satisfaction.

In the following analyses it is no longer necessary to eliminate the eight chronic community cases. Therefore, the following analyses will be performed on the entire Denbigh sample (i.e. n = 147). The possible confounding between stressors and social support, of course, continues to be a problem. Therefore, where

appropriate, the analyses are again performed on an adjusted and unadjusted data set.

A. Model adjusted for confounding between events and social support

Figure 8.8 Proportions with Low life satisfaction by severe event and social support

	With Severe Event		No severe Event	
	Low Support	High Support	Low Support	High Support
	4/8	2/11	13/55	6/73
Probability	0.50	0.18	0.24	0.08

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.272	18.59	0.0001
Severe Event	-0.520	3.11	0.0778
Social Support	-0.686	5.40	0.0211
Severe * Support	0.066	0.05	0.8231
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.271	18.56	0.0001	0.053
Severe Event	-0.530	3.28	0.0701	-0.029
Social Support	-0.647	7.43	0.0064	-0.334
Residual		0.05	0.8231	0.107

Approximately one-third (32%) of subjects with a severe life event also had low life satisfaction, compared with 27% of those with low social support. Of those with both a severe event and low support 50% had low satisfaction.

Fitting a saturated model to the data shows that severe events are not significant predictors of life satisfaction among the community elderly, but that social support is. Deleting the non-significant interaction term from the model and fitting a simplified unsaturated model

also shows that severe events are not significant.

That life satisfaction is not significantly influenced by unpleasant changes in personal circumstances is perhaps surprising. Although the chosen level for dichotomizing life satisfaction scores may have contributed to this finding (i.e. the cut-point for "low" satisfaction may be too low, corresponding to that previously observed for depressed inpatients), this finding is consistent with a number of previous longitudinal studies (e.g. Palmore and Kivett, 1977; Baur and Okun, 1983). Thus Baur and Okun showed that life satisfaction in late life is relatively stable, and that being widowed is not, for example, a signficant predictor of change.

B. Model not adjusted for confounding between events and social support

Figure 8.9 Proportions with Low life satisfaction by severe event and social support

	With Severe Event		No Severe Event	
	Low Support	High Support	Low Support	High Support
	5/11	1/8	13/55	6/73
Probability	0.46	0.13	0.24	0.08

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.429	18.22	0.0001
Severe Event	-0.364	1.19	0.2763
Social Support	-0.751	5.04	0.0248
Severe * Support	0.131	0.15	0.6958
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.378	19.95	0.0001	0.053
Severe Event	-0.427	2.11	0.1463	-0.029
Social Support	-0.661	7.36	0.0067	-0.334
Residual		0.15	0.6958	0.107

Analysis of the unadjusted data set also shows that social support, but not severe events, is a significant predictor of life satisfaction for the community elderly. Fitting the unsaturated model to the data provides an excellent description of the data, and all the residuals are small.

The relation between life satisfaction, major difficulties and social support

Figure 8.10 shows that of the five people in Denbigh with a major difficulty only one person had low life satisfaction. However, the proportion of subjects with no major difficulty and low satisfaction, 0.17, was even lower. Social support clearly has a stronger effect; 25% of subjects with low support also had low satisfaction compared to 10% of those with high social support.

Figure 8.10 Proportions with Low life satisfaction by major difficulties and social support

	With Major Difficulty		No major Difficulty	
	Low Support	High Support	Low Support	High Support
	0/2	1/3	17/63	7/79
Probability	0.00	0.33	0.27	0.09

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.351	6.90	0.0086
Major Diff.	0.312	0.37	0.5447
Social Support	-0.161	2.47	0.7551
Major * Support	0.507	0.97	0.3244
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.223	6.03	0.0140	1.271
Major Diff.	0.422	0.71	0.4005	-0.611
Social Support	-0.611	6.66	0.0098	-0.095
Residual		0.97	0.3244	0.051

The simplified, unsaturated, model provides a good fit to the data with a non-significant (p=0.32) goodness of fit statistic. This model shows that whereas social support is a significant predictor of morale in late life, major non-health difficulties are not. However, caution is obviously required in interpreting these results because of the extremely low frequency of major difficulties.

The relation between life satisfaction, marked health difficulties, and social support

Many studies show that a strong positive correlation exists between health and life satisfaction among the elderly (e.g. Markides and Martin, 1979; Larson, 1978), and this effect remains strong even when other variables such as age and social class are controlled (Larson, 1978). Although objective indices of health also tend to correlate with life satisfaction, they usually do so at a lower level than subjective measures (Palmore and Luikart,1972). A recent meta-analysis of studies of

health on subjective well-being reveals a consistent moderate correlation of about 0.32 between them, with virtually all findings being significant (Okun et al.,1984).

In the analysis presented in figure 8.11, the data set has been adjusted to account for possible confounding between marked health difficulties and levels of support.

A. Model adjusted for confounding between marked personal health difficulties and social support

Figure 8.11 Proportions with Low life satisfaction by marked health difficulty and social support

	With Marked Difficulty		No Marked Difficulty	
	Low Support	High Support	Low Support	High Support
	9/17	6/19	6/42	4/69
Probability	0.53	0.32	0.14	0.06

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.309	29.17	0.0001
Marked Diff.	0.981	16.39	0.0001
Social Support	-0.472	3.79	0.0515
Marked * Support	0.026	0.01	0.9134
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.307	29.23	0.0001	0.028
Marked Diff.	0.979	16.43	0.0001	-0.027
Social Support	-0.521	3.80	0.0512	-0.029
Residual		0.01	0.9134	0.022

Forty-two percent of subjects with a marked health difficulty also had low life satisfaction, compared with 25% of those with low social support. Of those subjects with both a marked personal health difficulty and low

social support, 53% had low life satisfaction. In contrast, only 9% of subjects with no marked health difficulty had low satisfaction.

Fitting a saturated model to the data shows that a marked personal health difficulty is a significant predictor of low morale in late life. Social support just fails to attain significance at the 5 percent level, and the interaction is not significant. Deleting the interaction term from the model gives an excellent fit with small residuals. However, social support again just fails to achieve significance in this simplified model.

B. Model not adjusted for confounding between marked personal health difficulties and social support

Figure 8.12 Proportions with Low life satisfaction by marked health difficulty and social support

	With Marked Difficulty		No Marked Difficulty	
	Low Support	High Support	Low Support	High Support
	12/24	3/12	6/42	4/69
Probability	0.50	0.25	0.14	0.06

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.419	30.11	0.0001
Marked Diff.	0.870	11.32	0.0008
Social Support	-0.524	4.10	0.0429
Marked * Support	-0.026	0.01	0.9213
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.415	31.06	0.0001	-0.042
Marked Diff.	0.879	12.90	0.0003	0.016
Social Support	-0.520	4.12	0.0423	0.026
Residual		0.01	0.9213	-0.019

Analysis of the unadjusted data, as anticipated,

increases the effect of social support on life satisfaction. Of those subjects with low support, 27% had low satisfaction (the comparable figure for the unadjusted data set was 25%). Consequently, when the unsaturated model is fitted to the data, social support is a significant predictor of satisfaction. As before, a marked health difficulty has a powerful effect on life satisfaction.

The relation between life satisfaction, provoking agents, and social support

Thirty-two percent of the community subjects had experienced a severe acute or ongoing stressor and of these 35% had low life satisfaction. In comparison, only 9% of subjects with no provoking agent had low life satisfaction.

For the analysis presented in figure 8.13 the data have once again been adjusted to eliminate possible confounding between provoking agents and levels of social support.

A. Model adjusted for confounding between provoking agent and social support

Figure 8.13 Proportions with Low life satisfaction by provoking agent and social support

	With Provoking Agent		No Provoking Agent	
	Low Support	High Support	Low Support	High Support
	9/18	7/28	6/39	3/62
Probability	0.50	0.25	0.15	0.05

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.446	34.83	0.0001
Provoking Ag.	-0.896	13.39	0.0003
Social Support	-0.593	5.87	0.0154
Provoke * Support	-0.044	0.03	0.8578
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.437	35.75	0.0001	-0.063
Provoking Ag.	-0.891	13.44	0.0002	0.037
Social Support	-0.587	5.86	0.0155	0.035
Residual		0.03	0.8578	-0.041

The unsaturated model of the data shows that both provoking agents and social support are powerful predictors of life satisfaction. The saturated model again shows that the interaction term is not significant i.e. the combined effect of low support and provoking agent did not significantly increase the risk of low satisfaction.

B. Model not adjusted for confounding between provoking agent and social support

Comparing figures 8.13 and 8.14 shows that as a result of adjusting the data, 9 subjects with low support were re-classified as having high support. As in previous analyses, the adjustment has little effect on the outcome of the analysis, increasing the effect of support by 1%.

Figure 8.14 Proportions with Low life satisfaction by provoking agent and social support

	With Provoking Agent		No Provoking Agent	
	Low Support	High Support	Low Support	High Support
	12/27	4/19	6/39	3/62
Probability	0.44	0.21	0.15	0.05

a) Logit Analysis (saturated model)

Effect	Estimate	Chi-square	Probability
Intercept	-1.557	38.26	0.0001
Marked Diff.	-0.785	9.72	0.0018
Social Support	-0.593	5.55	0.0185
Provoke * Support	-0.044	0.03	0.8616
Residual		-0.00	1.0000

b) Logit Analysis (unsaturated model)

Effect	Estimate	Chi-square	Probability	Residual
Intercept	-1.558	38.30	0.0001	-0.059
Provoking Ag.	-0.771	10.41	0.0013	0.035
Social Support	-0.590	5.52	0.0188	0.056
Residual		0.03	0.8616	-0.026

The unsaturated model of the unadjusted data again provides a good fit to the data with a non significant (p=0.86) goodness of fit statistic. Both provoking agents and social support have a strong main effect on life satisfaction, and there in no interaction between the variables.

Summary

Our analyses of the combined Denbigh and Patient samples shows that elderly people who experience severe events or low social support are at increased risk of developing depression. In addition, major difficulties, but not marked health difficulties, also increase the risk of depression, although the significance of this finding is uncertain given their small numbers.

In contrast to depression, severe life events do not predispose to low life satisfaction. This finding lends support to the notion that life satisfaction is a relatively enduring cognitive assessment of the overall

conditions of one's life. Thus, despite many reports of relatively unpleasant changes in personal circumstances, the median life satisfaction score of the Denbigh sample, (12.0), was very high given that the maximum attainable score is 16.

Throughout the analyses there was a consistent significant association between levels of support and depression, and support and life satisfaction. Although it is tempting to conclude that deficits in social support predispose to both depression and low life satisfaction, within a cross-sectional framwework the direction of causality remains ambiguous. The lack of support may directly influence an individual's well-being, but there is also the possibility of a depressive social process whereby members of the depressed person's social environment find his or her depressive behaviour aversive.

Another consistent finding to emerge is the absence of significant interaction effects once the main effect of stressors and support have been taken into account. This was perhaps surprising since we had used a measure of social support, which according to Cohen and Wills (1985), is supposedly conducive to demonstrating a buffering effect. Given the marked direct effect of social support on depression and life satisfaction in this study, there is perhaps a danger that the protracted debate about stress buffering versus independent effects

may distract attention from the importance of studying in more detail social support in its own right. Despite a decade of social support research, we still lack a basic understanding of how and why social support ties are protective for health.

CHAPTER NINE

AGE AS A FACTOR IN THE PERCEPTION OF LIFE EVENTS AND DIFFICULTIES

One intriguing aspect of the life events literature concerns the diverse ways in which people appraise seemingly similar stressors (e.g. Dohrenwend and Dohrenwend, 1974). However, a person's response to the social environment is not entirely idiosyncratic (Hinkle,1961). Brown's method of quantifying the potential threat of a life event (or difficulty), confronts this paradox by making a consensus judgement of the "..likely meaning of an event for the person experiencing it, taking into account the circumstances in which it occurs" (Brown,1981).

An implicit assumption of this contextual rating procedure is that factors (e.g. social class, levels of social contact) which might have a considerable bearing on the interviewee's appraisal of an event or difficulty can be assimilated by a group of objective raters. In other words, given similar circumstances an event which is threatening to one person will also be threatening to most others. A study by Tennant et al.(1979), suggests this assumption is correct. They found high inter-rater agreement between naive and experienced judges in rating long-term threat and concluded that the concept of "threat" was generalizable. However, the claim for generalization across populations from a homogeneous

group of non-random academic judges is overstated. At most, theirs is evidence for limited external validity.

Other studies have suggested that the elderly may not perceive certain life events in comparable ways to younger people. For example, Brim and Ryff (1980), argue that the properties of life events change over different age groups, and that three dimensions characterize the salience of an event, namely; (a) the probability that an event will take place for a person; (b) the correlation of an event with chronological age; and (c) whether an event occurs for many or a few people. Neugarten (1968) uses the terms "on-time" and "off-time" to describe respectively normative and non-normative life events. Events perceived as on-time at the subjects stage in the life cycle (normative events) will have less of an impact than events which occur off-time, whether early or late. Thus, "for most men and women the normal and expectable life events are not crises...They call forth changes in self-concept and new adaptations, but if they occur at approximately the expected time they do not produce trauma. Even the death of a spouse if it occurs 'on schedule' does not create a psychiatric crisis" (Neugarten, 1984). Similarly the onset of chronic illness is an expectable event for many elderly people, and is perhaps one reason why some describe their health as good even when they have one or more chronic diseases.

Empirical evidence supporting this hypothesis comes

from a number of studies (e.g. Stern, Williams, and Prados, 1951; Gerber et al,1975). Sands and Parker (1980), suggest that the nature of bereavement is different for the elderly. Jacobs and Douglas (1979) have summarized much of this work and conclude that among the elderly a loss is faced with more cognitive acceptance and less numbness, denial, and guilt. They suggest that different characteristics of grief among the elderly may be the result of a process of anticipation of death.

Lowenthal et al (1975), found that being off-time for promotion and or increase in salary was a major reason for a reduction in the life satisfaction of middle-aged men. Further, Borque and Back (1977), found that events such as the departure of children, and retirement, were perceived by their subjects as most disruptive if they occured at a non-normative age.

Neugarten and Moore (1968), also suggest that certain norms will differ for various cohorts over time. Recent evidence of this comes from a study by Fallo-Mitchell and Ryff (1982). Young, middle-aged, and elderly women expressed different preferred timetables for the occurrence of certain life events, and mistakenly perceived that the other age-groups would hold similar timing pereferences to their own. However, only one of the 23 events rated (i.e retirement) could be described as an event typically occuring in old-age, and for this the groups did not differ in their timing preferences.

These observations raise some doubts about the validity of life event and difficulty ratings made in the present study, and of the conclusions of previous studies which have examined the role of stressors in precipitating illness among the elderly. Given these doubts it was desirable to examine the concordance of elderly and non-elderly judges in their ratings of life events and difficulties.

Method

Study Design - an overview

The rating of life events and difficulties is a very time consuming procedure. To obtain a sizeable sample of ratings respresentative of the stressors experienced by the elderly it was necessary to conduct a panel study i.e. "a study where data is obtained by interviewing a sample of respondents at two or more points in time" (Markus,1979).

Selection of panel members

While age is the principal explanatory variable in this study, other factors such as social class, sex, and level of education may also have a bearing on the perception of stressors. Consequently, elderly people similar in background and experience to the non-elderly group of four psychologists who carried out the origional ratings were recruited. Subjects were retired University academic staff, or administrators, and friends of theirs who were retired professional or clerical staff. The term

"elderly" here refers to people who are eligible for national insurance reirement pension; sixty years and over for women, and over 65 years for men.

At a pragmatic level the study required the panelists to be in relatively good health so that they could travel to weekly rating sessions. In addition the likely duration of the study of 3 months called for a considerable commitment of time. Therefore, as a precaution against attrition over-recruitment was deemed necessary.

Arrangements were made whereby 50 retired University academic and administrative staff were contacted by letter which called for volunteers for a study of the perception of stress among the elderly. The response rate is given below.

Figure 9.1 Response rate of retired University staff

	N	%
Did not reply	5	10
Refused to participate	8	16
Ill-health prevented participation	2	4
Previous commitments prevented participation	3	6
Agreed to attend, one occasion only	20	40
Agreed to join panel	12	24
Total	50	100

Sixty-four percent of those approached were willing to take part. The majority wished to attend on one occassion only: these subjects were subsequently enlisted to participate in a cross-sectional variant of the present study. Most of those contacted were male, reflecting their predominance among retired staff. In

order to include more women in the study additional direct approaches were made by word of mouth to retired social workers, doctors, architects, and administrators. A further 13 people were recruited in this way.

Of the 12 University staff, 7 eventually completed the rating of events, and 6 completed the rating of difficulties. Additionally, 3 university staff who were not available at the time the study commenced subsequently joined the panel for the rating of difficulties. Drop out rates were very low. Two male subjects were lost early on; one did not attend the first rating session because of a serious personal illness, and a second withdrew after the first session on account of his wife's ill health. Another male subject withdrew after completing the rating of life events to enter hospital. Finally a male subject was excluded prior to the study on the grounds of poor health, and a female subject was subsequently excluded on the grounds of her anxiety and depression which onset during the project.

The training factor

To compare the ratings of the elderly panel with those of the non-elderly psychologists it is essential that both are familiar with and equally competent in using the Bedford College rating scales.

Tennant et al. (1979), have shown that with "minimal training" novice raters can attain high levels of agreement with experienced raters in their judgements of

the long-term threat of life events. Wilkinson et al. (1985), have shown that this is also the case for the rating of difficulties. Of particular concern is that the socialization effects of training may inflate levels of agreement by altering raters' personal concepts of threat and severity. Tennant et al. argue that the brevity of their training procedure precludes this, and point out that coefficients of agreement between novice raters and a consensus of experienced raters improved only marginally between first and final rating sessions. However, as neither of the above studies included a pre-test or control group one cannot be certain that training did not contaminate personal concepts of threat.

It was therefore decided to form a trained and untrained panel of elderly raters. This would allow any differences in rating due to the raters stage in the life cycle to become apparent. If "socialization" effects are important (a) the trained and untrained panels might differ in their severity ratings of events and difficulties; (b) the trained panel would have high agreement with the trained non-elderly panel; (c) the untrained elderly panel would not show such high agreement with the non-elderly panel as their trained counterparts. If however there is no effect of socialization (and the perception of the severity of "threat" is indeed a generalizable concept within our culture) then one would anticipate close agreement

between all three panels (Old-trained; Old untrained; and Young trained).

Age and sex characteristics of the elderly trained and untrained panels

Subjects were matched approximately for age and sex and then allocated to a trained or untrained group. The age and sex characteristics of the two groups is given below.

Figure 9.2 (A) Age and sex of trained panel for rating life events and difficulties

	N	Median Age	Range
Male	5	74	65 - 77
Female	5	77	69 - 82

(B) Age and sex of untrained panel for rating life events

	N	Median Age	Range
Male	4	74	71 - 76
Female	4	74	64 - 81

(C) Age and sex of untrained panel for rating difficulties

	N	Median Age	Range
Male	6	71	65 - 76
Female	4	73	64 - 81

There were no significant age differences between the trained and untrained panels for the rating of life events (T=0.28, p=0.79) or difficulties (T=0.85,p=0.41).

Design

The 290 life events and 672 difficulties elicited from the 237 elderly subjects completing both life events and psychiatric interviews in Nantwich and Denbigh form the population from which events and difficulties were sampled. Events and difficulties were selected on the

basis of their consensus ratings of long-term threat and severity. These are the judgements of potential threat and severity previously made by the non-elderly group of psychologists.

A completely randomized block design was used, consisting of 25 blocks of life events and 20 blocks of difficulties. The number of blocks was based on an estimate of how many events and dificulties elderly subjects could rate in 12 weekly sessions. Each block of life events consisted of four items, one item at each level of long-term threat. Similarly each block of difficulties consisted of six items, one from each level of severity.

Allocation of items to blocks was in three stages; a) items to be rated were drawn at random, without replacement, from the population of events and difficulties within severity bands. For events, 25 items were drawn within each band, and 20 items were drawn for difficulties; b) items were randomly allocated to blocks; and c) items within a block were randomly ordered. Each replicated block therefore contained each level of severity in equal numbers. The design is illustrated below.

Figure 9.3 Complete randomized blocks for life events (four levels of severity, four blocks)

Severity 1	Severity 2	Severity 4	Severity 3
Severity 4	Severity 4	Severity 3	Severity 1
Severity 2	Severity 3	Severity 1	Severity 2
Severity 3	Severity 1	Severity 2	Severity 4
BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4

Twenty-five blocks comprising 100 life events, and twenty randomized blocks comprising 120 difficulties were generated in this way.

PROCEDURE

All subjects were provided with details of the background to the study. They were informed that the life events (and later difficulties) which they were being asked to judge were elicited from people who like themselves were living in the community. It was emphasized that they would be scaling in the absence of complete information, and that their task was similar to that of a judicial procedure. They should make their judgement on all the evidence they had, whilst being aware that they could not know all the circumstances in which it occurred.

Each life event and difficulty was presented separately together with demographic information, details of the interviewee's children and siblings, the extent of contact with them, and level of satisfaction with that contact. In addition, details about the subject thought to be relevant to the item being rated (e.g. any other illness which the subject had) were also given.

Subjects were provided with items grouped into blocks and with separate response sheets for recording their ratings.

Training panel members

In the first instance subjects listened to tape recorded extracts from two interviews, after which they were given details of the life circumstances of each interviewee (using individual booklets and overhead transparencies). Two life events taken from the interviews were then discussed in detail in order to familiarize subjects with the format in which events would be presented and with the concept of an "event". No attempt was made to rate the events. Two further examples were then presented, but without tapes of the interviews. The first 4 exemplars were specifically chosen to reflect a wide range of event type and severity. The subjects were then introduced to a summary of the "guidelines" for rating drawn from the Bedford College Manual. These listed the dimensions which raters should take into account in making their judgements, and directed them to consider fully all aspects of context before making their ratings. Subjects then rated four events with feedback on how the non-elderly group of psychologists had rated the events, and a discussion followed of the factors considered salient by this group in making their ratings.

For each life event, the elderly subjects were asked to rate its short-term threat, long-term threat, and

their "experience". The last rating required the subject to indicate if he/she had undergone an experience similar to the one being judged.

Following a revision of the guidelines the subjects proceeded to rate the first five blocks (20 items) of events, receiving feedback after each rating. Each event was read out by a presenter and the subject then made his/her rating. The consensus rating of the non-elderly group was then announced and this was recorded in red ink by the subject on his/her response sheet. Each subject was therefore in a position to see the extent to which his/her ratings departed from the consensus. Each presentation was followed by a full group discussion of the event and its consensus rating. After rating blocks 1 to 5 the panel were told they were now trained, and they proceeded to rate blocks 6 to 25 independently and without feedback or discussion.

The untrained group

The untrained group received identical treatment to the trained group up to the fourth example, except they did not listen to the tape-recorded interviews. They received no rating guidelines, merely instructions on how to use the rating scales. Rating started at block 1, without feedback, discussion, or comment. "Training" for this group consisted of familiarization with the distinction between short and long-term threat.

Comment

The trained and untrained groups rated 25 blocks of events over a period of six weeks. For both groups questions were confined to clarifying ambiguities about the abstract of the event. Subjects were discouraged from seeking additional information about an event in order to ensure approximate equivalence of older and younger panels.

In comparing the rating procedures of the elderly and non-elderly groups two points are noteworthy. First, unlike the non-elderly group of psychologists, the elderly subjects were not required to reach a consensus rating. Secondly, they rated "isolated" events from a stratified randomized schedule. In contrast, the non-elderly group rated in sequence all events and dificulties derived from an individual subject. These constraints were imposed on the elderly panels because of time pressures. Differences between the groups in the amount of information available for rating events and difficulties was minimized by providing the elderly panels with other relevant events and difficulties which had occurred to the subject under consideration.

Rating Difficulties

After all the life events had been rated, both elderly groups were introduced to the concept of the chronic problem or "difficulty" (i.e. problems which had lasted at least 4 weeks, but usually much longer), and

shown how to use the six-point rating scale.

The untrained group worked through three examples of difficulties without rating, and then rated three further examples. Thereafter they proceeded straight away to blocks 1 to 4.

The trained group were given guidelines for rating difficulties and worked through 6 examples, two with feedback and discussion. After revision of the guidelines subjects then rated 4 blocks of difficulties. For each item they were given the consensus non-elderly rating which they marked in red ink on their response sheets after making their own rating. As with events, there was full discussion after each rating. For blocks 5 to 20 both groups of subjects made individual ratings without feedback or discussion.

Test-retest reliability of life event and difficulty ratings

The test-retest reliability of elderly subjects' ratings are given in Appendix IX. The majority of panelists' had reliable ratings. However, one of the trained, and two of the untrained panelists were unreliable in their ratings of life events and excluded from the comparison with the non-elderly consensus. In addition, a subject who only rated difficulties had a nonsignificant reliability coefficient and was excluded from between-groups comparisons for difficulties.

RESULTS

Events and difficulties were sampled by consensus long-term threat and severity. However, the between-groups ratings' comparisons are based on event and difficulty type. This allows the results to be compared with previous studies and assessment of the hypothesis that "on-time" events are perceived as less stressful.

Four event, and three difficulty types were chosen, namely; death events, personal health events and difficulties, other's health events and difficulties, and non-health events and difficulties. Because the trained panel received feedback on the first five blocks of life events and four blocks of difficulties, these ratings, for both elderly panels, are excluded from the between-groups analyses. All analyses were performed using the SPSS-X procedure MANOVA for repeated measures designs.

The rating of death events

The non-elderly psychologists' median rating for the twenty death events was threat-level 1 (i.e. markedly threatening). In contrast, two-thirds (6/9) of the trained elderly group had a median rating of threat-level 3 (i.e. some threat), and four of the seven untrained raters had a median rating of threat-level two (i.e. some threat).

A repeated measures MANOVA showed no significant overall difference between the non-elderly and elderly trained groups ratings' of death events ($F=0.64$, $p=0.21$).

However, univariate F tests showed a significant between-groups difference for events of consensus threat-level 1, with the elderly trained panel rating the events as less threatening (F=8.69, p=0.02). The mean rating of the elderly group for these events was 2.3. There were no significant differences between the groups for events rated threat-level 2 (F=1.58, p=0.24), threat-level 3 (F=0.07, p=0.80), or threat-level 4 (F=1.43, p=0.27).

Similarly, the ratings of the non-elderly and untrained panel were not significantly different when all levels of threat were compared simultaneously (F=0.91, p=0.07). However, univariate F tests again showed death events of threat-level 1 were perceived as significantly less threatening by the elderly raters (F=11.23, p=0.02). The mean rating of the untrained panel for these events was 2.4, more than 1 scale-point lower than that of the non-elderly group.

Comparing the ratings of the trained and untrained panels shows no significant differences (F=0.16, p=0.71) in their ratings for death events. Within the trained group, men and women differed significantly in their ratings of markedly threatening events only (F=8.33, p=0.023). The men rated these events as more threatening, and their mean rating was 2.0 compared with 2.6 for women. There were no sex differences in the ratings of the untrained group (F=0.13, p=0.98).

<u>The rating of personal health events</u>

The non-elderly group's median rating of the 19 personal health events was threat-level 3, and the majority of trained (7/9), and untrained panelists (5/7), also had a median rating of three (i.e. some threat).

As with the rating of death events, the trained elderly group rated markedly threatening personal health events less severely ($F=17.6$, $p=0.003$) than their non-elderly counterparts. Their mean rating for these events was 2.5, i.e. 1.5 scale points lower than the non-elderly consensus. The untrained elderly panel rated both marked ($F=15.82$, $p=0.007$) and moderately threatening events ($F=5.86$, $p=0.05$) less severely. For events judged to be markedly threatening by the non-elderly group, the mean rating of the untrained panel was 2.29, and for events of consensus threat-level 2 their mean rating was 2.79.

Among the trained group, sex had a significant effect on the rating of personal health events ($F=0.88$, $p=0.04$). However, univariate F tests show the difference was confined to events of threat-level 3 ($F=9.62$, $p=0.02$). Women again perceive the events to be less threatening, and their mean rating was 3.0, compared to 2.4 for men. Within the untrained group the sexes did not significantly differ in their ratings of personal health events ($F=0.22$, $p=0.90$).

The rating of other's health events

The median rating of the non-elderly group for these 18 life events was 3.0 (i.e. some threat). The majority

of the trained (7/9), and untrained panelists (5/7), had an identical median rating.

In comparison with the non-elderly consensus, the trained elderly groups ratings were less severe for events of threat-level 1 ($F=25.6, p=0.001$) and threat-level 2 ($F=7.03$, $p=0.03$). The mean rating of elderly subjects for the former events was 2.3, and for the latter it was 3.11. The untrained group on the other hand perceived only the markedly threatening events as less stressful ($F=8.44$, $p=0.03$), and their mean rating for these events was 2.1.

Contrary to previous analyses of death and personal health events, the trained and untrained group also differed significantly in their ratings, but only with respect to events of threat level 3 ($F=5.14$, $p=0.04$). The mean rating of the trained panel (2.95) was less severe than their untrained counterparts (2.63).

For both trained ($F=0.54, p=0.44$), and untrained groups ($F=0.51, p=0.74$), there was no effect of sex on subjects' ratings of health-other events.

<u>The rating of non-health events</u>

For non-health events (n=23), the median rating of all the trained and untrained panelists was identical to that of the non-elderly consensus i.e. threat-level 3.

Comparing the non-elderly and trained groups shows that events of threat-level 2 ($F=8.72$, $p=0.02$), are perceived as less threatening by the elderly panelists,

but that events of consensus threat-level 4 were perceived as more threatening ($F=8.45$, $p=0.02$). Thus, the mean rating of the trained panel for events of threat-level 2 was 2.83, and for events of threat-level 4 their mean rating was 3.6.

The untrained panel rated markedly threatening non-health events less severely ($F=6.08$, $p=0.05$), and their mean rating for the events was 2.29. Further, in comparison to the trained group they rated events of threat-level 2 as significantly more threatening ($F=10.56$, $p=0.0006$).

For non-health events sex had no significant effect on either the ratings of the trained ($F=0.23$,$p=0.87$), or untrained panel ($F=0.90$, $p=0.19$).

Comment

Ratings of the potential long-term threat of life events show systematic discrepancies between the judgements of elderly and non-elderly people. Elderly people regard life events as less threatening, although it is notable that differences between young and old were confined almost entirely to those events of marked and moderate threat, and in particular the former.

Another notable finding is the absence of an effect due to training. On only two occasions were the ratings of the trained and untrained groups significantly different, although more importantly, their ratings of markedly threatening events were always in accord. It is

therefore unlikely that the Bedford College procedure contaminates personal concepts of threat.

Sex had a minimal effect on elderly peoples' ratings of life events. Women rated markedly threatening death events and personal health events of threat-level 3 as significantly less threatening, but these were the only differences to emerge. This finding is surprising in view of the voluminous literature showing women to be disadvantaged compared with men in their reporting of mental and physical health problems (e.g. Banks et al.,1975). However, a postal survey by Perrson (1980), also found no differences between men and women in their rating of life events.

The perceived severity of chronic difficulties

Kart (1981), notes that many elderly people have extremely biased notions of what is 'normal' in old age, often associating pain, discomfort and even intellectual decline with ageing per se. The stereotypical view of old age is shared by many younger people; how often has one heard the comment "Isn't she good for her age?".

The rating of personal health difficulties

A repeated measures MANOVA showed significant differences between the ratings of the elderly and non-elderly panels ($F=1.15$, $p=0.006$). Subsequent univariate F tests reveal that both trained ($F=1.67$,$p=0.001$) and untrained ($F=0.99$, $p=0.045$) elderly panels judge difficulties of consensus severity 1 to be less severe.

The mean rating of the trained group was 2.4, and that of the untrained group was 2.04.

Comparing the ratings of the two elderly panels shows that the trained group rated difficulties of consensus severity 4 as significantly less severe (F=3.1, p=0.019). The trained group also rated difficulties of severity 1 less severely, although this just failed to reach significance at the 5% level (F=2.12, p=0.058).

Within both trained (F=0.38, p=0.90), and untrained groups (F=0.69, p=0.50) there was no effect of sex on the rating of personal health difficulties.

The rating of other's health difficulties

Again, analysis of other's health ratings showed significant differences in the judgements of the non-elderly and elderly groups (F=1.42,p=0.001).

Compared to the non-elderly group the trained panel rated dificulties of severity 1 (F=2.5,p=0.03), severity 2 (F=2.14,p=0.04), and severity 3 (F=2.48,p=0.05), less severely. However, difficulties of severity 6 were rated more severely by the elderly (F=0.95, p=0.05). Among the untrained group, only difficulties of severity 1 were rated as significantly less severe (F=1.54,p=0.05), and the mean rating was 2.3. Comparing the elderly groups shows that trained panelists rated difficulties of severity 2 (F=2.94, p=0.04) and severity 3 (F=15.31, p=0.000) less severely.

There were no significant differences between

elderly men and women in their ratings of other's health difficulties within either the trained (F=0.56,p=0.71) or untrained group (F=0.76,p=0.37).

The rating of non-health difficulties

For difficulties not involving health there were no significant differences between the ratings of the non-elderly and trained groups (F=0.58, p=0.20). However, the mean ratings of the elderly group were less severe than the non-elderly consensus for difficulties of severity 2 (mean=2.7), and severity 3 (mean=3.7), but more severe for difficulties of severity 4 (mean=3.3), and severity 6 (mean=4.8).

Overall, non-health difficulties were rated less severely by the untrained group (F=0.83,p=0.02). However, the ratings of the non-elderly and elderly groups did not significantly differ for any specific level of severity. Further there were no significant differences in the ratings of the two elderly groups (F=0.13,p=0.68).

Within both the trained (F=0.9,p=0.04) and untrained groups (F=0.55,p=0.32), sex had no effect on the rating of non-health difficulties.

Summary

The results of this study, (a) provide support for the hypothesis that life events and difficulties (e.g. death, ill health) which are 'on-time' for the elderly are less stressful; (b) suggest that the ratings of the non-elderly group of psychologists are of limited

external validity for the elderly; and (c) suggest possibly erroneous conclusions in previous studies of the relationship between stressors and illness among the elderly where quantification of potential stressors is carried out by non-elderly judges.

Those life events and difficulties which are perceived as very stressful by younger people are clearly not so stressful for the elderly. Age differences in appraisal are confined almost entirely to events and difficulties rated on the top two scale-points of their respective scales, and on average they were rated 1 scale-point lower by the elderly.

Proportionally, life events and difficulties of this severity are relatively small, forming only 14% of the total recorded in Nantwich and Denbigh. However, they are, theoretically very important. Brown and Harris (1978), have argued that only severe events are capable of provoking an onset of depression. The systematic downgrading of these events by the elderly means that 60% (28/47) of events rated severe by the panel of psychologists (i.e. those which are S-and O-focused long-term threat 1, and S-focused long-term threat 2) would no longer qualify as severe. Further, the psychologists rated 16% of all the life events recorded in Nantwich and Denbigh severe. Generalizing the judgements of both elderly panels suggests that only 7% are severe.

Substituting the event ratings of the elderly panel

for those of the psychologists may help explain both the small number of onset cases of depression recorded, and the lack of a significant relationship between events and depression among both samples.

Disagreements in the ratings of difficulties between young and old are primarily for those of severity 1, and among the trained panel they were confined to health difficulties. The mean ratings of the trained and untrained elderly groups for personal health difficulties of consensus severity 3 was 3.5 and 3.2 respectively. Brown's definition of a 'marked' health difficulty requires a minimum rating of severity 3 and a duration of two years or more. For the elderly therefore only difficulties of consensus severity 1 and 2 can be described as 'marked'.

Contrary to expectation there was no consistent effect of sex on the rating of events and difficulties. Elderly men and women differed in their ratings of specific life events only, and sex differences were confined to the trained panel. Women rated death events of consensus severity 1 and personal health events of consensus severity 3 less severely than men.

Training did not have a consistent effect on elderly subjects' ratings of events and difficulties. Disagreements primarily arose in rating moderately severe events and difficulties, with the trained panel always rating less severely than their untrained counterparts.

It is unlikely, therefore, that training influenced personal concepts of threat and severity.

CONCLUSION

For a number of years evidence has been accumulating that clinical depression may be precipitated by social stressors, particularly those involving loss (e.g. Brown et al., 1973; Paykel, 1979). The elderly are subject to many types of loss; loss of health, loss of income and status after retirement, bereavement of spouse, siblings, and friends are relatively commonplace. The main objective of this study was to examine whether these factors are aetiologically important for depression among elderly people living in rural communities.

Murphy (1982), found that severe life events and difficulties increase the risk of depression for the elderly living in urban areas. There was an expectation, therefore, that similar findings would be observed for the rural elderly. However, analyses showed that when the Nantwich and Denbigh samples were examined separately neither life events, marked health difficulties, nor major non-health difficulties were significantly associated with onset of depression. When the samples were combined, however, severe events and marked health difficulties were aetiologically important for onset, although major difficulties again were not.

Given the contrasting results from the individual and combined samples, which set of results best describe the data? The results from the combined samples are more

in accord with those from comparable studies so one may be tempted to favour them. Combining samples can, however, produce misleading results when the corresponding proportions in the individual tables are not alike (Everitt, 1977). Comparing Nantwich and Denbigh showed that the relevant proportions were not statistically different. Consequently we conclude that both severe events and marked health difficulties are aetiologically important for depression among the rural elderly although major non-health difficulties are not. These results are similar to those of Murphy (1982), although in her study of the urban elderly major non-health difficulties also increased the risk of onset. However, in Murphy's study, 21% of normals and onset cases had a major difficulty compared with 5% in Nantwich and 4% in Denbigh. Major difficulties were clearly not an important source of stress for elderly people living in rural communities.

For our predominantly urban sample of elderly patients severe life events and major difficulties were significantly associated with onset of depression. While these results were in accord with Brown and Harris's (1978) findings, they again differed from Murphy's (1982), who found that marked health difficulties were also aetiologically important for onset. In Murphy's study, however, the proportion of patients with a marked health difficulty was nearly three times greater than in

this study. This was surprising since our patient sample were predominantly working-class and living in deprived areas of Liverpool. Our patient group was, however, a sample of convenience and much smaller than Murphy's. Hence one should not attach too much importance to these differences.

Only half the people in Nantwich and Denbigh had experienced a life event in the 12 months before interview, and many of the events had occurred to a member of the subject's family. Ongoing difficulties were more prevalent; 95 percent of subjects in both communities had at least one difficulty, and the median was three and two in Nantwich and Denbigh repectively. The content of reported events and difficulties highlights the importance of deteriorating health for many elderly people. Over half (58%) the events in Nantwich and two-thirds (67%) of those in Denbigh involved health (e.g. hospital admission, operations, illness, death). Approximately 90% of difficulties concerned the health of the subject or a close family relative. Personal health difficulties were prominent, accounting for two-thirds of all difficulties. Most elderly people in Nantwich and Denbigh reported more than one health problem and typically of long standing. The median duration of personal health difficulties was 5 years in Nantwich and 4 years in Denbigh.

Though events, and in particular difficulties were

relatively frequent in Nantwich and Denbigh most were not particularly threatening or problematic. At least three-quarters of all events and difficulties were rated on the bottom half of their scales. Where markedly severe consequences were found they were associated with health problems. Health events accounted for nearly all the markedly threatening events in Nantwich and Denbigh, and personal health difficulties accounted for over half the markedly severe difficulties in Nantwich and 79 percent of those in Denbigh.

The relative tranquillity of life in rural areas is confirmed by comparing our data with Murphy's study of the urban elderly. Though the rural elderly have more non-severe life events, they have fewer severe events than their urban counterparts. For example, the rate of severe events was at least 20 percent lower in Nantwich and 45 percent lower in Denbigh. Further, whereas 27% of normals and onsets in Murphy's sample had experienced a severe event, in Nantwich and Denbigh the comparable proportions were 18% and 12% respectively.

The contrasting fortunes of the rural and urban elderly were also evident for major non-health difficulties. Five times as many people in Murphy's sample had a major difficulty compared with Nantwich and Denbigh. When marked health difficulties are considered, however, the urban elderly fared better than subjects from Nantwich; 37% of subjects in Nantwich had a marked

health difficulty compared with 30% of the urban elderly. Both of these samples had poorer health than subjects in Denbigh, where only 20% had a marked health difficulty. The contrasting health of subjects in Nantwich and Denbigh is difficult to explain; possibly the discrepancy is due to the low response rate in Nantwich.

It has been suggested that life for elderly people in rural areas is less stressful than in urban areas. Judgements of the potential threat and severity of events and difficulties experienced by the rural elderly were, however, made by a group of relatively young psychologists. Our hypothesis implicitly assumes that the appraisals of younger people are consonant with those of elderly people. Similar assumptions concerning generalizability of threat and severity judgements have been made in all previous studies which have used the Bedford College procedure. In Chapter 9, however, we found sytematic discepancies between the elderly and non-elderly in their judgements of the threat and severity of events and difficulties. Compared to a non-elderly panel, events and difficulties of marked threat and severity were judged less severe by the elderly. Though the sample of events and difficulties for these comparisons were primarily composed of health problems, the elderly also tended to downgrade the rated threat and severity of non-health events and difficulties.

As a result of the size of the samples and

relatively low rates and proportions of subjects with severe events and difficulties in Nantwich and Denbigh, these stressors were not significantly associated with onset of depression when the samples were analysed separately. However, in comparison to the judgements of elderly subjects, the most severe ratings made by the non-elderly psychologists were an over-estimate of the probable threat and severity of these events and difficulties. Generalizing these results suggests that for elderly people in Nantwich and Denbigh, there were fewer severe events and difficulties than judged by the non-elderly psychologists. Therefore, the modest association between severe events, difficulties and onset observed in Nantwich and Denbigh was probably weaker.

The observation that age is an important factor in the perception of severe events and difficulties raises some important issues for studies which are methodologically similar to ours. For example, it suggests that the conclusions of Murphy's (1982) study, which does not take account of the effect of age in deriving ratings for events and difficulties, may exaggerate the importance of these stressors as causal factors of psychological illness among the elderly. Further, if age is important then other factors such as social class may also be important in the appraisal of life events and difficulties. One cannot assume, as Brown and Harris (1978) have, for example, that the judgements

of a group of academics accurately reflect the potential stress of events and difficulties experienced by working class women.

To examine levels of social support among the rural elderly a new instrument, the Index of Social Support, was piloted in Denbigh. The ISS was found to have high internal reliability and discriminated between normals and depressed people in the support available to them and their satisfaction with that support.

Levels of perceived support among the rural elderly in North Wales were significantly higher than those reported by a predominantly urban group of elderly patients. Normal elderly subjects in Denbigh reported a mean of 10.65 people whom they believed would provide emotional or practical support. Family members were most frequently mentioned as potential providers of emotional support, although friends and neighbours were an important source of practical aid.

Normal elderly people in Denbigh had relatively high levels of social contact. For example, three-quarters had a close friend whom they saw at least monthly, and the mean number of close friends reported was four. In contrast, sixty-two percent of patients did not have a close friend. Elderly people in Denbigh had significantly more good neighbours compared with patients; eighty-nine percent of subjects in North Wales had at least one good neighbour, and the mean was four. Perceived levels of

emotional support were also relatively high among normal people in Denbigh. On average, subjects had four people whom they believed appreciated them, would comfort them when distressed, and who could be counted on to provide help. These levels of support were not, however, significantly higher than that reported by patients. In contrast, the elderly patients did have significantly fewer people to whom they could talk frankly.

This study shows that a large proportion of normal elderly people in rural North Wales have relatively high levels of emotional support, and continue to maintain regular contact with their friends. In comparison, depressed elderly patients had lower levels of emotional support, significantly fewer close friends, and people to whom they could talk frankly. Differences between normal elderly subjects and patients were also observed in the levels of satisfaction with support. Seventy-one percent of normal elderly people in North Wales were fully satisfied with their perceived levels of support. In contrast only twenty-four percent of the patient sample were fully satisfied with their perceived support.

A number of studies (e.g. Broadhead et al., 1983) have shown evidence of a positive correlation between social support and psychological well-being. Contradictory findings have, however, been reported on whether social support acts to protect or "buffer" individuals from the effects of stressors or whether it

has an independent effect. Interpretation of these findings is hampered by differences in conceptualization and measurement of variables and criteria for inferring an interaction. A further problem in cross-sectional studies is the potential confounding among measures of life events, social support and disorder.

To permit a test of the buffering hypothesis the Denbigh and patient samples were combined. Prior to the analyses, each subject's data was examined for possible confounding between stressors and social support and, where appropritate, adjusted to minimize this effect. Analyses by logistic regression, which invokes a multiplicative model of no interaction, showed that social support has a significant independent effect on depression and life satisfaction. High social support was associated with high life satisfaction and low probability of depression irrespective of the presence or absence of a severe event or difficulty. In addition, severe events and major difficulties had a significant direct effect on depression, although marked health difficulties were not important. Interestingly, only marked health difficulties were significant predictors of life satisfaction. The absence of a significant association between events and life satisfaction is consistent both with previous findings (e.g. Baur and Okun, 1983) and the suggestion that life satisfaction in late life is relatively stable. However, in the face of

an ongoing severe health problem it would appear that life satisfaction is subject to reappraisal.

APPENDIX I

INTERVIEW SCHEDULE FOR LIFE EVENTS AND DIFFICULTIES

Notes

1. Once an event has been established, question in detail about incidents leading to it, or stemming from it.

2. Make sure the respondent knows the range of people included in the terms "close relative" and "close friend". Remind them from time to time during the interview both about these terms and about the 12 month period.

Now I would like to ask you about things which may have happened in the last 12 months:

HEALTH

1. Has anyone in the family been ill?

   What about you? Your husband/wife, or children/ grand-children? How serious was it? Was it an emergency?

   Has the illness led to any changes in your life?

2. Has anyone been admitted to, or left, hospital during the last 12 months?

   For what illness? Was it a routine admission or an emergency?

   How long were you/other in hospital?

   What is the medical outlook?

3. Has anyone in the family or any close relatives or friends died in the last 12 months?

   Were you involved at all? Was it expected? Were you present at the death?

4. Any surgical operations in the last 12 months?

5. Have you had any bad news about an illness that's been going on for some time?

6. Do you or any of your family have any ongoing health problems?

Do you or any close relatives suffer from any of the following?

Chest Troubles/ High blood pressure/ Heart trouble or stroke/ Varicose Veins or piles/ Asthma/ T.B./ Bronchitis/ Gall bladder or liver trouble/ Stomach ulcer/ Any other stomach troubles/ Kidney trouble/ Trouble passing water/ Incontinence/ Arthritis/ Rheumatism/ Diabetes/ Thyroid trouble/ Blackouts, fainting attacks or dizzy spells/ Trouble with the back or spine/ Skin trouble/ Trouble with teeth/ Hernia or rupture/ Epilepsy/ Migraine/ Any gynaecological trouble/ Eyesight/ Hearing/ prostate?

7. Do you have any relatives who may be a worry to you for any other reason?

   Perhaps because of drinking, or gambling, mental handicap or anything else at all?

8. Have you ever had any serious illness?

   What was it? When was that?

9. In the last 12 months has anyone in the family suffered with their nerves?

   Have they been in hospital?

10. Have you or any of your close relatives had any accidents in the last 12 months?

    Was this in the home or outside?

    Have you witnessed any road accidents?

    If yes: How serious was it? Were you involved?

11. Has there been a pregnancy in the family/any miscarriages?

    Any grandchildren born? or lost?

ROLE CHANGES

1. Has anyone in the family got married in the last 12 months?

   Your children? grandchildren? Did this bring any changes?

2. Has anyone got engaged?

   Was this expected? Did it bring any changes for you?

3. Has anyone separated from or divorced their husband or wife?

   Were you involved at all? Did you expect it to happen?

4. Has anyone started at school, college or University?

   How did you feel about this?

5. Anyone taken any important examinations or qualifications?

   What were the results?

6. Have you made any new friends in the last 12 months?

   Probe for new opposite sex relationships

7. Have you lost someone you were close to? Perhaps someone has moved?

8. Have there been any big changes in the amount you see of your friends or relatives?

9. If appropriate: Do you have a boy/girlfriend?

   Have you thought about getting married? Would you like to?

LEISURE AND INTERACTION

1. Have there just been the ..of you at home during the the 12 months?

2. Has anyone come to stay? For how long?

3. Has anyone left home at all? Permanently?

4. Is there anyone you see much less of?

   Why was this? Do you miss them?

5. What do you do with your leisure time?

   Any hobbies/ clubs/ outings/ bingo/ church or chapel?

6. Are you able to invite your friends to visit you at home?

7. Have you had any difficulties with friends? or been worried about them at all?

8. Have you had a holiday in the last 12 months?

Did you have a good time? Did anything unexpected happen while you were away, or when you returned?

EMPLOYMENT

1. Are you still working now? full-time or part-time?

   Is this because you want to continue working?

   What do you feel about retirement?

2. Have you retired in the last 12 months?

   Has it brought any big changes in your life?

HOUSING

1. How long have you lived in this house?

2. Do you own it yourself?

3. Do you like living in this house? Are there any problems about living here?

   Is there enough room? is it private enough? Is the upkeep expensive? How do you manage the gardens and repairs?

4. Are there any restrictions in living here?

5. Have there been any problems with the landlord?

6. Do you find it difficult paying for the house on a pension?

7. Do you qualify for a rent or rate rebate?

8. What about the neighbourhood? How do you get on with the neighbours?

9. Do you feel at all cut off living here? too far from your friends or neighbours?

   What is the bus service like here? Do you have a car? Do you still drive?

10. Have you thought about moving to a new house in the last 12 months?

    What have you done about this?

FINANCE

May I ask you a little bout financial circumstances?

1. Do you have any money worries? Do you find it difficult to manage on a pension?
2. Have you had to go without anything?
3. Do you have a private as well as a state pension?
4. Do you have any savings?
5. Do you get any allowances such as supplementary benefit or attendance allowance?

CRISES

1. Have there been any crisis/emergency?

   Any crisis involving you/ spouse/ children/ grandchildren?

2. Has anything happened in the home? Perhaps a burglary or fire?
3. Have you been attacked, in the home or street?
4. Have you had to break any bad news to anyone?
5. Have there been any legal troubles? Have you had to go to court?
6. Have you had any worries with H.P.?
7. Have you or anyone in the family had any contact with the police at all?

   or social services?

   what about your children or brothers/sisters etc.

8. Have any of your relatives had any crises or troubles with which you have had to help? What about friends?
9. Have you lost any pets in the last 12 months?

FORECASTS

1. Have you or any member of the family had any unexpected news in the last 12 months about anything that has happened or is going to happen?

2. Sometimes people learn unexpected things about others close to them - Has anything like this happened to you in the last 12 months? Any news that shook you?

MARITAL

1. Have you and your husband/wife both been living at home in the last 12 months?

2. How well would you say that the two of you get on in general?

3. Would you say that there are any problems with your relationship?

4. How often do the two of you have quarrels? What are they usually about?

5. Do you feel that you can talk to your husband/wife freely?

6. Have you been separated for any length of time during the last 12 months?

7. Have either of you ever considered a permanent separation or divorce?

8. Do you talk to each other about things which worry you?

9. Do you wish he/she would confide in you more?

10. When he/she has problems or worries does he/she talk them over with you?

11. Would you say that you are an affectionate person? What about your wife/husband?

12. What about the sexual side of things? Have there been any problems?

    Have you been able to talk this over with anyone? Have you sought any help or advice?

13. Do you like doing the same things together?

INTERACTION WITH CHILDREN/PARENTS

1. How do you get on with your children/parents?

2. Are there any problems with them?

3. Are you able to discuss any problems with them? Do they talk to you about any worries which they have?

GENERAL

1. Has anything particularly disappointing happened over the last 12 months that you have not mentioned already?

2. Have you had to make any important decisions over this time?

3. Has anything turned out better than expected?

4. Has anything given you special pleasure?

APPENDIX II

LIFE EVENT RATINGS

If no events place X in this box ____

BRIEF DESCRIPTION OF EVENT
Long-Term Threat =

1. Subject Number ____

2. Event Number ____

3. Full classification of Event: (Rate twice if required) ____ ____

1. Starting first job or return to work after 10 years.
2. Change of job.
3. Unemployment without change of job. i.e. "off sick".
4. Loss of job.
5. Return to work.
6. Promotion/Demotion.
7. Pregnancy.
8. Births.
9. School/University.
10. Engagement.
11. Marriage and announcement of marriage plans.
12. Divorce/Separation.
13. Misc. Role changes.
14. Illness.
15. Hospital admission
16. Hospital discharge.
17. Death.
18. Miscarriage.
19. Operations.
20. Interaction change.
21. Residence change.
22. Girl/Boy change.
23. Police/Solicitor contact/court.
24. Accidents.
25. Burglaries.
26. Loss/dammage/theft of property.
27. Examinations.
28. Misc. Crises.
29. Forecast change
30. News of important event
31. Forecast change.
32. Valued goal ful. or disappointment.
33. Revelation.
34. Important decision
35. Breaking bad news.
36. Meeting key person from past.
37. Change at work
38. Ceremonies.
39. Treatment related
40. Retirement.

4. INDEPENDENCE |___|___|

1. Independent: Immediate origin unconnected with S and more distant origin difficult to attribute to S with any plausibility.

2. Independent: Immediate origin unconnected with S but might be related through some change in S's behaviour. Do not include event if any clear evidence of such influence; then rate under possibly independent (5,6,7).
Do not include events which though not clearly due to S's neglect are quite likely to be due to it (e.g. certain accidents to children). Rate these 3.

3. Independent: Possibly neglect - source outside S, but quite plausible that some neglect on S's part did contribute, although no evidence of this.

4. Independent: Possibly psychosomatic. Conditions occuring to S that might not have occurred without insidious onset of psychiatric symptoms. ALL ILLNESS TO S.

5. Possibly Independent: Consent.

6. Possibly Independent: Intentional. Due to own choice.

7. Possibly Independent: Probable carelessness/ neglect. In deciding between 3 and 7, S should be given the benefit of the doubt.

8. Possibly Independent: Rows, and breaking-off contact after row.
9. Possibly Independent: Breaking-off contact without a row.

10. Possibly Independent: S's love events.

11. Possibly Independent: S's husband's/boyfriend's love events.

12. Illness Related: e.g. attempted suicide.

5. Focus |___|

1. Subject } S-Focused Events
2. Joint }

3. Household member }
4. S's possessions-including pets } O-Focused Events
5. Other person }

6. Short-Term contextual threat |___|

1 = Marked. 2 = Moderate. 3 = Some. 4 = Little/none.

7. Sort-Term threat - reported |___|

1 = Marked. 2 = Moderate. 3 = Some. 4 = Little/none.

8. Long-Term contextual threat |___|

1 = Marked. 2 = Moderate. 3 = Some. 4 = Little/none.

9. Long-Term threat - reported |___|

1 = Marked. 2 = Moderate. 3 = Some. 4 = Little/none.

10. Severe event? |___|

1 = Yes. 0 = No.

11. Relationship before Event |___|___|

9 = N/A (only S-focus).
0 = Parent/Parental surrogate.
1 = Child.
2 = Spouse/cohabitee/fiance.
3 = Sibling
4 = Close relative
5 = Joint with household members.
6 = Key person from past.
7 = Close relative, Confidant, V.C.O.
8 = Other friend/ neighbour
10 = Casual acquaintance

12. Shortened classification of event |___|___|

0 = Housing.
1 = Spouse.
2 = Children.
3 = Money.
4 = S's Health.
5 = Spouse's Health.
6 = Child's Health.
7 = Other's Health.
8 = Socio-sexual.
9 = Bereavement/ loss.
10 = Miscellaneous

13. Number of weeks before interview |___|___|

14. Number of weeks before psychiatric interview |___|___|

DIFFICULTY RATINGS

If no difficulties place X in this box [ ]

BRIEF DESCRIPTION OF DIFFICULTY
Contextual threat =

1. Subject Number [ ][ ][ ][ ]

2. Difficulty Number [ ][ ]

3. Classification of Difficulty [ ][ ]

0. Housing
1. Husband
3. Children
4. Money
5. S's Health
6. Husband's Health
7. Children's health
8. Other's health
9. Socio-sexual
10. Single parent stat.
11. Bereavement/ Loneliness

4. INDEPENDENCE: take into account the origin of the difficulty and S's response to it since then. [ ][ ]

1. Independent: Immediate origin unconnected with S and more distant origin difficult to attribute to S with any plausibility.

2. Independent: Immediate origin unconnected with S but might be related through some change in S's behaviour. Do not include difficulty if any clear evidence of such influence; then rate under possibly independent (5,6,7). Do not include difficulties which though not clearly due to S's neglect are quite likely to be due to it (e.g.certain accidents to children). Rate these 3.

3. Independent: Possibly neglect - source outside S, but quite plausible that some neglect on S's part did contribute, although no evidence of this.

4. Independent: Possibly psychosomatic. Conditions occuring to S that might not have occurred without insidious onset of psychiatric symptoms. ALL ILLNESS TO S.

5. Possibly Independent: Consent.

6. Possibly Independent: Intentional. Due to own choice.

7. Possibly Independent: Probable carelessness/neglect. In deciding between 3 and 7, S should be given the benefit of the doubt.

8. Possibly Independent: Rows, and breaking-off contact after row.

9. Possibly Independent: Breaking-off contact without a row.

10. Possibly Independent: S's love events.

11. Possibly Independent: S's husband's/boyfriend's love difficulties.

12. Illness Related: e.g. attempted suicide.

5. Severity - Contextual |__|

1. Marked - High 2. Marked - Low 3. Moderate/High
4. Moderate - Low 5. Little - High 6. Little - Low

6. Severity - General |__|

1. Marked - High 2. Marked - Low 3. Moderate - High
4. Moderate - Low 5. Little - High 6. Little - Low

7. Health Difficulty? |__|

1. Health
2. Health/non-health
3. Non-health
4. Bereavement/loneliness

8. Marked or Major Difficulty? |__|

1. Marked Health difficulty -less than 24 months duration
2. Marked Health difficulty -2 years or longer
3. Major Difficulty (Brown and Harris)

9. Duration of difficulty in years before interview

|__|__|

0. Not present
1. Less than 12 months
2. 1 year
3. 2 years
4. 3 years
5. 4 years
6. 5 years
7. 6 - 9 years
8. 10 - 14 years
9. 15 - 19 years
10. 20 years +

APPENDIX III

THE INDEX OF SOCIAL SUPPORT

Instructions

"The following questions are, in the main, about family members, neighbours, and friends. You may, however, think that some other person such as your G.P., vicar, or someone else, also fits the description of those asked about; so do not forget to mention them".

Note to Interviewer

Adjacent to the numbers, record the person's name or initials and his/her reltionship to S.

1.a) DO YOU HAVE CLOSE FRIENDS WHOM YOU REGULARLY (at least once a month) MEET OR KEEP IN CONTACT WITH?

|__| 0=NO 1=YES (record response in box)

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

For "yes" responses: How many friends like this do you have?

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

2.a) OF ALL THE PEOPLE YOU KNOW, WHO COULD YOU COUNT ON TO HELP YOU WITH A PROBLEM EVEN THOUGH THEY MIGHT HAVE TO GO OUT OF THEIR WAY TO DO SO?

|__| 0=NOBODY (Has no family/friends/neighbours)
1=NOBODY (Has family/friends/neighbours)

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

3.a) OF ALL THE PEOPLE YOU KNOW, WHO CAN YOU TALK TO FRANKLY WITHOUT HAVING TO WATCH WHAT YOU SAY?

|__| 0=NOBODY (Has no family/friends/neighbours)
1=NOBODY (Has family/friends/neighbours)

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

4.a) OF ALL YOUR FAMILY, FRIENDS, NEIGHBOURS AND ACQUAINTANCES, WHO DO YOU THINK CARES ABOUT AND APPRECIATES YOU AS A PERSON?

|__| 0=NOBODY (Has no family/friends/neighbours)
1=NOBODY (Has family/friends/neighbours)

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

5.a) OF ALL THE PEOPLE YOU KNOW, WHICH OF THEM WOULD COMFORT AND REASSURE YOU WHEN YOU NEEDED IT BY HOLDING YOU IN THEIR ARMS?

|__| 0=NOBODY (Has no family/friends/neighbours)
1=NOBODY (Has family/friends/neighbours)

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

6.a) DO YOU FEEL THAT YOU ARE AN IMPORTANT PART OF YOUR FAMILY'S OR ANYONE'S LIFE?

|__| 0=NO 1=YES

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

7.a) HOW MANY GOOD NEIGHBOURS DO YOU HAVE WHO YOU MEET OR TALK TO REGULARLY (at least once a month)?

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) OVERALL, DO YOU HAVE AS MUCH CONTACT WITH YOUR NEIGHBOURS AS YOU WOULD LIKE?

|__| 0=NO 1=YES

8.a) DO YOU THINK THAT ANY OF YOUR FAMILY, FRIENDS, ACQUAINTANCES OR NEIGHBOURS ASK OR EXPECT TOO MUCH FROM YOU IN ANY WAY?

|__| 0=NO 1=YES

For 'YES' responses: WHO IN PARTICULAR?

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

9.a) HOW MANY PEOPLE WITH SIMILAR VIEWS AND INTERESTS TO YOURSELF DO YOU MEET AND TALK TO REGULARLY (at least once a month)?

|__| 0=NOBODY

For positive resonses:

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

b) HOW SATISFIED ARE YOU WITH THIS?

|__| 0=NOT SATISFIED 1=SATISFIED

10.) WHO WOULD YOU SAY THAT YOU HELP, OR SUPPORT IN SOME WAY IN DAY-TO-DAY LIFE?

|__| 0=NOBODY

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

APPENDIX IV

PSYCHOMETRIC PROPERTIES OF THE ISS

The ISS was only piloted in Denbigh. Consequently, data concerning its psychometric properties is necessary. Here we report data on its internal reliability and discriminant validity.

A popular way of estimating the reliability of empirical measures is by Cronbach's alpha (Cronbach,1951). The mean number of supportive persons reported was 10.40 (median, 10.00). Inter-item correlations ranged from 0.17 to 0.67, with a mean inter-item correlation of 0.28. Coefficient alpha for the ten "availability" of support items was 0.83, indicating a very reliable measure. Item-total correlations were all above 0.3, with the exception of that for item eight (asking subjects to list those whom they considered asked too much of them). The corrected item-total correlation for this question was -0.15, and it correlated negatively with every other item in the scale. It was decided to exclude the item from the scale, and this increased coefficient alpha from 0.83 to 0.84.

An implicit assumption of reliability analysis is that the scale items are parallel and measure a single phenomenon equally. A factor analysis enables one to examine this assumption.

A principal components analysis of the availability of support scale gave rise to one factor (using the

Kaiser-Guttman criterion wherby only factors having eigenvalues greater than unity are retained). The factor, its loadings and communalities is given below.

Table 1 Principal components matrix for the ISS Availability scale

	Factor 1	Communality(h^2)
4. People who appreciate me	0.773	0.597
1. Close friends regularly seen	0.767	0.588
2. People I can count on	0.742	0.550
3. People I can talk to frankly	0.729	0.532
9. People with similar views	0.704	0.496
7. Good neighbour to me	0.601	0.362
6. I am important to my family	0.514	0.264
10.People whom I help	0.449	0.202
5. People who comfort me	0.279	0.078
Eigenvalue	3.668	3.669
Percentage Variance	40.800	

** item 8 is excluded from this analysis **

Eight of the items loaded substantially on the first factor which accounted for 41% of the variance. The non-zero loadings indicate that all the variables in the set share a common property in that a person scoring high (or low) on one item will also tend to score high (or low) on each of the other items. For this reason we can think of this factor as a general support factor. Item 5 (which had the lowest communality, and hence reliability) correlated modestly with every other item.

The mean score for the eight 'satisfaction' items was 7.30. Inter-item correlations ranged from 0.08 to 0.66 with a mean of 0.37. The corrected item-total correlations ranged from 0.3 to 0.70. Coefficient alpha for this scale was 0.81, which shows that it too is very reliable. Principal components analysis of the

satisfaction scale with a varimax rotation (Kaiser,1958), gave rise to the following three factors.

Table 2 Principal components matrix for the ISS Satisfaction scale with Varimax rotation

	Factor 1	Factor 2	Factor 3	Communality (h^2)
5. Satisfaction with number who provide comfort.	0.759	0.274	0.104	0.660
2. Satisfaction with number who can be counted on.	0.716	0.193	0.075	0.555
1. Satisfaction with number of friends.	0.704	-0.149	-0.379	0.762
4. Satisfaction with number of people who appreciate me.	0.692	-0.393	0.108	0.645
3. Satisfaction with number who I can talk to frankly.	-0.050	0.859	0.146	0.663
9. Satisfaction with number of people with similar views.	0.139	0.681	-0.059	0.789
6. Satisfaction that I am an important part of family.	0.276	-0.124	0.836	0.302
7. Satisfaction with number of good neighbours.	0.272	-0.229	-0.419	0.487
Eigenvalue	2.244	1.587	1.033	4.864
Percentage Variance	28.100	19.800	12.900	60.800

The analysis shows there is no general factor of 'satisfaction' underlying the eight items. The first factor, defined principally by items 5, 2, 1, and 4, accounted for 28.1% of the variance. However, it is notable that 68% of the sample reported they were fully satisfied with the support they received (i.e. scored a maximum of 8 on the satisfaction scale, and a further 12.9% scored 7. What the factor matrix shows, therefore, is dissatisfaction with specific elements of their support network by a relatively small number of individuals. This in turn gives rise to a fairly

heterogenous collection of correlation coefficients and the resulting ambiguous factor solution. All of the communalities exceeded 0.3 so that each item was reliable.

The correlation between the availability and satisfaction scales was a modest 0.43. Together with the results of the factor analysis it appears that perceived availability and satisfaction with support is not a unitary phenomenon and should be analysed separately.

Discriminant validity of ISS

It was noted in Chapter 4 that the nature and size of the social networks of clinical populations differed from the norm. One would anticipate that if the ISS is a valid measure, the community sample (excluding cases of depression) would have higher availability of support scores than the patient sample. This is examined in Table 3 below.

Table 3 Comparison of the mean availability of support scores for the community and patient samples

	MEAN		Student's	
	Community	Patient	T	p
1. Number close friends	3.94	0.76	4.54	0.001**
2. Number can count on	4.28	3.66	1.06	0.29
3. Number can talk to frankly	3.27	2.14	2.33	0.03*
4. Number appreciate me	4.38	3.69	1.22	0.23
5. Number would comfort me	3.85	2.79	0.73	0.47
6. Am important to my family	0.82	0.76	0.71	0.48
7. Number good neighbours	3.82	1.86	3.69	0.01**
8. Number similar views	2.99	0.41	3.87	0.01**
9. Number I help	0.90	0.35	2.11	0.046*
MEAN AVAILABILITY SCORE	10.65	6.96	4.21	0.001**

* $p<0.05$ ** $p<0.01$

Mean availability of support was greater for the community "normals" on all items, although differences attained statistical significance on only 5 items. Depressives did not differ from normals in their perceptions of the numbers of people whom they could count on, appreciate, or comfort them, and each group felt they were an important part of their family. However, overall the perceived availability of support was substantailly higher among the community sample ($T=4.21$, $p<0.001$). Interestingly, the three items which discriminate most between depressives and normals involved contact with close friends, people with similar views (which again are likely to be friends), and having good neighbours. Each of these items may be influenced substantially by health.

Patients not only have lower levels of support compared to normals, but they also report higher levels of no support.

Table 4 Comparison of community and patient samples with no support

(* $p<0.002$ ** $p<.0001$)	Community %	Patient %	z	
1. No close friends	25.7	62.1	7.6	**
2. Nobody I can count on	1.5	4.4	1.3	
3. Nobody to talk to frankly	13.2	13.8	0.5	
4. Nobody who appreciates me	2.9	3.4	0.07	
5. Nobody to comfort me	8.8	13.8	3.6	*
6. Not important part of family	18.4	24.1	1.8	
7. No good neighbours	11.0	24.1	3.7	**
8. Nobody with similar views	34.6	86.2	17.1	**
9. Nobody to help	52.2	75.9	6.1	**

Approximately two-thirds of the patients had no close friends, and eighty-six percent reported they did

not meet people with similar views to themselves. Interestingly, a nearly identical proportion (13%) of both samples report having nobody they could talk to frankly. One would have anticipated a higher proportion of the patients responding negatively to this item given that studies (e.g. Brown and Harris,1978; Murphy,1982) show that absence of a confiding relationship predisposes to depression. Approximately twice the number of patients report having no good neighbours, although this may well be associated with living in an urban, as opposed to rural community (90% of the patient group lived in Liverpool). Community subjects were more satisfied than patients on seven of the 'satisfaction' items, although differences only attained statistical significance for three items (see table 5). These items are the same as those which discriminate most between normals and patients on the availability of support scale, and concern satisfaction with number of friends, people with similar interests, and good neighbours.

Table 5 Comparison of the mean satisfaction with support scores for the community and patient samples

	MEAN		Student's	
	Community	Patient	T	p
1. Satisfaction with number of friends.	0.93	0.55	5.77	0.001**
2. Satisfaction with people I can count on.	0.96	0.93	0.78	0.440
3. Satisfaction with number I can talk to frankly.	0.93	0.93	0.10	0.924
4. Satisfaction with number of people who appreciate me.	0.95	0.90	1.06	0.290
5. Satisfaction with number of people who provide comfort.	0.95	0.89	1.12	0.265
6. Satisfaction with being an important part of one's family.	0.91	0.82	1.40	0.164
7. Satisfaction with number of good neighbours.	0.85	0.59	3.37	0.001**
8. Satisfaction with number with similar views.	0.87	0.62	3.34	0.001**
MEAN SATISFACTION SCORE	7.30	6.17	3.74	0.001**

Comparing patients and normals shows there is a highly significant difference between them in levels of satisfaction with support ($T=3.74, p<0.001$). The median satisfaction score for the community subjects was equivalent to the maximum attainable score of 8.0, and table 6 shows the distribution was highly skewed to the right.

Table 6 Histogram of reported satisfaction with support

a. Community subjects (excluding depressives)

```
Freq  Score
  1   0.0   *
  0   1.0
  2   2.0   *
  3   3.0   *
  4   4.0   *
  3   5.0   **
  9   6.0   ***
 17   7.0   ******
 97   8.0   ****************************************
          I.......I.......I.......I.......I.......I
          0       20      40      60      80      100
                      Frequency
```

Over seventy percent of normal subjects (n=97) had a maximum score, and a further 13 percent (n=17) scored just below maximum. The distribution of scores would appear to suggest the influence of a response set, although the scale does show evidence of dissatisfaction with specific elements of perceived support (29% expressed some dissatisfaction). In contrast, (see below), only 22 percent of the depressed group were fully satisfied with their perceived levels of support. Here again, the the overall distribution of scores was positively skewed, with a median score of 6.0.

b. Patients

```
Freq  Score
  2   3.0   ********
  3   4.0   ************
  3   5.0   ************
  8   6.0   **********************************
  6   7.0   ************************
  7   8.0   ****************************
          I.......I.......I.......I.......I.......I
          0       2       4       6       8      10
                      Frequency
```

Summary

The ISS has a number of desirable statistical properties. Both the "availability" and "satisfaction" scales have high internal reliability. They also discriminate between normals and depressives. Further, the "availability" scale is dominated by a single factor.

APPENDIX V

DIARY OF SIGNIFICANT EVENTS

1981

JULY 1ST: Irish and Israeli elections.
Wimbledon tennis tournament quarter-finals.

JULY 3rd: Cigarettes to increase by 3 pence
Wimbledon Ladies Final: Winner-Chris Lloyd.

JULY 4th: Riots in Southall between 'skinheads' and Asians. 40 Policemen injured.

JULY 5th: Police use CS gas to quell rioting in Toxteth. First time CS gas used on mainland UK.

JULY 6th: Riots continue in Toxteth. Parliamentary debate today.

JULY 7th: Rioting breaks out in North London.
Ian Botham resigns as cricket captain of England.

JULY 8th: Widespread rioting in Manchester and Salford.
Hunger striker dies at Maze prison.

JULY 10th: Rioting and looting in Brixton.

JULY 11th: Sebastian Coe sets world record for 1000 meters.

JULY 12th: Rioting by 300 youths in Leicester.

JULY 16th: Roy Jenkins narrowly defeated at Warrington by-election 16 weeks after SDP formed.
Start of British Open Golf Championship.

JULY 17th: Humber bridge opened by Queen.

JULY 21st: England beat Australia by 18 runs in Second Test.
Eddystone Lighthouse extinguished.

JULY 28th: 200 youths riot in Toxteth.
William Wyler dies, age 79.

JULY 29th: ROYAL WEDDING OF PRINCE CHARLES AND LADY DIANA SPENCER

AUGUST 1st: E.P. Thompson barred as Dimbleby Lecturer.
7th Hunger striker dies at Maze.

AUGUST 2nd: England beat Australia in 4th Test match.

AUGUST 3rd: 450 daytrippers resued from a pleasure steamer which had run-aground off S.Wales coast.

AUGUST 8th: Death of the 9th Hunger striker in Maze prison.

AUGUST 10th: Air-Traffic controllers in U.S.A. on strike and flights in chaos.

AUGUST 13th: Fifth test with Australia starts today.

AUGUST 19th: Seb Coe regains world record for mile in Zurich.
U.S. war planes shoot down a Libyan plane in the Gulf of Sitre.

AUGUST 20th: Jessi Mathews (Mrs.Dale) died today.

AUGUST 21st: Owen Carron (provisional IRA) wins the Fermanagh and South Tyrone by-election.

AUGUST 29th: Opening of Football season today.

AUGUST 30th: Iranian president and Prime Minister die in an explosion in Tehran.
Keith Fletcher named as England cricket captain for tour of India.

AUGUST 31st: Notting Hill carnival.

SEPTEMBER 1st: Albert Speer died today, age 71.

SEPTEMBER 6th: Start of World Cup athletics in Rome.

SEPTEMBER 14th: Government reshuffle. James Prior moved to Northern Ireland Office, and N.Tebbit becomes Sec. of State for Employment.

SEPTEMBER 16th: Sibson beats Minter to retain European title for Middleweight boxing.

SEPTEMBER 17th: Yorkshire cricket club announce that Boycott and Illingworth are to remain with the club until end of season when there will be an investigation into the club's affairs.

SEPTEMBER 19th: The Littlejohn brothers (who claimed to be British spies) are released from a Dublin gaol.

SEPTEMBER 20th: 11 people die in storms that sweep Britain.

SEPTEMBER 21st: Nigel Patrick (actor) died today, age 68.

SEPTEMBER 26th: Robert Montgomery (actor) died today. Sunday Times suspends publication.

SEPTEMBER 27th: Healey beats Benn by 1% for deputy leadership of the Labour Party.

SEPTEMBER 29th: Bill Shankly died today, age 67.

OCTOBER 1st: President Sadat of Egypt assassinated today.

OCTOBER 10th: I.R.A. bomb planted outside Chelsea barracks kills an elderly lady.

OCTOBER 13th: Bob McKenzie died today, age 64.

OCTOBER 15th: Price of Wales visits Toxteth, Liverpool.

OCTOBER 17th: Moshe Dyan died today, age 66.

OCTOBER 22nd: Liberal-SDP alliance win Croydon by-election.

OCTOBER 24th: Salvation Army choose new general (a Sweedish man).

OCTOBER 25th: End of B.S.T. today.

OCTOBER 26th: 171 people so far dead, and 5000 at risk following Italian Olive Oil scandal.

OCTOBER 27th: Oxford Street bomb kills a policeman.

OCTOBER 30th: Eric Ogden, M.P. for Liverpool joins S.D.P.

OCTOBER 31st: A Soviet submarine runs aground in Sweedish waters.

NOVEMBER 2nd: C.B. radio is legalised today.

NOVEMBER 5th: Announced that Princess of Wales is due to have a baby in June.

NOVEMBER 6th: Dr.Leonard Arthur is found not guilty of the attempted murder of a child with Downs Syndrome.

NOVEMBER 7th: Everyone is to get a 5-00 electricity refund in January.

NOVEMBER 9th: Peter Tatchell is chosen as prospective parliamentary candidate for Bermondsey.

NOVEMBER 12th: The Space Shuttle takes off for the second time.

NOVEMBER 13th: I.R.A. bomb found at the home of the Attorney General.
Two Southern Region trains collide at Beckenham.

NOVEMBER 14th: I.R.A. assassinate Rev. Robert Bradford M.P..

NOVEMBER 20th: Paul Vickers (surgeon) found guilty of murdering his wife, but his mistress Pamela Collison is set free.

NOVEMBER 21st: Australia beat Ireland 16-12 in Rugby.

NOVEMBER 25th: Scarman Report on Riots published today.

NOVEMBER 26th: Shirley Williams (SDP) wins the Crosby by-election.

NOVEMBER 29th: Natalie Wood (actress) dies accidentally.

DECEMBER 1st: British Leyland 'tea break' strike enters third week.

DECEMBER 2nd: Price of colour T.V. license up to 46-00 today.

DECEMBER 3rd: Steve Davis wins U.K. championship for snooker.

DECEMBER 4th: Pint of milk to increase by one-and-half pence to 20 pence today.

DECEMBER 7th: Arthur Scargill wins election for N.U.M. president.

DECEMBER 9th: Blizzards sweep U.K.- worst for 14 years.
Telecom announce that costs of telephones to rise by 50%.

DECEMBER 14th: Poland announces Martial Law and outlaws Solidarity

DECEMBER 16th: Claud Cockburn (satirist) dies, aged 77. Strikers shot in Poland.

DECEMBER 17th: Mass arrests in Poland as military take-over the Government.

DECEMBER 20th: Penlee Lifeboat disaster. Polish Ambassador to Washington defects.

DECEMBER 21st: More heavy blizzards sweep U.K..

1982

JANUARY 2nd: England beat Australia 15-11 in rugby union.

JANUARY 6th: Severe floods and snow sweep North.

JANUARY 7th: Boycott quits England tour of India.

JANUARY 9th: Snow brings chaos to England and Wales.

JANUARY 10th: South Wales cut off by snow.

JANUARY 13th: ASLEF calls first of 2-day strikes. Mark Thatcher lost in Sahara desert.

JANUARY 14th: 40 people killed as plane crashes in river in Washington.

JANUARY 18th: 5 people killed in eastern France when a boat pushing 2 barges crashes into a gas pipeline.

JANUARY 25th: A DC-10 airliner with 208 people skids into Boston harbour. Nobody killed.

JANUARY 29th: 1100 people to lose their jobs as the DeLorean car factory closes.

FEBRUARY 5th: Laker Airways collapses.

FEBRUARY 6th: Ireland beat England/ Wales beat France in Rugby.

FEBRUARY 9th: Plane crashes into Tokyo Bay killing 24 people.

FEBRUARY 15th: 84 people killed in Oil Rig accident in Newfoundland.

FEBRUARY 16th: McCarthy report published, and finds in favour of ASLEF.

FEBRUARY 18th: Pictures of Princess of Wales in a bikini appear in the Sun and Daily Star. Palace demand apology.

FEBRUARY 22nd: Half-term in a Liverpool school has to be extended because pupils attacking the teachers.

FEBRUARY 24th: 100 people held hostage on an aeroplane in the Lebanon are released.

FEBRUARY 25th: Row over Government sale of Amersham International.

FEBRUARY 27th: A plane hijacked in Tanzania lands at Stanstead and S.A.S. placed on alert.

MARCH 2nd: Attempted assassination of Lord Chief Justice of Ireland.
Row continues over tour to South Africa by leading English cricketers led by Boycott.

MARCH 4th: Gerrard Tuit (most wanted man in U.K.) arrested in Dublin.
Jeremy Thorpe resigns as head of Amnesty UK.

MARCH 6th: England beat Wales in Rugby Union.

MARCH 9th: BUDGET DAY

MARCH 11th: Policeman aged 20 stabbed to death.

MARCH 12th: Man appears in court charged with murder of policeman.
Rupert Murdoch tries to sack Harold Evans as editor of the Times.

MARCH 13th: Liverpool win the League Cup Final.

MARCH 16th: Claus Von Bullo found guilty of attempted murder of his wife.

MARCH 18th: 3 Royal Marines are killed on a firing range in Newcastle-upon-Tyne.

MARCH 22nd: Third launch of space shuttle.
Harry H. Corbett dies, age 57.

MARCH 23rd: Coup in Guatemala and Bangladesh.

MARCH 25th: Roy Jenkins wins Glasgow Hillhead byelection.

MARCH 27th: Oxford win the boat race.

MARCH 29th: ARGENTINA SENDS NAVY TO FALKLANDS.

APPENDIX VI

PSYCHOMETRIC PROPERTIES OF CARE

Gurland and his colleagues (e.g. Golden, Teresi and Gurland, 1984) have recently produced a series of papers on the psychometric properties of the CARE. It is notable that these statistics are based on current psychiatric state and not retrospective twelve month assessments. With regard to reliability, each of the indicator scales has been shown to be homogeneous, to have high internal reliability (coefficient Alpha's ranged from 0.72 to 0.95), and high inter-rater reliability (the average item kappa coefficients measuring agreement between interviewers were between 0.59 and 0.87).

Teresi et al., (1984) provide evidence for the construct validity of the CARE. Using morbidity and mortality as outcome variables, individuals classified as having medical and psychiatric disorders at 'time 1' were significantly more likely to manifest such disorders when re-interviewed one year later than were persons not so classified. Further, the odds that individuals with cognitive impairment, somatic complaints, activity limitation, and difficulty walking at 'time 1' would be dead within one year were 2 to 3 times greater than for those without such problems.

APPENDIX VII

PSYCHOMETRIC PROPERTIES OF THE LSI-W

The following analysis focuses on the internal consistency and factorial composition of items composing the LSI-W. The data is derived from 155 subjects in Denbigh who completed the life events interview.

Scoring

The LSI-W was scored on a 3-point Likert scale, with subjects responding "Agree", "Disagree", or "Unsure" to each of the eight items (see Table 1 for item wording). For items 1, 3, 4, and 5 agreement was scored 2, and disagreement scored 0. The scoring was reversed for items 2, 6, 7, and 8, where disagreement was scored 2 and agreement 0. A response of unsure to any item was scored 1. The maximum attainable score is 16.

Results

The mean LSI-W score for the sample was 10.99 (s.d.=3.74). The inter-item correlations ranged from 0.03 to 0.43, with a mean of 0.19. Coefficient alpha (Cronbach, 1951), was 0.66, lower than the value of 0.8 reported by Bigot (1974), which had suggested some item redundancy. The item-total correlations were all above 0.20 with the exception of that for item 7 which was 0.14; its exclusion from the scale increases coefficient alpha from 0.66 to 0.69. Item 6 also performed poorly, correlating significantly with items 1, 2, and 8 only.

Bigot reported a coefficient alpha of 0.7 for the

"Acceptance-Contentment" scale and 0.6 for the "Achievement-Fulfilment" scale. In this study, the respective alphas were 0.65 and 0.41. Given the small number of items the "Acceptance- Contentment" subscale looks impressive with the item-total correlations ranging from 0.37 to 0.57, and a mean inter-item correlation of 0.32. In contrast, the mean inter-item correlation for the "Achievement-Fulfilment" subscale was 0.16, and two of the item-total correlations (items 6 & 7) were below 0.2. Only one of the six correlations between items 5 to 8 was above 0.2, although 4 of the 6 items were significant at the 5% level.

A principal components analysis of the LSI-W with a varimax rotation (Kaiser, 1958), gave rise to two factors (using the Kaiser-Guttman criterion whereby only factors having eigenvalues greater than unity are retained). Child (1970), has noted that when the number of variables is below 20 there is a tendency for this method to extract a conservative number of factors. The factors, their loadings, and communalities are reported in table 1 overleaf.

Table 1 Principal components matrix for the LSI-W with Varimax rotation

Item	Scale		Factor 1	Factor 2	Communality h^2
1.	Acceptance-Contentment	I am as happy as when I was younger.	0.816	-0.011	0.666
2.	Acceptance-Contentment	My life could be happier than it is now.	0.687	0.138	0.491
3.	Acceptance-Contentment	These are the best years of my life.	0.604	-0.079	0.371
4.	Acceptance-Contentment	The things I do are just as interesting to me as they ever were.	0.578	0.238	0.391
5.	Achievement Fulfilment	I would not change my past life even if I could.	0.176	0.648	0.451
6.	Achievement Fulfilment	Compared to other people of my age I've made a lot of foolish decisions in my life.	0.332	0.186	0.145
7.	Achievement Fulfilment	When I think back on my life I didn't get most of the things I wanted.	-0.097	0.739	0.557
8.	Achievement Fulfilment	Compared to other people I get down in the dumps too often.	0.523	0.526	0.549
		EIGENVALUE	2.524	1.096	3.62
		PERCENTAGE VARIANCE	31.55	13.7	45.25

Factor 1 accounts for 31.6 percent of the variance, while factor 2 accounts for 13.7 percent. The low

communality for item 6 suggests that it is unreliable, otherwise the rotated factor matrix confirms Bigot's (1974) subscales. Factor 1 loads substantially on the "Acceptance-Contentment" subscale while factor 2 loads specifically on "Achievement-Fulfilment".

Summary

According to Nunally (1967), the adequacy of a reliability coefficient will depend on the purpose for which a measure is needed. For most purposes the LSI-W reliability coefficient of 0.66 is perfectly adequate, particularly if the measure is used, as in the current study, as part of a battery of questionnaires. Of some concern is the poor performance of item 6 which is not explained by any factor. To permit comparison with other studies this item has not been omitted from the present study. However in future research both items 6 and 7 should be omitted from the scale. Overall the analysis suggests that the LSI-W is a more adequate measure of current satisfaction than past achievement, and it should be scored and interpreted as a single scale rather than two sub-scales.

APPENDIX VIII

INTER-RATER AND TEST-RETEST RELIABILITY FOR THE RATING OF LIFE EVENTS AND DIFFICULTIES

Inter-rater reliability data are reported for 47 life events and 90 difficulties. The ratings were all made over a 3 month period.

The life events and difficulties rated varied widely in both type and likely degree of threat/severity. Life events included some pleasant occurrences (e.g. birth of first great grandchild, financial 'windfall'), as well as a range of less pleasant ones (e.g. hospital admission, burglary, death of a close family member). While the majority of difficulties were health problems (e.g. chronic arthritis, failing eyesight), difficulties relating to work, finance, housing, and social interaction were also presented.

At each session Brown's rating procedure, as described, was followed, although the two raters who were not trained at Bedford College did not contribute to the consensus in the first 10 rating sessions. Individual ratings were recorded in writing before discussion leading to a consensus rating commenced. The discussion entailed each panel member presenting the rationale for his or her decision, the interviewer's rating having the same status as that of other panel members. The criterion for a consensus was the agreement of the majority of panel members.

Test-retest reliability data are reported for the long-term threat ratings of 29 events and severity ratings of 48 difficulties. This represents data from 18 subjects who were selected at random from the subpopulation whose data had previously been rated by all four raters. The ratings were made 15-18 months after the first, and at least 9 months had elapsed since the raters had carried out any rating.

Analysis

Agreement, both between pairs of raters and over time, was calculated using the weighted kappa coefficient, K_w, (Cohen, 1968; Everitt, 1968). The kappa coefficient was proposed by Cohen (1960) as a measure of agreement remaining after chance agreement had been subtracted; the weighted version allows the magnitude of disagreement to be taken into account. For events, disagreements in ratings of 0, 1, 2, and 3 points were given loadings of 0-3 respectively; for difficulties, discrepancies of 0, 1, 2, 3, 4, and 5 points were given loadings of 0-5 respectively. To permit comparison with previous work, Kendall's (1955) coefficient of concordance, W, was also computed for each pairwise comparison.

Results

Table 1a presents the coefficients of agreement between pairs of raters for the long term threat of life events.

Table 1 Inter-rater reliability

(a) Long-term threat of life events (N=47)

Rater	1	2	3	4
		K_w		
*1	-	0.62	0.64	0.54
*2	0.89	-	0.60	0.63
3	0.88	0.88	-	0.60
4	0.83	0.86	0.86	-
		W		

* indicates 'novice' rater

The weighted Kappas range from 0.54 to 0.64 (with only one of the six coefficients below 0.6), and the W's rage from 0.83 to 0.89. All the coefficients are significant beyond the $p<0.001$ level, using a large sample test of significance (Everitt, 1968). There are no significant differences between "novice" and Bedford College trained raters.

Table 1b presents coefficients of agreement between pairs of raters for the severity of difficulties.

(b) Severity of difficulties (N=90)

Rater	1	2	3	4
		K_w		
1	-	0.64	0.69	0.60
2	0.89	-	0.65	0.56
3	0.89	0.87	-	0.61
4	0.89	0.86	0.86	-
		W		

The weighted kappas range from 0.56 to 0.69 (again with only one of the six coefficients below 0.6), and the W's range from 0.86 to 0.89. Again, all the values obtained are significant at beyond the $p<0.001$ level and

there are no significant differences between inexperienced and experienced raters.

The test-retest ratings of long-term threat of life events is reported in table 2a.

Table 2 Test-retest reliability

(a) Long-term threat of life events (N=29)

Rater	1	2	3	4	Consensus
K_w	0.58	0.50	0.63	0.49	0.63
ɬ	0.90	0.83	0.88	0.82	0.89

The coefficients are calculated between each raters initial individual rating and his or her subsequent individual rating, and between the initial consensus and the subsequent consensus. On both measures of agreement three of the four raters show lower levels of reliability than the consensus rating. K_w ranges from 0.49 to 0.63, and ɬ from 0.82 to 0.90.

The test-retest reliability for the severity of ongoing difficulties is reported in table 2b.

Table 2 Test-retest reliability

(b) Severity of difficulties (N=48)

Rater	1	2	3	4	Consensus
K_w	0.55	0.50	0.51	0.46	0.61
W	0.83	0.79	0.80	0.82	0.85

The individual K_w's, ranging from 0.46 to 0.55, are all lower than the consensus rating; the same observation applies to the W's, which range from 0.79 to 0.83. All

the kappa coefficients in table 2 are significant at beyond the $p<0.001$ level.

Summary

Measures of long-term threat and severity can be used reliably both by naive and experienced raters. In addition, both measures show an acceptable degree of stability over time, provided that the consensus rating is used as the criterion; individual raters are less consistent.

APPENDIX IX

TEST-RETEST RELIABILITY OF ELDERLY PANELISTS' RATINGS OF LIFE EVENT AND DIFFICULTIES

The analyses in Appendix VIII shows that the non-elderly group of psychologists' ratings of events and difficulties are stable over time. However, "..all test-retest reliability coefficients must be interpreted as applying only to the population from which they were obtained" (Kline,1979). It is therefore important to examine the reliability of the elderly subjects' ratings.

When all 25 blocks of life events had been rated the panel members were asked to re-rate blocks 8, 12, 16, 20, and 24. There was a minimum period of one week between rating and re-rating any block, and a maximum of three weeks. This reliability study was not announced until all blocks had been completed. For difficulties, blocks 6, 10, 15, and 18 were re-rated. Again there was a minimum period of one week between rating and re-rating, but the maximum period was two weeks. The relatively short re-test interval for both life events and difficulties was unavoidable because of time pressures.

The reliability analysis was performed using Kendall's (1955) coefficient of concordance, and the results are given in table 1 overleaf.

Table 1 Test-retest reliability coefficients of elderly panelists' ratings of life events and difficulties

A. Trained Panel

Subject	Life Events (n=20)			Difficulties (n=24)	
	W	P		W	P
003	0.91	0.016		0.88	0.014
004	0.94	0.012		0.79	0.037
005	0.92	0.013		0.92	0.008
006	0.91	0.016		0.88	0.013
012	0.68	0.136	*N.S.	0.84	0.022
501	0.87	0.025		0.88	0.014
502	0.82	0.039		0.86	0.016
503	0.92	0.013		0.82	0.026
504	0.91	0.016		0.87	0.016
511	0.92	0.015		0.88	0.013

B. Untrained Panel

Subject	Life Events (n=20)			Difficulties (n=24)	
	W	P		W	P
008	subject withdrew to enter hospital				
009	0.94	0.012		0.89	0.012
010	0.86	0.028		0.84	0.021
011	0.92	0.014		0.90	0.010
014	rated difficulties only			0.71	0.034
015	rated difficulties only			0.66	0.083
016	rated difficulties only			0.82	0.017
505	0.71	0.108	*NS	0.80	0.024
508	0.78	0.060	*NS	0.85	0.020
509	0.90	0.017		0.84	0.022
510	0.91	0.015		0.95	0.006

Considering the trained panel (table a), only one subject had a non-significant reliability coefficient and that was for the rating of life events only. This subject's data was therefore excluded from the between samples comparisons of life events ratings.

Two subjects from the untrained panel (S.505 and S.508) had non-significant reliability coefficients for life events and they again were excluded from inter-sample comparisons for events. Further, one subject

(S.015), who only rated difficulties, had a non-significant coefficient and was excluded from the inter-sample comparisons of difficulties.

Summary

Overall, the great majority of elderly panelists proved to be reliable in their ratings of events and difficulties over time, although levels of agreement may have been inflated by the relatively modest retest interval.

APPENDIX X

IDENTIFYING OUTLYING VALUES USING THE FOURTH-SPREAD

Identifying outlying values with near certainty requires sample sizes of 500 or more (Hoaglin, Mosteller and Tukey, 1983). However it is possible to approximately identify outliers using a resistant measure such as the Fourth-spread, which is defined as the upper-fourth minus the lower-fourth of a batch of ordered numbers.

The fourth spread identifies the middles batch of a distribution and is similar to the interquartile range. Hoaglin et. cl (op. cit) suggest a rule of thumb whereby values one-and-a-half of the fourth-spread upward from the upper fourth and downward from the lower-fourth are designated outliers. For example, in Nantwich the median number of events reported was 1 at depth 45 of the distribution. The hinges are at depth 22.5 (45/2) and are values of 0.0 and 2.0. The fourth spread is the upper hinge minus the lower hinge i.e. 2.0-0.0=2.0. The Inner Fence is that number outside of which values are statistical outliers. The lower fence can be calculated as follows: 0.0-(1.5 * 2.0)=-3. The upper fence similarity, 2+(1.5*2.0)=5. Thus using this procedure any subject with less than -3 events and more than 5 events can be thought of as an outlying value.

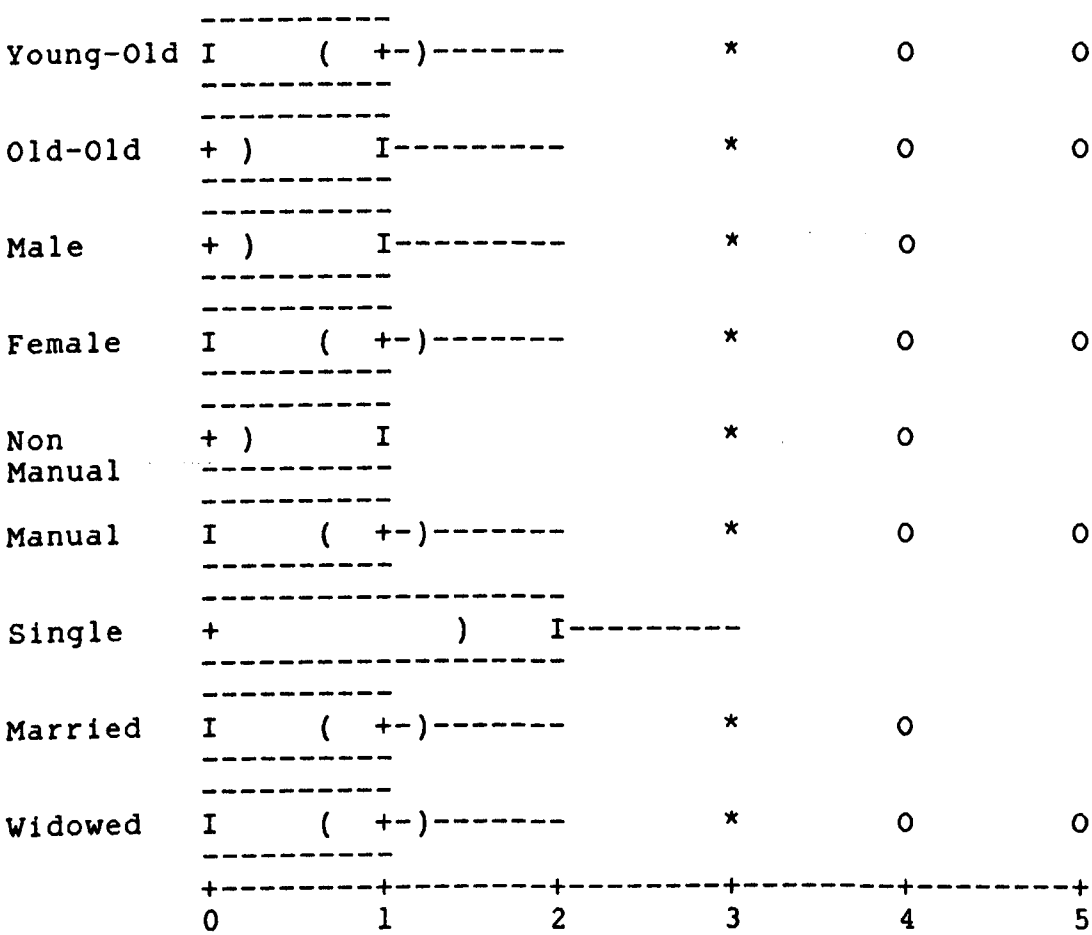
APPENDIX XI

Graphical analysis of the effect of demographic variables on the distribution and severity of events and difficuties

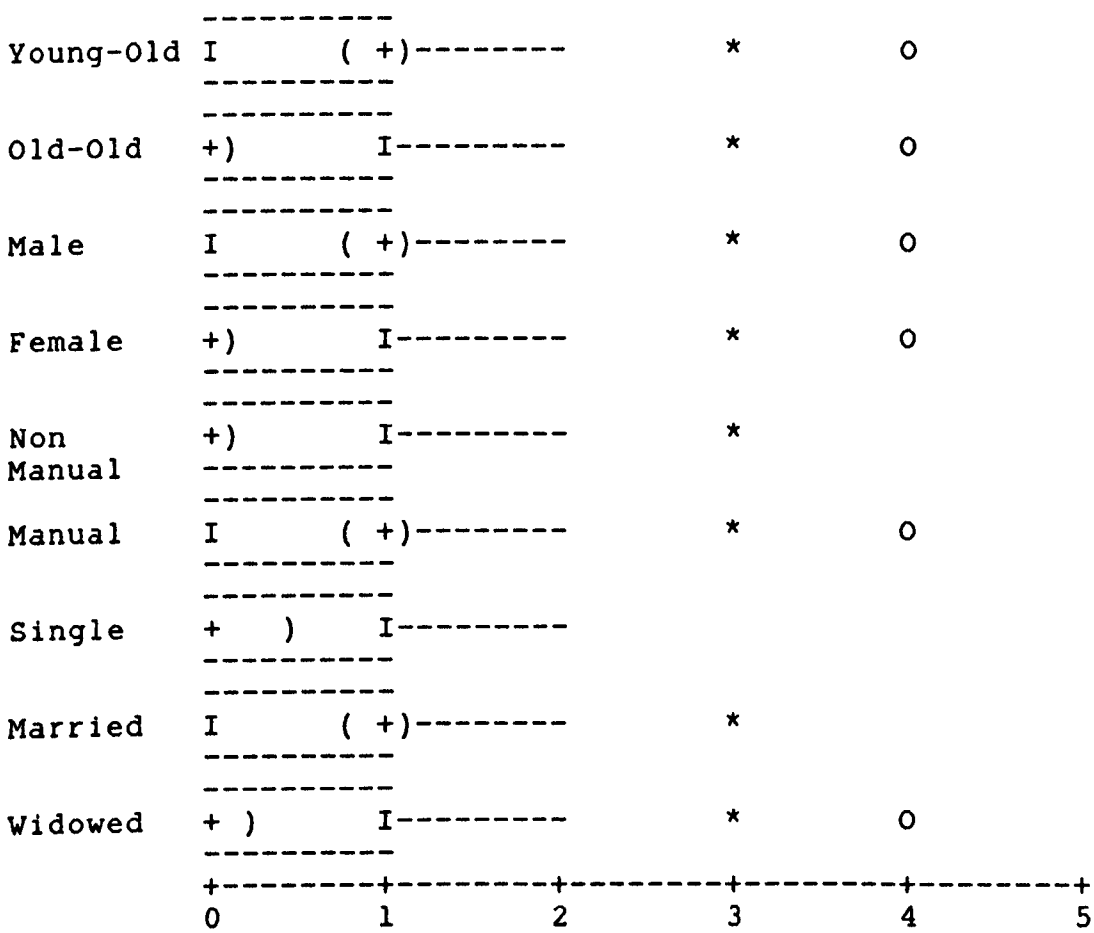
To complement and enhance the analysis in Chapter 6 of the effects of demographic variables on the distributions of of events and difficulties and their rated severity a series of parallel notched boxplots (McGill, Tukey, and Larsen, 1978) have been computed using the Minitab algorithm (Ryan et al., 1981). Graphical comparisons enable one to see at a glance the similarities and differences between the batches with respect to their location, spread, skewness, and outlying values (Tukey, 1977). Where the notches, "( )", of the boxplots do not overlap it is indicative of a significant difference at the 0.05 level. The median value is marked "+", h-spread "I", outliers "*", and extreme outliers "O". Comment on the plots is confined to the main text in Chapter 6.

Table 1 Comparison of the effect of demographic variables on the distribution of Health Events

A. Nantwich



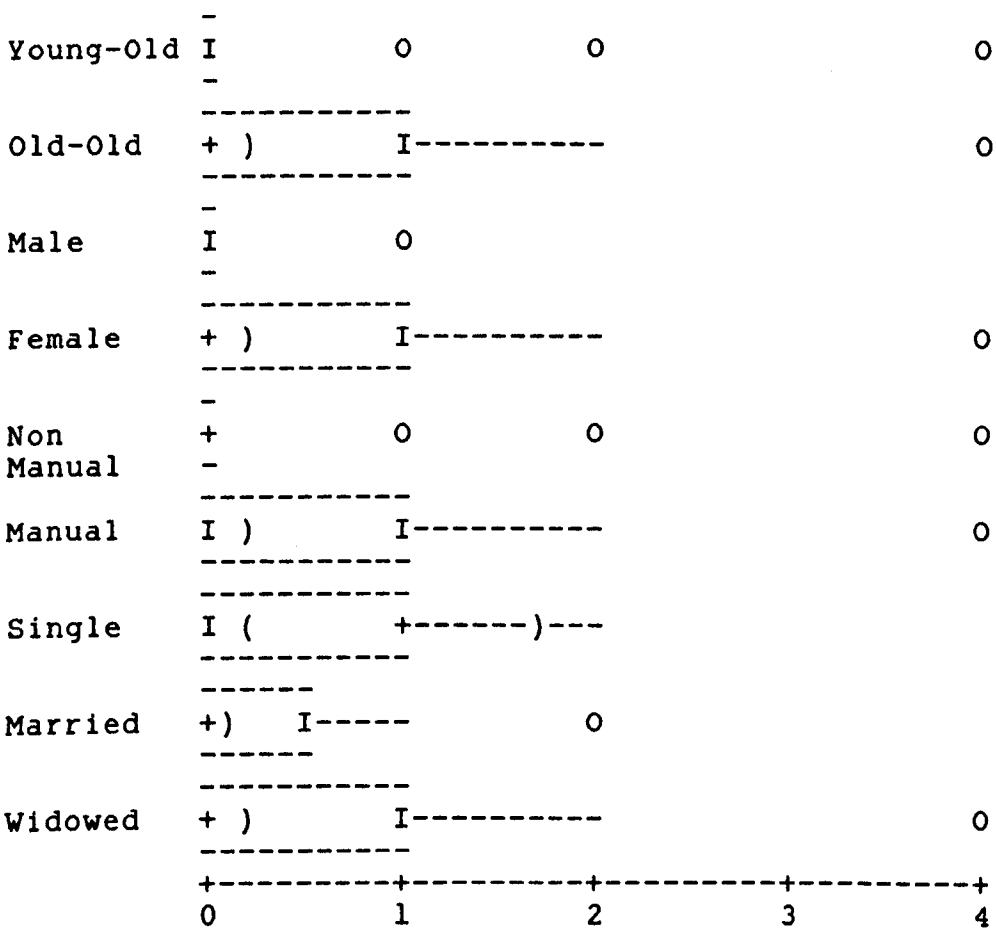
B. Denbigh


Young-Old
Old-Old
Male
Female
Non Manual
Manual
Single
Married
Widowed
0
1
2
3
4
5
Number of Health Events

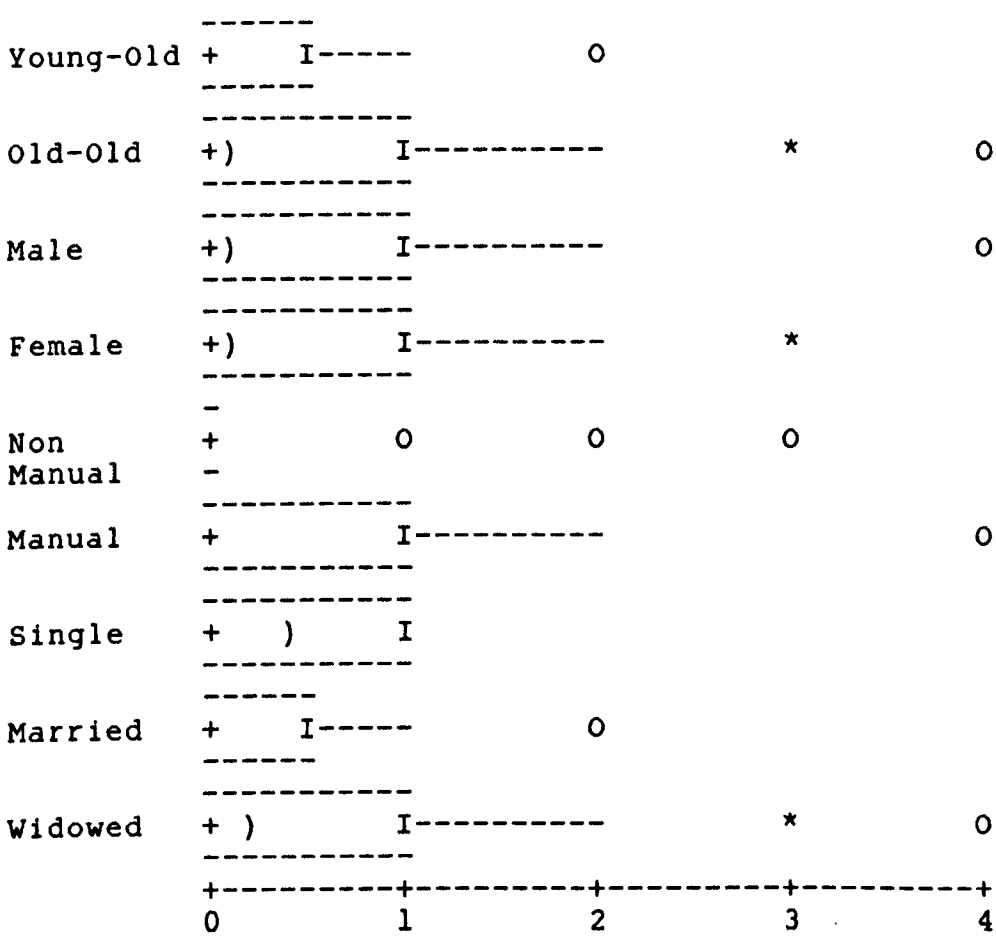
The effect of demographic on the distribution of Personal health events

Table 2

A. Nantwich



B.Denbigh

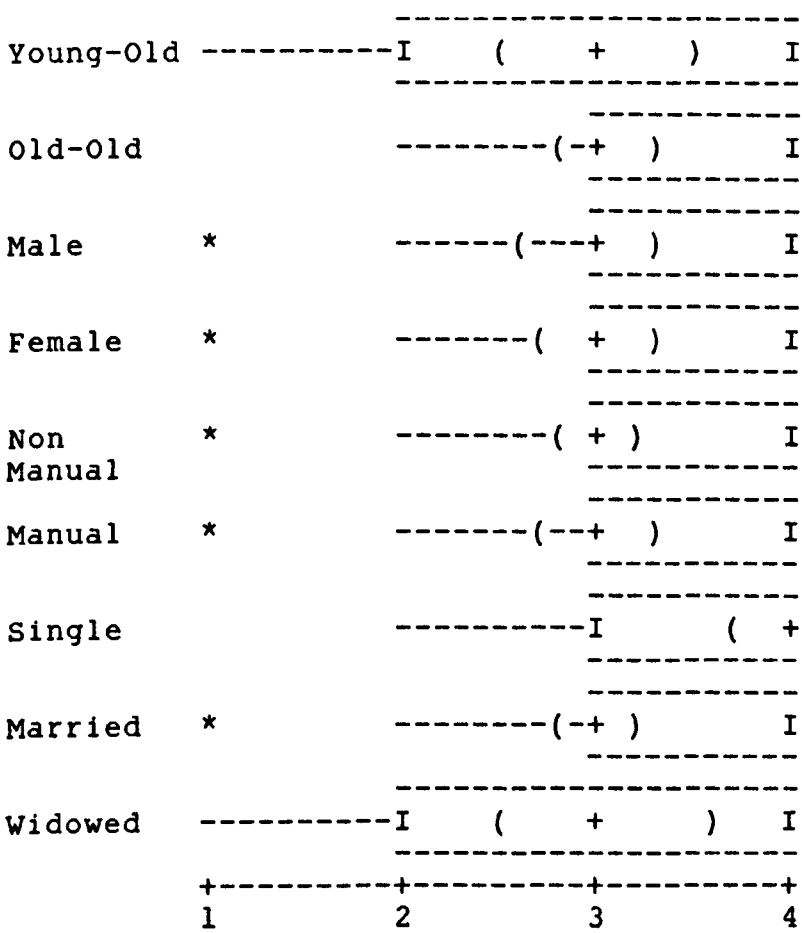

Young-Old
Old-Old
Male
Female
Non Manual
Manual
Single
Married
Widowed
0
1
2
3
4
Number of personal health events

The effect of demographic on the distribution of long-term threat

Table 3

B. Nantwich

B. Denbigh

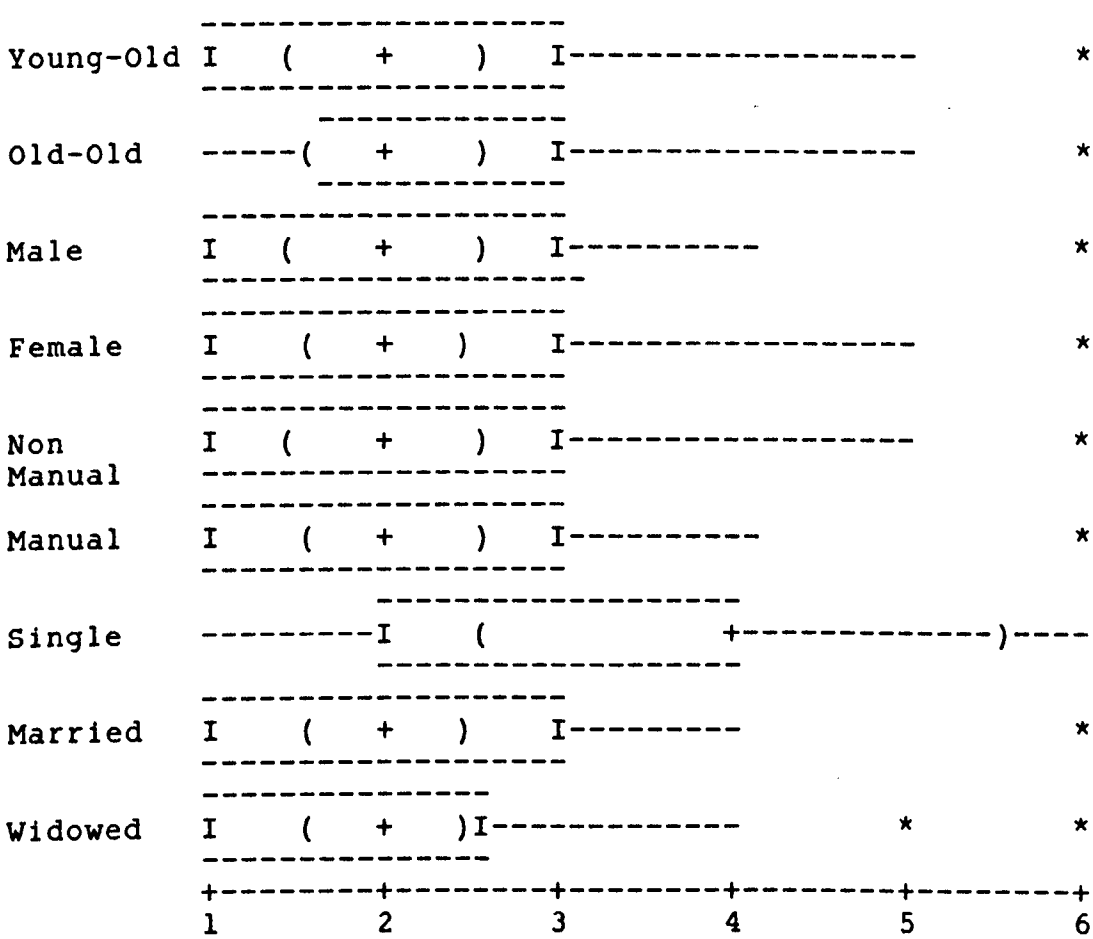


Long-term threat

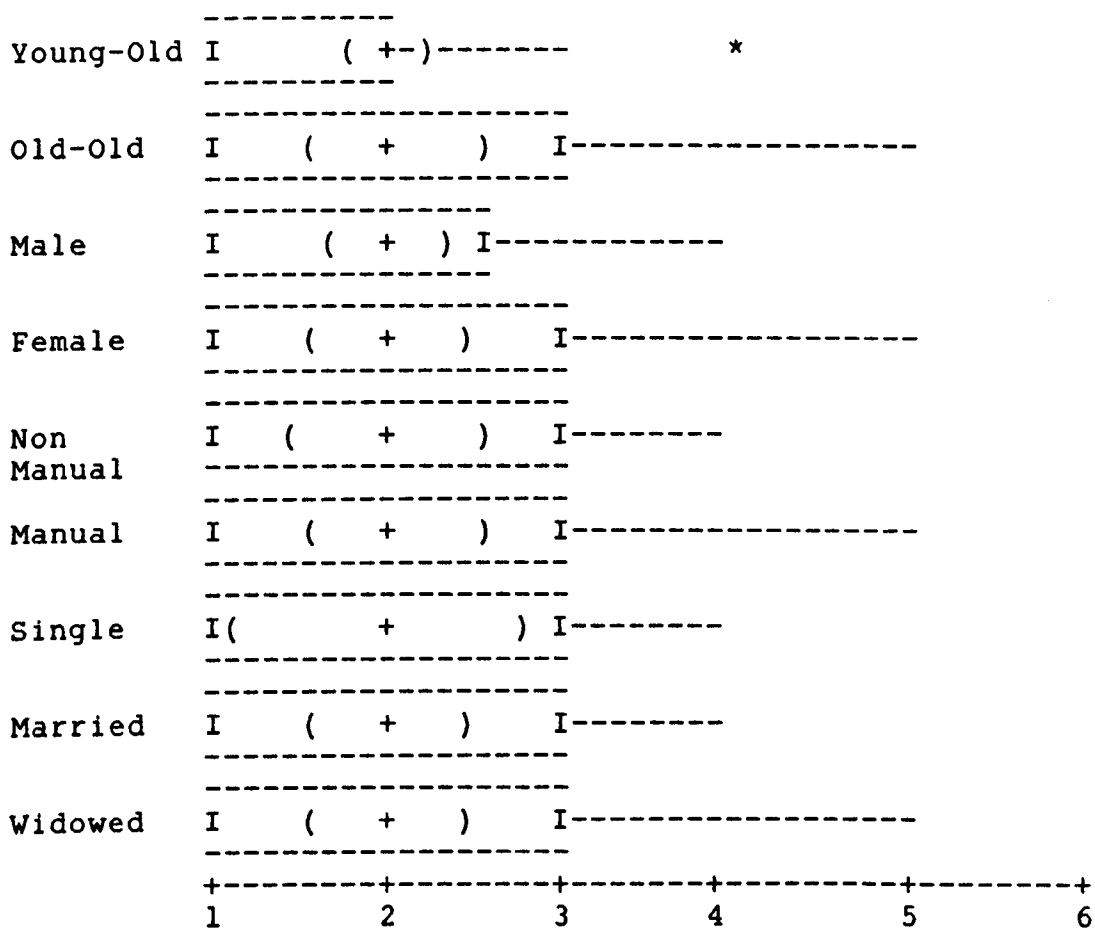
The effect of demographic on the distribution of personal health difficulties

Table 4

A. Nantwich



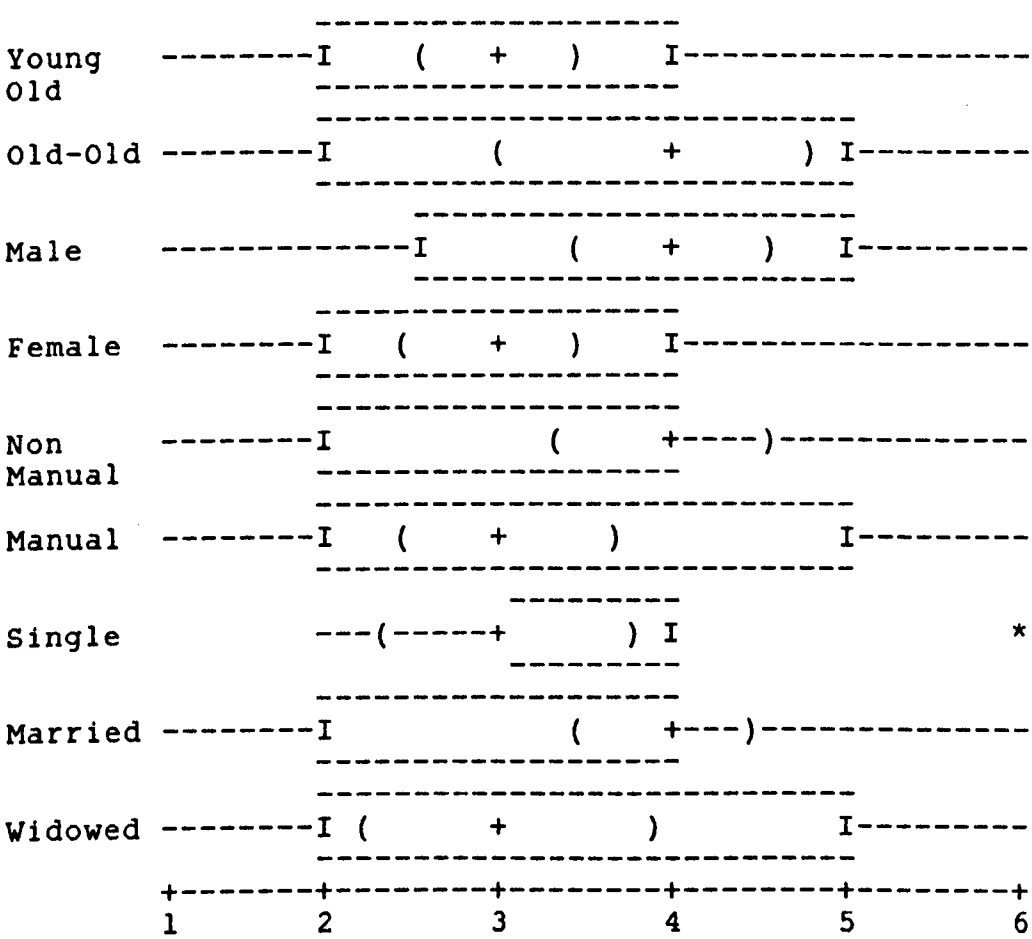
B. Denbigh


Young-Old
Old-Old
Male
Female
Non Manual
Manual
Single
Married
Widowed
1
2
3
4
5
6
Number of health difficulties

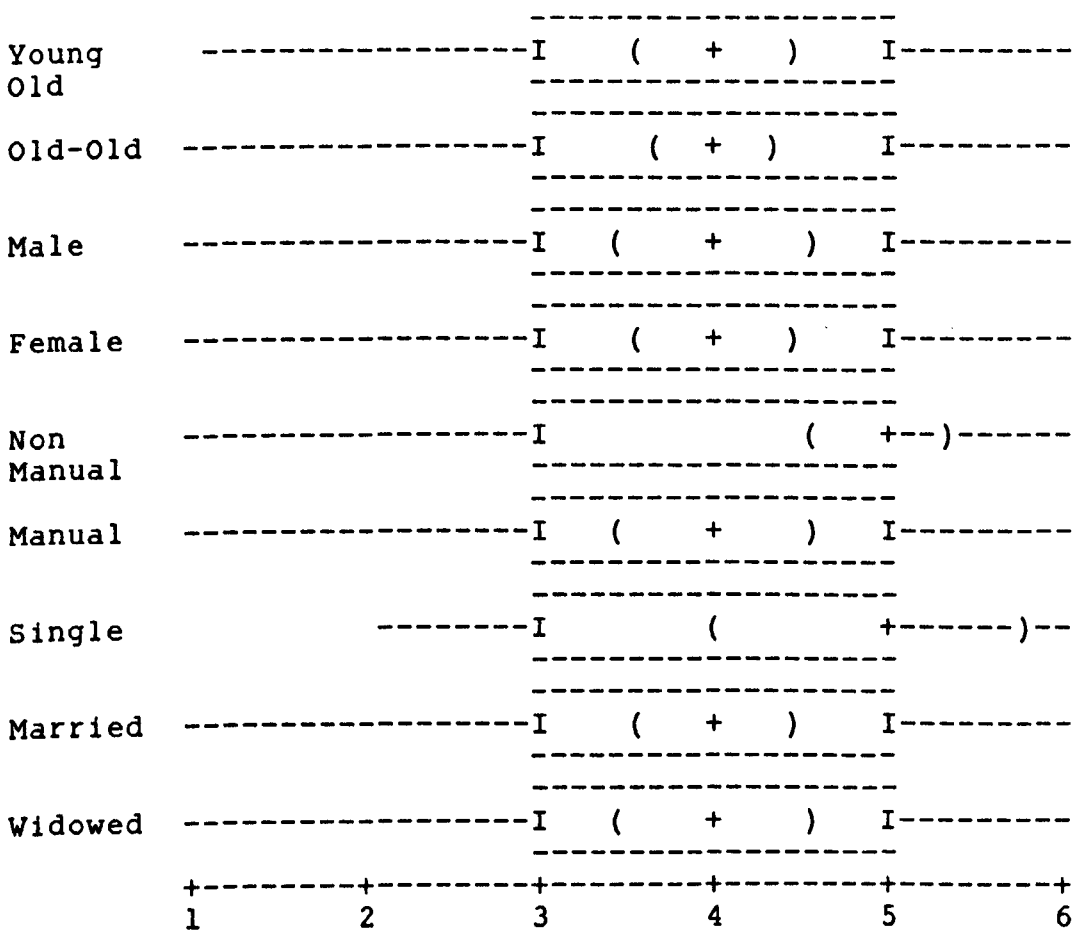
The effect of demographic on the distribution of severity of difficulties

Table 5

A. Nantwich



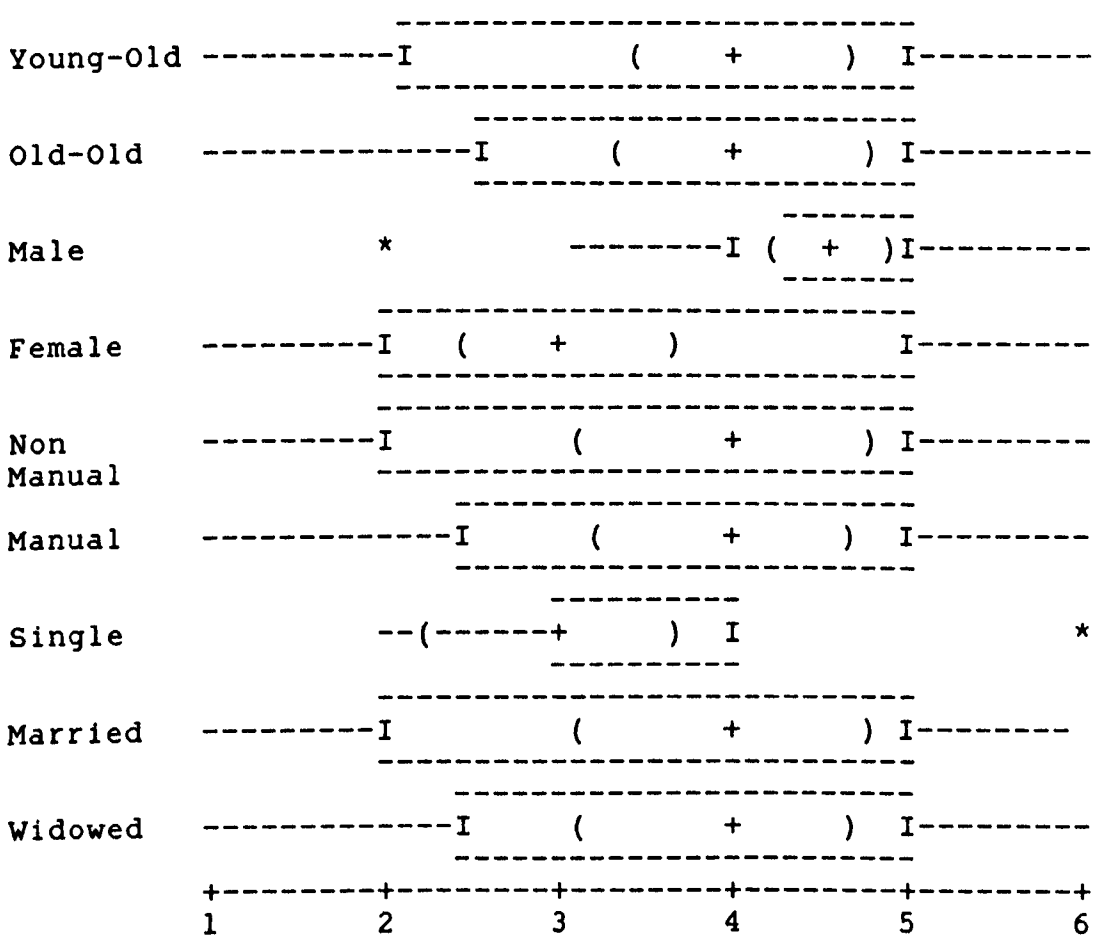
B.Denbigh


Young Old
Old-Old
Male
Female
Non Manual
Manual
Single
Married
Widowed
1
2
3
4
5
6
Severity Levels

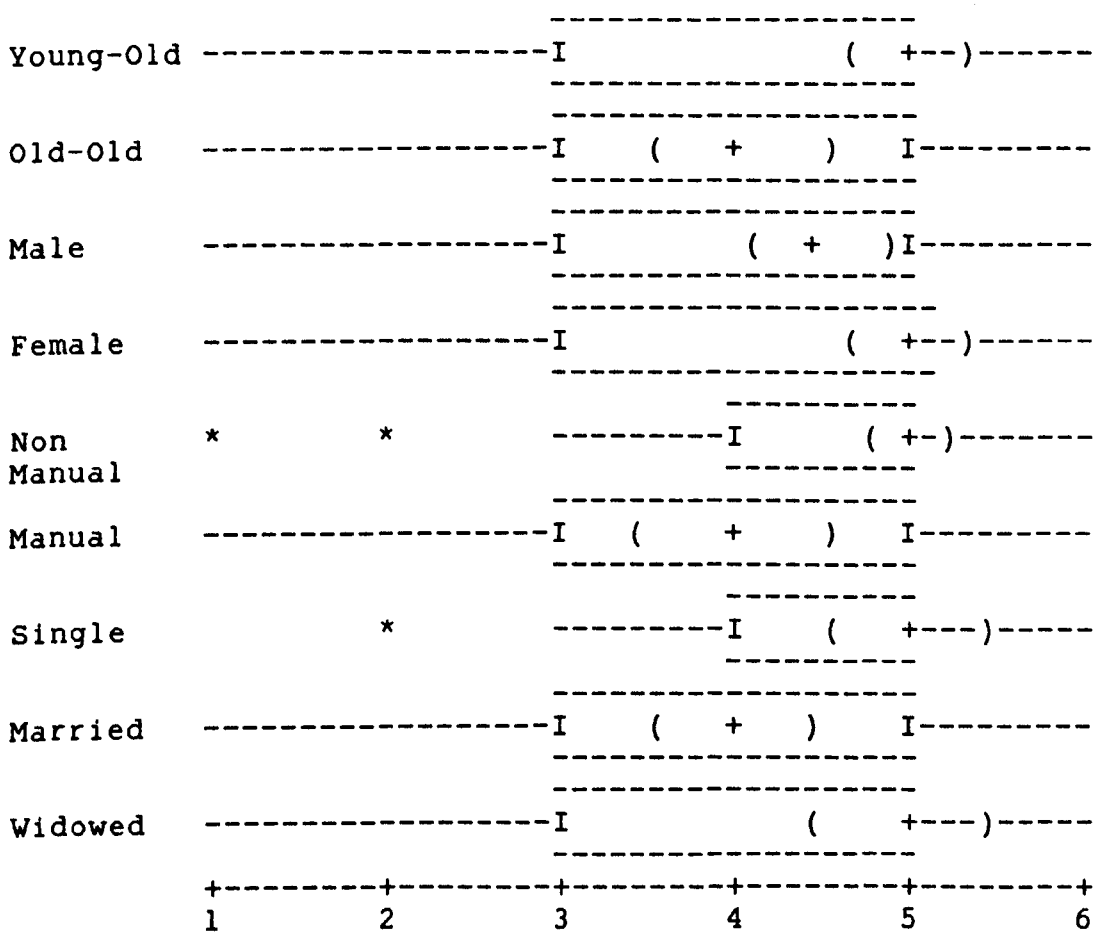
The effect of demographic on the distribution of severity of personal health difficulties

Table 6

A. Nantwich



B. Denbigh


Young-Old
Old-Old
Male
Female
Non Manual
Manual
Single
Married
Widowed
1
2
3
4
5
6
Severity levels

APPENDIX XII

LOGISTIC REGRESSION ANALYSIS

This appendix is concerned with the analysis of data which arise when a sample population is cross-classified according to two or more categorical variables such as sex (male,female) or age (young,middle-aged,old). Our objective is to introduce the reader to a general and powerful approach for analyzing such data sets, and this will be accomplished via a nonmathematical discussion of the methodology and consideration of an illustrated example. For a comprehensive discussion of loglinear models the reader is refered to Bishop, Fienberg, and Holland (1975).

Until recently the statistical and computational techniques available for the analysis of cross-classified data were quite limited. Most researchers handled multidimensional cross-classifications by analysing various two-dimensional marginal totals, that is, by examining the categorical variables two at a time, usually by means of a chi-square test of independence. However, this strategy is fraught with problems and usually does not result in a systematic evaluation of the relationship among a variable set. Further, the classical chi-square approach does not provide estimates of the effects of the variables on each other, and its application to tables with more than two variables is complicated.

The advantages of statistical models that summarize data and test hypotheses are well recognized. Regression analysis, for example, examines the relationship between a response variable and a set of explanatory variables. Analysis of variance techniques provide tests for the effects of various factors on a response variable. Neither technique, however, is appropriate for categorical data, where the observations are not from populations that are normally distributed with constant variance.

A special class of statistical techniques, called loglinear models has been formulated for the analysis of categorical data. In loglinear models all variables that are used for classification are explanatory variables and the response variable is the number of cases in the cell of the cross-tabulations. When a distinction is made between explanatory variables and response variables, loglinear models can be converted into ***logit*** or ***linear logistic*** response models, in which one predicts log-odds quantities involving the response variables using a linear combination of effects due to the explanatory variables.

The statistical model

The linear model postulated by logistic regression analysis is like the one underlying traditional multiple regression analysis, except that it is the ***log odds*** for one outcome versus the other that is assumed to vary

linearly with a set of predictors. Let P denote the proportion of individuals in a population assigned to one of the two levels of the response variable.

$$\text{odds} = \frac{P}{1-P}$$

These now lie in the range from zero to positive infinity, with p of 0.5 corresponding to odds of 1 (even money). Impossible events have odds of zero, certainties have odds of positive infinity. This asymmetry, with half the range condensed into 0 and 1, and half spread out over 1 to infinity, can be removed by taking logs, thus giving the *log odds* or *logit*.

$$\text{log odds} = \ln \frac{P}{1-P}$$

Now certainty corresponds to a logit of positive infinity, impossibility to a logit of negative infinity, and an even chance to a logit of zero. It would be helpful to see some examples, especially since logits are not a familiar unit of measurement.

Logit	p
-1.000	0.2689
-0.500	0.3775
0.000	0.5000
0.500	0.6225
1.000	0.7311
1.500	0.8176
2.000	0.8808
2.500	0.9241
3.000	0.9526
3.500	0.9707
4.000	0.9820
4.500	0.9890
5.000	0.9933

It can be seen from the above that the effect of the

transformation is to stretch out the values near to zero and one. It is also notable that the transformation is symmetrical about 0.5; for example, 0.3775 and 0.6225 are equidistant from 0.5, and their logits -0.5 and 0.5 are equidistant from zero.

Clearly the log odds is especially suitable for representation by linear models. Logistic regression analysis, therefore, is a set of procedures for making inferences about the factors affecting a probability in the context of the model

$$\ln \frac{P}{1-P} = \alpha+\Sigma\beta_i X_i$$

With the sample estimates of α and $\beta_1,\beta_2,...$denoted by a and b_1 and $b_2,..,$ the predicted log odds for subjects with values $X_1,...,X_k$ on the explanatory variables is

$$\ln \frac{P}{1-P} = a+\Sigma b_i X_i$$

and the predicted probability is

$$P = \frac{\exp(a+\Sigma biXi)}{1+\exp(a+\Sigma biXi)}$$

Note that P always lies between 0 and 1.

In ordinary multiple regression analysis, the coefficient b_i is the estimated average change in the response variable per unit change in X_i, with the other variables held fixed. In logistic regression analysis, b_i is the estimated average change in the log odds per unit change in X_i and $\exp(b_i)$is the estimated *odds ratic* (OR) associating X_i with the response variable, the other

variables being held fixed. In general, if P_u and P_v are the estimated probabilities for subjects with different values on an explanatory variable, the odds ratio is

$$OR=\frac{P_u(1-P_v)}{P_v(1-P_u)}$$

Computational Methods

As in traditional regression analysis, a variety of explanatory variables may be included in a logistic regression analysis. If a categorical explanatory variable has C levels, C-1 dummy coded variables are required to represent all levels. If an explanatory variable is quantitative it may be analyzed as measured. If there is reason to suspect a nonlinear association between the log odds for the response variable and a quantitative explanatory variable, the square, logarithm, reciprocal, etc. of the explanatory variable may be included in the equation in order to produce a more nearly linear association. The interaction between two or more explanatory variables (the effect of one depending on the level of the other), may be modeled by including the products of these variables in the equation

There are several well-documented packages of computer programs for carrying out a logistic regression analysis, including SAS, SPSS-X, BMDP, and GLIM.

Model Selection

The objective of a logit analysis is to find a simple predictive model with as few parameters as

possible which would efficiently represent the relationship between the explanatory and response variables. As with ordinary least squares methods, different procedures (forward, backward, and stepwise selection) can be used to either include or exclude terms from the equation. For example, with a stepwise procedure the explanatory variable which is most strongly associated with the response (whilst controlling for the variables already in the equation) is entered at each step provided it is significantly associated with the response variable.

Illustrated Example

To illustrate the application of logistic regression analysis the following example has been taken from Everitt and Dunn (1983).

In this example we are interested in the possible association between age and heavy smoking (over 20 cigarettes per day). The data are given in Table 1.

Table 1 Association of age with heavy smoking

		Age		
		1	2	(2=over 40)
Smoking Habits (2=over 20 per day)	1	50	15	
	2	10	25	

We shall first fit a loglinear model

$$\log m_{ij} = \beta_0 + \text{Age}(i) + \text{Smoke}(j) + \text{AS}(ij) \quad \text{(Eq 1)}$$

where Age, Smoke, and AS are parameters representing main effects and interactions respectivly. As written the

model has nine parameters, but since the table only has four cells, some will not have unique estimates. The model could be re-parameterized in terms of four estimatable contrasts, or constraints on the parameters introduced. The method of analysis here (GLIM) uses the latter approach and sets a number of the parameters at zero. For the above model, the GLIM estimates of the non-zero parameters are given in table 2.

Table 2 Estimates for the saturated loglinear model

Parameter	Estimate	Standard Error
β_o	3.91	0.14
Age(2)	-1.20	0.29
Smoke(2)	-1.61	0.35
AS(22)	2.12	0.48

$G^2=0$ with 0 d.f.

Since the estimated expected values under this model are equal to the observed values, G^2 takes the value zero; a model with the same number of free parameters as number of cells is known as a saturated model. If we now fit a model which sets all the interaction parameters to zero, that is

$$\log m_{ij}=\beta_o+\text{Age}(i)+\text{Smoke}(j) \qquad \text{(Eq 2)}$$

we obtain estimates as shown in Table 3, and a G^2 value of 22.5, with a single degree of freedom.

Table 2 Estimates for the unsaturated loglinear model

Parameter	Estimate	Standard Error
β_o	3.66	0.15
Age(2)	-0.41	0.20
Smoke(2)	-0.62	0.21

$G^2=22.50$ with 1 d.f.

This model clearly does not describe the data very well and we conclude that there is a significant interaction between age and smoking.

If we now reformulate our interest in these data as that of investigating the effect of age-group on heavy smoking, we could fit the following logit model.

$$\log \frac{F_i}{1-F_i} = \beta_o + \text{Age}(i) \qquad \text{(Eq 3)}$$

In the above equation, F_i is the probability that an individual is a heavy smoker when he comes from age-group i, i=1,2. Fitting this model using GLIM results in the parameter estimates given in Table 3. Again G^2 is 0 since this saturated model fits the data perfectly.

Table 3 Estimates for the saturated logit model

Parameter	Estimate	Standard Error
β_o	-1.61	0.35
Age(2)	2.12	0.48

$G^2=0$ with 0 d.f.

If we now fit a logit model assuming that age has no effect, that is

$$\log \frac{F_i}{1-F_i} = \beta_o \qquad \text{(Eq 4)}$$

then we obtain the results shown in table 4. G^2 now takes

Table 4 Estimates for the unsaturated logit model

Parameter	Estimate	Standard Error
β_o	-0.62	0.21

$G^2=22.50$ with 1 d.f.

the value 22.5. Consequently we are led to exactly the same conclusion as in our previous analysis. The

equivalence of some of the parameter estimates can be explained if we return to examining the loglinear models for heavy smokers, that is

$$\log m_{i2} = \beta_0 + \text{Age}(i) + \text{Smoke}(2) + aS(i2) \qquad \text{(Eq 5)}$$

and for light smokers

$$\log m_{i1} = \beta_0 + \text{Age}(i) \qquad \text{(Eq 6)}$$

(remembering that some parameters are a priori set to zero). Subtracting equation 6 from equation 5 gives

$$\log m_{i2}/m_{i1} = \text{Smoke}(2) + AS(i2)$$

which since $m_{i2}/m_{i1} = p_i/(1-p_i)$, is equivalent to equation 3. Hence the parameter Smoke(2) in the loglinear model takes the same value as β_0 in the logistic model, and AS(i2) in the former model, the same value as Age(2) in the latter.

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