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Edited by Andrew Steptoe and Jane Wardle

Excerpt

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Section 1

Life stress, social support and health

Readings

Unemployment and mortality in the OPCS Longitudinal Study.

K. A. Moser, A. J. Fox and D. R. Jones. *Lancet*, ii, 1324–9, 1984.

Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population.

J. V. Johnson and E. M. Hall. *American Journal of Public Health*, 78, 1336–42, 1988.

Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents.

L. F. Berkman and S. L. Syme. *American Journal of Epidemiology*, 109, 186–204, 1979.

Goal frustration and life events in the aetiology of painful gastrointestinal disorder.

T. K. J. Craig and G. W. Brown. *Journal of Psychosomatic Research*, 28, 411–21, 1984.

Psychosocial assets, life crisis and the prognosis of pregnancy.

K. B. Nuckolls, J. Cassel and B. H. Kaplan. *American Journal of Epidemiology*, 95, 431–41, 1972.

Introduction

Section 1 is concerned with the role of life stress in the development of illness. A variety of health problems are addressed, ranging from symptoms of cardiovascular and gastrointestinal disorders to mortality. The readings have been selected to illustrate a number of important themes.

The first theme is the operationalisation of adverse life experience. One of the major difficulties that bedevilled early work in psychosoma-

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tic medicine and stress research was that life experience was poorly characterised, and was assessed primarily through respondents' retrospective reports. The fact that people with illnesses say that they were under stress before onset, contributes little to our understanding, since these reports may be biased by the person's health status, and by *post hoc* interpretations of their experience. The readings in Section 1 have taken various approaches to assessing life experience in a more objective way, involving the measurement of specific life events (*Craig and Brown; Nuckolls et al.*), chronic adverse circumstances such as job strain (*Johnson and Hall*), and the condition of unemployment (*Moser et al.*). They illustrate various strategies for deriving information about peoples' experience of life that can be quantified and related to health outcome in a systematic fashion.

The second theme is that life stress is not simply a product of unpleasant occurrences, but also depends on the person's social and personal resources. Personality and behaviour patterns are discussed further in Section 3, so in this section the focus is on the social environment. The impact of social networks and supports on health has been acknowledged increasingly over recent years (Cohen and Syme, 1985; Shumaker and Czajkowski, 1993). What is also becoming apparent is that social support is not a unitary concept. The extent of the social network is conceptually distinct from the degree of emotional and material support that is provided in times of crisis. Some social contacts may have negative rather than positive consequences, and social conflict is a potent source of psychological distress. It cannot be assumed that a person reporting close contact with family and friends will necessarily have access to effective support in times of crisis. Support itself has many dimensions, including emotional support, tangible or material assistance, and support in terms of information and advice. The relative impact of these will vary in different circumstances. These distinctions may account for some of the discrepant results in the debate concerning whether social support has a 'main effect' on health, or whether it acts as a 'buffer' to life stress. The readings illustrate both effects, with results from the Alameda County study showing that networks are directly associated with mortality (*Berkman and Syme*), while studies of job strain (*Johnson and Hall*) and the stressors encountered by pregnant women (*Nuckolls et al.*) demonstrate that social support protects people who are under particular pressure.

The third major theme is the design of studies relating life stress with health. The fundamental issue concerns the analysis of causation. The most convincing test of causation used in science is the experimental design, in which exposure to the putative causal factor is evaluated in a randomised prospective study. Such a procedure cannot reasonably be

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used in studies of life stress and health, so investigators are reliant on a range of observational study designs in which conditions are not manipulated experimentally. Three general approaches are illustrated in Section 1: the cross-sectional survey in which putative causal factors and health outcomes are assessed simultaneously (*Johnson and Hall*); the case-control study, in which the experiences of people with a particular disorder are contrasted with those of comparison subjects (*Craig and Brown*); and the longitudinal cohort study, in which populations with different levels of exposure to the putative causal factor are followed up, and differential health consequences are measured (*Moser et al*; *Berkman and Syme*; *Nuckolls et al.*). Each of these designs has different strengths in terms of such factors as the representativeness of samples, their abilities to uncover the sequence of events as they unfold, and the speed with which results can be obtained. They also have different limitations such as the number of participants required, openness to bias, and competing explanations of results. These properties have been lucidly compared by Elwood (1988). The reader may also identify an important tension between population-based studies which involve large representative samples (*Moser et al*; *Johnson and Hall*; *Berkman and Syme*), and clinically based studies that explore in detail the experience of individuals suffering from particular problems (*Craig and Brown*; *Nuckolls et al.*). This contrast between the individual and population level is one that runs through much of the literature on psychosocial processes and health, and will reemerge in later sections of the volume, particularly in relation to disease prevention through population-based programmes (Section 4) as against intensive interventions with individual people at risk (Section 6).

Unemployment and mortality

The paper by *Moser, Fox and Jones* uses longitudinal data from a national register to evaluate the association between unemployment and mortality. Unemployment has important political and social ramifications, and there is little doubt that it may have adverse effects on well-being. Health consequences have been investigated extensively over recent years, with studies of mental health (Warr, 1987), suicide (Brenner, 1985), and physiological function (Kasl *et al.*, 1968; Mattiasson *et al.*, 1990). The strength of the study by Moser *et al.* lies in their imaginative use of routine census data to investigate the relationship of unemployment to the most convincing health endpoint of all – mortality. Data were derived from a large representative sample of the population, and show that mortality among men aged 15–64 years who were seeking work in the week prior to the 1971 census was significant-

ly elevated over the subsequent 10 years. This effect has been replicated using 1981 census data, where similar results emerge despite the overall level of unemployment being much higher than a decade earlier (Moser *et al.*, 1987). Rates of deaths through violence or suicide were especially high among unemployed men, although raised risk of death from cardiovascular disease and cancer was evident as well. Comparable observations have been made in Denmark, Finland and other countries (Iversen *et al.*, 1987; Martikainen, 1990).

A particular feature of this reading is that Moser *et al.* were able to use their data to explore alternative explanations of the results. One obvious possibility is that men were unemployed because of poor health, and that excess mortality might be the result of preselecting a 'sick' group. If this were the explanation, one would expect the elevated mortality rate to diminish over time, as the proportion of unhealthy subjects in the unemployed category was reduced. In fact, there is little evidence for such an effect. It is also interesting that the impact of unemployment was experienced by the wives of men in the study, and that they too showed excess mortality. Again, this argues against a selection factor being responsible for the mortality among the unemployed. The explanation favoured by the authors is that the stress of unemployment has an effect on the family and not solely on the index subjects.

The results of this analysis illustrate another important association between psychosocial factors and mortality, namely the socioeconomic status mortality gradient. Moser *et al.* used conventional measures of social class to classify subjects, but similar patterns are seen in Berkman and Syme's results using different indices of social status. There are many competing explanations of social inequalities of health, and these have been clearly discussed by Blane (1985). While selection processes and population drift may account for some of the effects, the major responsibility probably lies in the different social and personal experiences of people with differing social status (Marmot *et al.*, 1991). Social gradients in mortality and morbidity appear to increase as people move from early adulthood to late middle-age, so are particularly worrying in the context of demographic trends in the population (House *et al.*, 1992).

One benefit of the research strategy described by Moser *et al.* is that, through studying a large, representative sample, it was possible to establish strong relationships between life stress and health. The limitation of this approach is that little is known about the individuals involved. It is possible, for example, that many of those designated as unemployed found work soon afterwards, while others lost their jobs over the 10-year follow-up. Some men will have been able to cope with

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unemployment more effectively than others. Such effects would be likely to dilute the impact of unemployment as defined in the study.

Job stress and social support

The second reading pursues the theme of life stress and health by evaluating dimensions of work-related strain in relation to cardiovascular symptoms. People who are employed spend a substantial portion of their waking lives at work, so it is not surprising that a large literature has investigated the impact of job stress on health and well-being. A particularly influential approach to occupational stress is the demand-control model developed by Robert Karasek (1979). This model proposes that job strain will arise when high levels of job demand are coupled with low levels of control over decision making and job content. Thus, a demanding job will not in itself lead to ill-effects, since the worker may be able to exert considerable discretion over how the job is done. This approach has not gone uncriticised (see Ganster, 1989); nevertheless, a body of evidence has emerged suggesting that the demand-control approach may be particularly relevant to cardiovascular disease (Karasek and Theorell, 1990).

Johnson and Hall's study illustrates this association with cardiovascular disease, while also adding the element of social support. They find that symptoms of cardiovascular disease are particularly prevalent among high job strain workers who report little work-related social support. This illustrates a buffering effect of social support, in that the impact of social relationships was more pronounced among workers who experienced high job strain. The study investigated a large random sample of the working population, and sophisticated statistical procedures were used to show that the impact of high job strain coupled with low support is not a marker of some other potential causal factor such as socioeconomic status, gender or cigarette smoking. The study also introduces the concept of domain-specific social support, suggesting that the measurement of social relationships in the work setting may be particularly useful when evaluating job-related experience. Another intriguing observation is that high levels of job control may not always be beneficial, since the prevalence of cardiovascular symptoms among subjects reporting high control coupled with high demands and low support was substantial. High control over a job may bring with it heavy responsibility, and when this is experienced in social isolation, the result may be negative.

The limitations of the study design, acknowledged by *Johnson and Hall*, are also illuminating. The cross-sectional approach limits causal interpretation. It is possible that some aspect of cardiovascular disease

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or its symptoms leads workers to become socially isolated, and to perceive their work as being excessively demanding. The reliance on self-report of health status may lead to misclassification and bias. However, longitudinal analyses have confirmed the impact of these factors on mortality, so bias in symptom reporting is unlikely to be responsible (Johnson *et al.*, 1989). The study has therefore helped to establish the three-way interaction between demands, perceptions of control, and social support as being important to the investigation of life stress and health.

Social networks and mortality

It has been believed since the seminal work of Emil Durkheim that social ties and social networks protect people against ill-health. *Berkman and Syme's* paper was perhaps the first convincingly to show an association between mortality and the extent of social networks. They had the advantage of being able to utilise data from the Alameda County study, a systematic survey of nearly 7000 randomly selected adults that was first assessed in 1965. The sample has been investigated from a number of aspects, and is notable for the high response rate and minimal attrition. Both these features add to the confidence that can be placed on the longitudinal cohort design. A further reading using the Alameda County data is included in Section 4 (*Wingard et al.*).

Berkman and Syme demonstrate that mortality in men and women is associated with social relationships, assessed both at the most individual level (marriage) and in terms of broader networks. Mortality was more frequent during the follow-up period in those with few social connections, and this was apparent in men and women from early to late adult life. As in the study by *Moser et al.*, it was possible to tease out competing explanations of this pattern by carrying out subsidiary analyses. Thus, it can be seen that the results were not simply due to people with few social connections being more unhealthy from the start of the survey, or using health services less effectively. The degree to which people follow a healthy lifestyle (regular exercise, moderate alcohol consumption, not smoking, etc.) may play a part in the social network difference, but only goes a small way towards accounting for mortality effects. Similarly, the strong association between socioeconomic status and mortality contributes to the link between networks and death, without being entirely responsible.

It is therefore argued by *Berkman and Syme* that social isolation may reduce peoples' resistance to sources of ill-health through failures of psychological coping and through stress-related physiological processes. These possibilities are elaborated further through readings in

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Sections 2 and 3. It is suggested that social networks contribute to the individual's resistance in a general fashion, rather than affecting vulnerability to specific disorders. This non-specificity hypothesis has been elaborated in detail by Cassel (1976). The associations between social support and mortality described in this reading have been confirmed in other surveys (House *et al.*, 1988).

It should be noted that although social networks are often associated with a protective effect, this is not invariably the case. Having an extensive social network may have negative as well as positive consequences. The more contacts the person has, the greater the opportunities for adverse emotional experiences such as bereavement, separation and loss of friendship. Moreover, people with wide networks may be called upon to provide support to many others, and this can also be emotionally demanding (Buunk and Hoorens, 1992). The summary measures of social networks obtained in the Alameda County study do not provide information about the way in which social connections operated, or how they were mobilised in times of difficulty.

Life events and gastrointestinal disorder

The next reading illustrates a very different approach to the investigation of psychosocial factors and health. The notion that life stress could be quantified through the measurement of discrete objective 'life events' was first systematically introduced by Holmes and Rahe (1967). Their original instrument, the Schedule of Recent Experiences, was a list of 43 events, and this has been elaborated subsequently and used extensively in many different health settings. The Schedule of Recent Experiences and its successors have been severely criticised on many counts (Brown, 1974). These arguments are well summarised by Paykel (1983), and concern the accuracy and reliability of event recording, and the evaluation of the significance of events for the individual under investigation.

The paper by *Craig and Brown* illustrates a powerful alternative strategy for assessing life events and chronic life difficulties. This is the Life Events and Difficulties Schedule developed by Brown and his associates. It is an interview method which not only provides accurate information about events through probing and cross-checking, but also includes an independent method of assessing the threat associated with each incident. This technique has been applied principally to psychiatric disorders, although research on physical complaints has been gathering momentum (Brown and Harris, 1978, 1989).

The study applies the life event method to patients with gastrointestinal disorders. *Craig and Brown* found that severe life events or chronic

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difficulties over the previous nine months were significantly more common among patients with functional gastrointestinal disorders (such as irritable bowel syndrome and dyspepsia) than in healthy controls or patients with organic disorders. In contrast, experiences involving the frustration of desired goals following a period of sustained striving were more frequent in the organic disorder group. The result is important as a demonstration of the way in which associations can be found at the clinical level between stressful experiences and ill-health, and also as an example of the operationalisation of subtle concepts such as goal frustration within a framework of objective assessment. Interestingly, the basic pattern of results has been confirmed in an independent study in which a specific association between duodenal ulcer and goal frustration was identified (Ellard *et al.*, 1990). The data run counter to the theory that life stress has a non-specific generalised impact on health status, since different types of experience were found to be related to different outcomes. Results from psychophysiological experiments likewise challenge the notion of non-specificity in stress processes (Steptoe, 1983).

Studies like the one described by *Craig and Brown* involve intensive assessments on the individual participants, so are inevitably smaller in scale than surveys. This means that some of the numbers are extremely small in the various subsidiary comparisons, so their representativeness is unknown. The information on life events and difficulties is collected retrospectively, although the interviewer is not aware of the diagnostic status of participants. This approach therefore has both strengths and limitations, and can be seen as complementary to the larger-scale cohort studies.

Pregnancy complications and life events

The last reading of Section 1 focuses on another set of health problems (complications of pregnancy) and another aspect of the association between life stress and health, namely the protective influence of psychosocial assets. *Nuckolls, Cassel and Kaplan* studied a cohort of women bearing their first child, and recorded life events before and during pregnancy, together with the women's social and personal resources and assets. They found an interaction between life stress and assets, so that high levels of pregnancy complications were observed among women with poor resources who experienced severe life change both before and during pregnancy. In this way, the study documented an interaction between stressful life experience and support, for neither events nor assets proved to be significant in isolation.

Some features of this study can be criticised on methodological

grounds, although the general pattern of results has been confirmed at least in part by other researchers (Norbeck and Tilden, 1983; Newton and Hunt, 1984). *Nuckolls et al.* used the type of life schedule that was criticised by *Craig and Brown*. The participants had a difficult rating task, being required on a single occasion to recall life events both during pregnancy and during the year prior to pregnancy. The pregnancy complication rate was surprisingly high (47% of the sample), so different patterns of results might emerge from a present-day obstetric unit. Nevertheless, the study has a number of strengths that make it an important illustration of links between life stress and health. The authors were able to conduct a prospective study on a rather homogeneous cohort, with psychosocial measures being obtained before the medical events occurred. Such a design was possible because complications were frequent in the population. Much larger cohorts are required to investigate relatively rare events like premature mortality. A careful analysis was performed on those who did not complete the study, strengthening the confidence that could be placed on results. It is also notable that the psychosocial assets found in this study to buffer severe life events include personal as well as social resources. Factors such as self-esteem and attitudes to pregnancy were incorporated into the assets measure, suggesting that a broad conceptualisation may be helpful. The relevance of personal factors of this kind to stress resistance and vulnerability to adverse life events is a thread that is taken up again in Section 3. Finally, it should be noted that the beneficial effects of social support during pregnancy, labour and postpartum have been amply confirmed by other investigations, with emotional, tangible and informational support all having a positive influence on women's health (Gjerdingen *et al.*, 1991).

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