#### THE UNIVERSITY OF HULL

## FACTORS RELATED TO REHABILITATION AFTER FIRST ACUTE MYOCARDIAL INFARCTION

being a Thesis submitted for the Degree of

Doctor of Philosophy

in the University of Hull

by

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#### Abbreviations key card

AACL - Affect adjective check list

AAS - Affect adjective scale
CHD - Coronary heart disease

CLS - Change in life-style

CMU - Coronary monitoring unit

CRC - Cardiac rehabilitation centre

df - Degree of freedom

ECG - Electro cardiogram

EPI - Eysenck personality inventory

GHQ - General Health Questionnaire

GP - General practitioner

Indep FU - Independent variables measured at follow-up

Indep HOS - Independent variables measured during stay in

hospital

MI - Myocardial infarction

MMPI - Minnesota Multiphasic Personality Inventory

MPI - Maudsley Personality Inventory

MS - Mean sum of squares

PCI - Perception of causes of the illness

RD - Resumption of driving

RHR - Resumption of daily number of hours at work

RML - Resumption of mental load and responsibility

at work

RPA - Resumption of physical acitivity at work

RSA - Resumption of sexual activity

RTW - Return to work

SD - Standard deviation

SES - Socio-economic status

SS - Sum of squares

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#### Summary of the thesis

The major abjective of this research has been the investigation of associations between aspects of rehabilitation after myocardial infarction and a number of psychological factors. The influence of medical, social and occupational factors, was also studied. The first chapter explains what a coronary heart disease is. The second chapter shows that although most patients surviving a heart attack are expected by cardiologists to restore their pre-illness level of activity in most areas of life within 3-4 months of leaving hospital, many of them do not do so. Chapters 3 and 4 review the literature in which explanations are put forward for this discrepancy between the expectations of cardiologists and the actual behaviour of patients. It appears that this discrepancy can often not be explained simply in terms of physical, cardiac disability or unsuitable occupational demands. It has frequently been proposed that psychological factors play an important role in determining the degree of success of the rehabilitation process. Such reasoning however, has usually been based on theoretical considerations, subjective impressions or clinical observations of small samples rather than on the findings of well controlled studies. The fifth chapter specifies the research objectives and dependent and independent variables. The following seven aspects of the rehabilitation were studied as dependent variables: Return to work, Resumption of physical activity at work, Resumption of mental load and responsibility at work, Resumption of daily number of hours at work, Resumption of Sexual acitivity, Resumption of driving and Change in the preillness life-style. Each one of the seven aspects is investigated separately in chapters 8 to 14. The associations between the

dependent and independent variables were analysed in two follow-ups four and ten months after leaving hospital. The analyses were carried-out on data obtained from 183 patients. The results (which are summarised in the end of each chapter) show that by four months, 62% of the patients had returned to work. Of these patients 53% fully resumed their physical activity at work, 74% fully resumed their mental load and responsibility at work and 62% fully resumed their daily number of hours at work. By ten months the respective figures were: 84%, 65%, 77% and 78%.

By four months 61% of the patients fully resumed their sexual activity, 78% fully resumed their driving and 26% reported no changes in their life-styles. At ten months the respective figures were: 57%, 78%, and 26%.

The independent variables found to be most significantly related to the rehabilitation criteria were: Severity of the illness, Physical disability, Anxiety level during first two days in hospital, Perception of causes of the illness, advice given by consultants, GPs or wives regarding whether or not to resume work and the level of general well-being expressed by the patients. It is concluded that many of these variables may prove to be of a potential usefulness for purposes of early detection of patients likely to fail or delay their rehabilitation.

Finally, the advantages and disadvantages and the major research conclusions are discussed in chapter 16.

#### CHAPTER 18

#### Coronary Heart Disease (CHD)

- A. The function of the coronary arteries
- B. Definition of CHD
- C. The pathological process underlying CHD
- D. Types of CHD experienced by patients in this study

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.. carefully arteries and a graphic

E. Summary

#### A. The function of the coronary arteries

The coronary arteries are the blood vessels which supply blood to the heart muscle. The right and left coronary arteries (see figure 1) come off the very beginning of the aorta and communicate directly with each other through smaller collateral blood vessels (not shown in figure 1), thus providing the opportunity for collateral supply in the event of blockage in either artery. Each coronary artery branches and rebranches just like a tree.

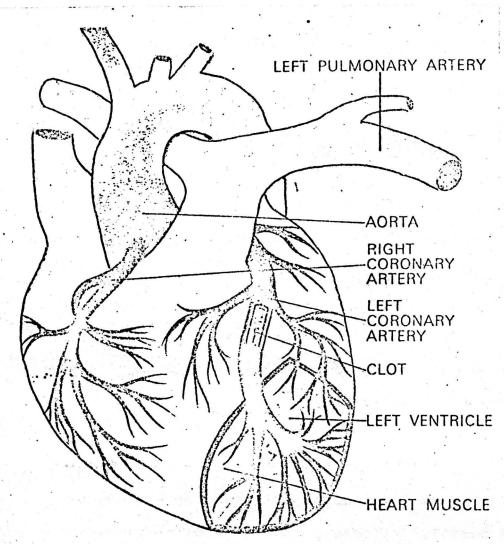
#### B. Definition of CHD

CHD is defined as: "the cardiac disability, acute and chronic, arising from reduction or arrest of blood supply to the myocardium (the heart muscle) in association with disease processes in the coronary arterial system" (W.H.O., 1959).

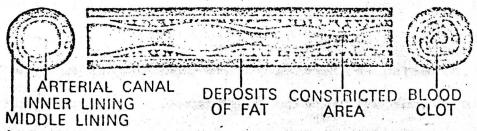
#### C. The pathological process underlying CHD

The pathological basis of CHD is atherosclerosis. This is a process of accumulation of fatty deposits (mainly consists of cholesterol) on the walls of the coronary arteries, causing a reduction in the coronary bore and a restriction of the blood supply to the heart muscle. This accretion of fatty material begins in childhood but the ill-effects are not usually found until the late 30's. A diagram of the coronary arteries and a graphic description of atherosclerosis is shown below in figure 1.

#### Figure 1\*: The coronary arteries and atherosclerosis



A heart attacked: Prime target for atherosclerosis is the heart, and the artery most commonly affected is the left coronary. The drawing shows the disease in an advanced state. The artery is drastically narrowed, and in the cut-away section a clot has formed in the constricted vessel preventing vital blood flow to the ventricle muscles.



A healthy open artery is able to expand and contract freely depending on the strength and rate of the surging blood flow. But when fatty deposits accumulate, the artery gradually narrows and loses its essential flexibility. As the walls become stiffer, constricted blood stagnates and then clots.

\* Extracted from - The Mind Alive Encyclopedia of Man & Medicine,
Marshall Cavendish, London, 1973.

#### D. Types of CHD experienced by patients in the study

CHD covers a wide variety of cardiological disorders. The patients in the present study can be divided into two major diagnostic groups:

#### 1. Myocardial ischaemia or angina pectoris

The pain of angina pectoris or coronary insufficiency is experienced when the heart muscle has a relative lack of adequate blood supply for the work it has to do. The relative shortage of oxygen or haemoglobin in the blood supply to the heart muscle is known as myocardial ischaemia. The pain symptoms usually occur on effort but they can also occur at rest. When they have passed the symptoms leave the heart muscle undamaged.

Patients who are diagnosed as suffering from angina pectoris or myocardial ischaemia are usually informed that they have not had a 'heart attack' and that their heart has not been damaged. However, they are told that they suffer from a coronary heart disease and that they can regard the episode as a 'warning'. Their duration of stay in hospital is usually shorter than that of myocardial infarction patients. When no obvious signs of incapacitating cardiac symptoms are present, these patients are encouraged to resume most of their pre-illness activities within weeks of leaving hospital.

#### 2. Myocardial infarction (MI)

If the blood supply to an area of the heart muscle fails

altogether (due to a blocking of a coronary blood vessle) and no alternative blood supply is available, that area of the heart muscle dies. This episode is diagnosed as myocardial infarction.

Patients diagnosed as suffering from MI, are usually informed that they have had a 'heart attack' and that their heart has been damaged. Their recovery and rehabilitation process is more gradual and lengthy than that of myocardial ischaemia patients.

Of the various types of CHD, myocardial infarction presents the most well-defined picture. It is diagnosed on the basis of history, elevation of serum enzymes and typical ECG changes. The treatment is to a great extent uniform in all patients.

Most of the patients in the present sample were diagnosed as myocardial infarction. As it will be seen later, only such patients were selected for the analyses of the data.

#### E. Summary

The coronary arteries are the blood vessels supplying blood to the heart muscle. A coronary heart disease (CHD) is a cardiac disability arising from a reduction or arrest of blood supply to the heart muscle. The pathological process underlying CHD is that of atherosclerosis which is an accumulation of fatty deposits on the walls of the coronary arteries. This causes a narrowing of the coronary bore and a restriction in blood supply to the heart muscle. The two types of CHD experienced by patients in the sample were: a. myocardical isachaemia in which the problem is mainly that of shortage of

blood supply to the heart muscle without any tissue damage, and
b. myocardial infarction in which a death of heart muscle tissue
occurred as a result of a complete blockage of its blood supply.

#### CHAPTER 2:

#### Review of the literature

A. Medical opinion regarding mobilization and rehabilitation after CHD

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- B. The Prognosis of CHD patients
- C. Summary

## A. Medical opinion regarding mobilization and rehabilitation after CHD

A vast number of papers published over the last twenty
Years shows little controversy regarding these matters amongst
Cardiologists. It appears that there is a common agreement on
two major points:

- 1. In uncomplicated cases, during convalescence, a complete bed rest is harmful and therefore mobilization and physical activity should begin as early as possible (after 4-5 days of bed rest).
- 2. In most cases, after recovery and convalescence have been completed, patients should resume their normal life, and return to work.

#### 1. Early mobilization

Only twenty or thirty years ago it was common for heart patients to spend weeks or even months in complete bed rest with severe restrictions on body movements. They were not allowed to carry out, independently, simple activities such as taking food, shaving or sitting up. Nowadays it is usual for most patients to be mobile within twelve or fourteen days of the illness.

It was in the early fifties that adverse effects of bed rest were recognised by cardiologists. S.A. Levine (1951) and his associates enhanced this recognition when they produced clinical and psychological evidence to show that strict prolonged bed rest was deleterious to patients with congestive heart failure and acute coronary thrombosis. They explained that if

heart failure was present the heart obtained more rest with the patient in a chair than when he is lying in bed. The results of their method of treatment (of placing the patients in chairs for varying and increasing periods of time beginning not later than the first week of the attack) seemed encouraging and appeared to have both physical and psychological advantages over the strict bed-rest method of treatment.

This view was widely accepted and consistently supported by other authors. In 1950 (Panel discussion) it was claimed that exercise within the limits of any abnormal symptoms increases the cardiac reserve (the heart's capacity to fulfil its function under increasing demand). Arnott (1954) warned that unjustified bed rest prescription may be harmful and lead to addiction. It also causes profound metabolic changes. Similar views were expressed by Bedwith (1954), Coe (1954), White and Rusk (1958), Hellerstein (1960) and others.

It appears that today the strict prolonged bed rest has been abandandoned and early mobilization programmes are adopted instead. A clear indication of this approach is given in a book published by the International Society of Cardiology (Myocardial Infarction, 1973) in which it is advocated that measures to counteract the adverse effects of bed rest and immobilization should be taken as soon as the patient's clinical condition permits. Recommendations for a mobilization programme during the early stages of the illness are put forward. The convalescence period is divided into seven stages in which physical activity is gradually increased from limited limb movements, breathing and relaxation exercises, using the commode,

shaver and toothbrush and eating sitting up in bed in the first stage to walking in the corridor, climbing a flight of stairs and walking out of doors, in the seventh stage. It is expected that the progress and timing from one stage to another will vary from patient to patient, from physician to physician and from country to country, but nowadays somewhere between three and five weeks will be the average period between the beginning and the end of the programme for non-incapacitated patients.

#### 2. Restoration of normal life and return to work

It seems that physicians in general agree that cardiac patients can and should return to work (Med. J. Aus; 1963; B.M.J., 1964; Bastiaans, 1968). There is a large body of evidence suggesting that work in general is not only harmless for the post-coronary patient but also beneficial. As indicated by White (1958) ideas of this kind were expressed as early as 1921. Brown (1954) explains that if the person remains active, the development of the collateral circulation is assisted by the increased blood flow which accompanies effort, whereas it is probably hindered by the stagnating blood flow of ill-advised rest. Many studies have shown that the survival rate and the progress made by patients who resume employment are as good as or even better than those of patients who do not return to work. For example: Hellerstein, 1957; Sharland, 1964; W.H.O., 1967.

Follow-ups of heart patients who resumed work show that their job performance is at least as good as that of comparable 'normal' workers (Goldwater, 1960), that they perform successfully in a wide variety of jobs (Rosenbaum, 1959), that their

time record, work reports and eagerness to work are not worse than those of others (Klein, 1956), and that they work safely even at high levels of heat, stress and energy espenditure (Hellerstein, 1959). It has also been shown that from a psychological point of view the post coronary patient is better off at work where he is happier and relieved of the dangers of boredom and frustration (Master, 1961). In almost all cases the satisfaction restoration of self-respect and relief of financial worry, which are the results of the return to work, outweigh any deterimental emotional stress associated with the job (Hellerstein, 1957).

Cardiologists agree that coronary patients not only can and should return to work — but also that they should do so as early as possible (Durbin, 1956; Sigler, 1967). W.H.O., (1964, 1967) recommend that resumption of work should begin within three months of the acute episode. The International Society of Cardiology (Myocardial Infarction, 1973) guidelines for the continuation of rehabilitation after convalescence has been completed, are as follows:

"Having now reached the stage of walking and perhaps
climbing a flight of stairs, the patient should be encouraged
to return progressively to ordinary daily living activities over
the next three to four weeks without subjecting the recovering
heart to more than about 40% of maximum energy expenditure....
Then (between six to ten weeks following the initial illness)
progressive physical conditioning, permitting higher cardiac
energy expenditure, is aimed at restoring the patient's level
of physical fitness and return to an active way of life.... Return

to work should be possible two to three and a half months after the onset of the infarction, depending to some extent on the physical capacity of the patient, on his psychological recovery and on the strenuousness of his job. If at all possible there should be an acclimatization phase of light work, again depending on the patient's fitness and the kind of work. Should his work involve intermittent high energy expenditure, special arrangements may have to made for him to be excused these, at least for a time!"

(P. 283).

Whilst there is no shortage of evidence regarding the ability of cardiac patients to resume work, little research has been reported of other aspects of the rehabilitation. interesting that in a review of 33 cardiology textbooks less than 1000 words referring to sexual activity and heart disease Even the Journal of Rehabilitation's extensive 40-article review on coronary management failed to discuss sexual activity (Hellerstein, 1969). In view of its important role in life, sexual activity has recently been the subject of a number of studies. Ueno (1963) found that coition death accounted for 0.6% of endogenous sudden deaths (34 of 5559 cases). Death was due to heart disease in half of the 34 cases and occured most commonly during or after extramarital intercourse (80%). Hellerstein (1970) on the basis of extensive investigations, Concluded that 80% of post-coronary patients could fulfil the physiologic demands of a majority of jobs and of sexual activity Without symptoms or evidence of significant strain. Furthermore, it is argued that most activities can be performed even in the presence of abnormal responses since ECG monitoring studies of CHD patients revealed that the caloric demands and heart rate Costs of sexual activity and of modern industrial jobs were

comparable to those of walking or stair-climbing. Nemec (1976) found no difference in heart rate or blood pressure responses of healthy males during sexual intercourse in two different positions (male on top (MOT) as opposed to male on bottom (MOB). It was therefore concluded that there was no physiologic basis for advising cardiac patients to utilize the MOB position during sexual intercourse.

#### B. The prognosis of CHD patients

## 1. General statistics of death rate and life expectancy of survivors

Coronary heart disease (CHD) is now responsible for one third to one half of all deaths in most developed countries. The impact is increasing in young men. In 1950 33 males and 8 females per 100,000 population'in England and Wales between the ages of 35 and 44 died of CHD. In 1971 these figures were 67 and 9 respectively. (DHSS report on health and social subjects No. 7. Diet and coronary heart disease). Up to 25% of first heart attacks end fatally in a few hours and about a third of the total end fatally in a few weeks. Those who recover from a first heart attack have a markedly reduced life expectancy, death often being sudden and due to a recurrent Coronary episode (Myocardial infarction, 1973). Of those who survive the acute illness, about 90% live at least one year (Master, 1961; Hinohara, 1970), 70% live at least five years (Richards, 1956; Dimond, 1961) and about 50% live at least ten Years (Weiss, 1951; Sigler, 1967).

#### 2. Rehabilitation

#### A. Return to work

The most extensively studied aspects of rehabilitation of Coronary heart disease is the rate of return to work of male patients. The numerous research findings indicate that about 50% resume work within four months (Nagle, 1971), 80% within six months (Groden, 1971; Kellerman, 1968) and up to 90% resume work within a year of the illness (Biorck, 1964; Eisher, 1970).

Owing to a lack of information it is not known, in patients who resume work, the degree to which their pre-illness level of physical activity, mental load and responsibility or the daily number of hours at work, are resumed.

## D. Restoration of the pre-illness level of activity in other areas of life

Although the concept of rehabilitation is not restricted to resumption of work but covers a much wider field, very few studies have investigated the effects of the difficulties associated with measurements and comparisons of social or domestic activities due to individual differences.

From the few reports available it appears that various leisure activities are, at least initially, affected by the illness. Inability to resume or suitably modify or find alternatives to premorbid leisure activities was observed in 53 out of 113 post MI patients three months following their illness (Martin, 1967). When compared with other patients, cardiac patients had a greater tendency to report that the illness had had a deleterious effect on their sex life and on their

outlook on life. However, family life was felt to be more harmonious and they tended to increase their participation in and concern with religious activities (O'Leary, 1968). Klein (1965) reports that only 5 out of 20 patients resumed sexual activity after MI. Of the remaining 15, 8 decreased their activity and 7 reported a complete abstinence. Bloch (1975) reports a decrease in the monthly frequency of sexual intercourse from 5.2 prior to the illness to 2.7 eleven months after the illness in a sample of 100 MI patients. Almost all his patients resumed normal life otherwise (89% had returned to work).

#### C. Summary

There seems to be little controversy among cardiologists with regard to mobilization and rehabilitation after CHD. It is accepted that mobilization and physical activity should commence, in most cases, within 4-5 days of the onset of the illness. In most cases, patients should restore their pre-illness normal life and return to work within thme months of the illness.

half of all deaths in most developed countries. Up to 25% of first heart attacks end fatally in a few hours and about a third die in a few weeks. 90% of those who survive the acute stage live at least one year, 70% live at least five years and 50% live at least ten years. Of those who survive only 50% resume work within four months, 80% within six months and up to 90% within a year of the illness. There is not much statistical information about resumption of other pre-illness activities but it appears that sexual activity and other leisure activities are substantially reduced. It can be concluded that the rate

in which work and other activities are resumed is considerably lower than what is expected by cardiologists.

#### CHAPTER 3:

#### Review of the literature

## Factors affecting rehabilitation - Theoretical considerations

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- A. Medical factors
- B. Social and Occupational factors
- C. Psychological factors
- D. Summary

#### Factors affecting rehabilitation - Theoretical considerations

The extent to which a person will resume his pre-morbid level of functioning following a CHD is thought to be determined in a multifactorial fashion. The various factors thought to be involved can be classified into three major groups:

- A. Medical factors.
- B. Social and Occupational factors.
- C. Psychological factors.

The first two groups are briefly referred to below. The main objective of this discussion is to review the theoretical basis for formulating hypotheses regarding the function of the psychological variables in the rehabilitation process.

#### A. Medical factors

It is commonly accepted in medicine that most people surviving a coronary heart disease should reach a level of recovery that will enable them to resume their pre-illness activities (Hellerstein, 1970). However, it is known that some Patients experience extensive cardiac damage and/or are incapacitated by cardiac symptoms of angina (chest pain) and dyspnoea (breathlessness).

Therefore, it can be concluded that when cardiac rehabilitation is investigated as a dependent variable, effects of the severity of the cardiac damaged and cardiac symptoms should be taken into account. These factors can be expected to set the limits for both the speed of recovery and the level of restoration of pre-illness activities. However, the actual level of rehabilitation and the

speed in which it will be achieved depend on the operation of other factors and the ways in which they interact.

#### B. Social and Occupational factors

This group includes aspects of the patient's occupation, financial commitments, age and other socio-economic variables. It can be argued, for instance, that the older the patient, the less likely he is to return to work. Similarly, it can be hypothesized that patients with unstable occupational histories and patients in heavy manual occupations would be less likely and slower to resume work than others.

#### C. Psychological factors

Recognising the stress-inducing elements of CHD, many authors tend to view psychological factors, related to ability to cope with stress, as major determinants of the degree to which restoration of pre-illness activities will be achieved.

The definition of stress seems to differ amongst various authors investigating the subject. Selye (1936) defined stress mainly as the bodily changes evoked in response to stressful stimuli. Lazarus (1969) on the other hand emphasized cognitive rather than physiological factors. He maintains that degree of stress would mainly depend on the appraisal of threat by the individual. Rees (1976) sees the stimulus or the change in the environment as the major determinant of the degree of stress. However, it seems highly likely that the experience of CHD, which is a major upsetting physiological change and a serious threat to life, would be regarded by any of the above definitions

as a stressful experience requiring high level of coping behaviour.

Furthermore, the stress associated with a heart attack extends beyond the acute onset of the symptoms. The possibility of recurrence is a permanent threat to every person surviving this illness. It can be expected, therefore, that cognitive factors will play a significant role in determining the ways of coping with the illness.

One of the earliest demonstrations of the importance of Cognitive factors in determining emotional experiences of persons was made by Schachter and Singer (1962). They showed that the specific emotion experienced by a person depends not only upon his state of physiological arousal, but also on the way in which he interprets and labels this state. The labeling process itself was found to be influenced by what the person attributes as being the origin of this arousal. These findings stimulated further research into the relationships between cognitive, attributional factors and reactions to stress. In a series of studies (Lazarus, R., and Alfert, 1964; Speisman et al., 1964; Lazarus R., Opton, Nomikos and Rankin, 1965) it was shown how direct manipulation of subjects' cognitive processes by varying the information about a stimulus, may affect its assessment and in turn its impact on people. It was found that the same potentially disturbing film produces different degrees of emotional disturbances, depending on how it is interpreted. Stress reaction (measured by physiological responses and verbal report) was reduced by providing information that suggested that an operation that was part of a primitive initiation ceremony which subjects Watched on film was enacted rather than real. On the other hand

stress reaction was enhanced by information that emphasized the harm inflicted by the observed operation.

The influence of cognitive factors on the experience and Control of stress has been further emphasized on recent studies (Appley and Trumbull, 1967; McGrath, 1970). Arnold (1970) expresses her view of the cognitive processes of appraisal by stating:

"In interpreting a situation we do not merely know it is here and now... nor do we ascribe a vague cognitive 'meaning' to it. We remember what has happened to us in the past, how this thing affected us and what we did about it. Then we imagine how it will affect us this time and estimate whether it will be harmful." (p174).

This view is consistent with that of others (Lazarus R., Averill, and Opton, 1970; Glass and Singer, 1972). They all agree that subjects react in widely different — and sometimes even opposite — ways to stimuli which are objectively 'the same'.

In addition to the appraisal of threat there are other factors considered to influence reaction to stress. Lazarus (1966) maintains that reaction to threat depends to a great extent on certain personality characteristics of the individual.

It is unfortunate that most research into determinants of the reaction to stress has maily been limited to laboratory situations. There is little empirical data concerning behaviour under real stressful conditions. This evidence is particularly lacking in the field of cardiac rehabilitation. However, a

few attempts to provide theoretical models for illness behaviour in general have been made. Lipowski (1970). for instance, views the concept of coping as central in the psychological response to illness. He defines coping by combining two different definitions. One is psychological (Lazarus, 1966) according to which coping is mainly a strategy of dealing with threat. The other is sociological (Mechanic, 1968), according to which coping is "... the instrument behaviour and problem solving capacities of persons meeting life demands and goals. It involves the application of skills, techniques and knowledge, that a person has acquired." According to Mechanic physical illness or disability can be conceived of as a form of Psychological stress involving threat of suffering and losses. It also calls for adaptation tasks, challenges and goals to be achieved where success may lead to psychological growth. in which the source of threat is internal simultaneously imposes tasks to be dealt with and impairs to some extent the ability to meet life demands and achieve goals. Therefore, coping with illness should involve aspects of both definitions. Dealing With pain and physical restrictions on the one hand (threat) and With tasks and goals on the other. This analysis leads Lipowski to form a third definition of coping with illness that combines both Lazarus's and Mechanic's aspects. Lipowski's definition of coping with illness is as follows: "All cognitive and motor activities which a sick person employs to preserve his bodily and psychic integrity, to recover reversibly impaired functions and compensate to the limit, for any irreversible impairment." He then explains the reaction to illness in terms of coping styles and coping strategies. Coping styles are defined as relatively enduring dispositions related to cognitive and motor modes of Coping. Coping strategies are techniques of dealing with

exigencies of illness. They are the outcome of both the individual's coping styles and the given constellation of situational factors. The determinants of coping styles are classified into three groups:

<u>Intrapersonal factors</u> - age, personality, intelligence, values, beliefs.

<u>Disease related factors</u> - type, location, degree of reversibility. <u>Environmental factors</u> - social and situational effects.

The various combinations of these factors will produce different coping strategies (the most prevalent ones are presented by Lipowski) which in turn will determine the degree of success of the rehabilitation process.

The above analysis refers to the concept of coping with illness in general. The arguments regarding the determinants of coping styles and coping strategies and the relationship between them have still to receive empirical support. Whether or not this model can be useful in the understanding of behaviour following CHD remains to be seen. So far, no research has been reported in which the association between specific coping styles and level of rehabilitation have been investigated.

Physicians are commonly considered to have a key role in affecting patient's attitudes towards illness and rehabilitation. It is believed that physicians, by taking the correct action, should have the ability to affect the patient's reaction to his illness in a way that will prevent unnecessary invalidism. By a sympathetic approach, understanding, reassurance and guidance, physicians should be able to eliminate ambiguity, to destroy misconceptions created by incorrect beliefs and attitudes, and thus relieve those psychological reactions of fear and depression

that are considered to be responsible for unnecessary invalidism (Bellak, 1952; Nodine, 1962; Schecter, 1967). This assumption which is generalised to other diseases is made on the basis of the high prestige and power related to the role of physicians in our society, on the one hand, and on the particular needs and beliefs of patients on the other.

It may well be that explanations of the nature of the illness and reassurance about prognosis given to the CHD patients in hospital will contribute to the relief of unnecessary ambiguity and anxiety. However, there is no empirical evidence With regard to this subject. The relative effectiveness of different approaches to ensure understanding of and compliance With instructions given by doctors to CHD patients have not yet been systematically studied. The relative importance of the roles of the hospital cardiologist, nursing staff and the General Practitioner in directing the post coronary patients towards a constructive behaviour and preventing unnecessary invalidism has also yet to be established. Evidence on these matters is particularly important in view of the fact that Communication between doctors and patients, despite its extreme importance, is often distorted and misinterpreted (Ley and Spelman, 1967).

Various authors have used psychoanalytic terms in their descriptions of the psychological aspects of coping with illness. An initial reaction of fear of death is considered to be natural and to occur in almost every patient. It only becomes pathological when it persists over a long period of time after recovery from the physiological disorder has been achieved. A pathological reaction is thought to consist of prolonged anxiety,

depression, and excessive operation of defence mechanisms, (King, 1962; Gordon, 1966; Schecter, 1967). Another characteristic of the reaction occuring in adults afflicted by an incapacitating illness is regression, (Braceland, 1966). Lederer (1962) describes a process of regression characterised by egocentricity, constriction of interests, emotional dependency and hypochondriasis, and exaggerated concern with the self and the functions of the body and seeking of emotional support from others. This dependence and regression may continue after recovery and lead to an objection to return to normal life and meet the duties of a healthy person. Segal and Likoff (1962) refer specifically to the cardiac patient when they say that "an unconscious urge exists to return to a state of early childhood in which there is no responsibility - the patient regresses to infantile habits, particularly in eating, speech Control, restlessness and insomnia." They maintain that some degree of dependence would be inevitable especially in the early stages of the illness, when the patient is restricted to bed. But when these reactions are sufficiently intense and persist over a long period of time, they interfere with the recovery process and may prevent the restoration of normal life.

Bellak (1952) distinguishes between five forms of reactions to disease. a) A normal reaction: this implies some anxiety, some depression, which very soon decreases to a concern approximately commensurate with the organic illness. b) An avoidance reaction: manifestly unpreturbed, denial of illness, with overactively false gaiety; probably will soon turn into a depression, anxiety or self-harm, by disobedience of medical instructions. c) Reactive depression; prolonged depression, hypochondriasis in a person manifestly relatively well adjusted University.

prior to organic difficulty. d) Channeling of all previous existing anxiety of a rather disturbed person into the new groove of concern; this may sometimes cause the patient to give up more diffuse manifestations of disturbance and cause them to appear more tractable. e) psychological invalidism: this exists when a person who is on the whole physically well enough to function occupationally and socially, has fears or symptoms or attitudes which make him an invalid.

Apart from the ambiguity associated with Freudian terms of the kind mentioned above ('Unconscious,' 'repression,' 'denial,' etc) there seem to be no findings of systematic research in support of the various predictions. Although there is some empirical evidence that shows that some CHD patients report experiencing fear of death and recurrence and some tend to conceal their fears at the early stages of the illness, it is not known how these reactions are associated with the rehabilitation process. In fact, no well designed study of a sufficiently large sample has yet been reported, in which regression, overdependence or any of the other reactions mentioned above were systematically measured. Nor has it been shown how do these reactions influence the process of rehabilitation.

Personality characteristics, as mentioned earlier, are also considered to play an important role in determining the reaction to stress. Unfortunately, these were studied in Connection with laboratory research of human reactions under Various stressful conditions. They have not been systematically examined in relation to illness behaviour, in particular in relation to cardiac rehabilitation. However, it seems that there is no shortage of speculative predictions regarding the ways

in which they operate. Bellak (1952) argues that the more neurotic the person was before, the more pathologic will be the reaction to disease. In the case of CHD he expects that anxiety provoking dyspnoea and angina, and the enforced restriction of activity, will be dealt with differently by different individuals. The dependent, passive person will give in. The aggressive individual may be defiant and endanger himself.

Braceland (1966) maintains that most people will react
Constructively to cardiac illness. The initial anxiety will
abate as the physical conditions improve, they will soon adjust
to their new reality, accept their limitations and make suitable
adjustments. After the initial period of crisis they will return
to adequate social and occupational functioning with little or
no psychiatric or rehabilitative problems. However, a pathological reaction with prolonged psychiatric problems can be expected
in patients with dependent personalities, patients with tendiencies
to depression and with neurotic personality.

Klerman (1962) claims that people have a limited capacity to deal with stressful situations. When this is exceeded, symptoms of acute disorder can be observed. When the stress is over or when the person is removed from the stressful situation, depending on the stability and strength of his personality, the symptoms will either disappear or continue to interfere with normal behaviour. His examples are mainly drawn from reactions of soldiers in combat conditions but he argues that there is a similarity in reactions to surgical operations and severe illnesses.

personality characteristics and patterns of response to CHD, has yet been reported. It is impossible to draw valid conclusions regarding these personality characteristics that predispose a person to develop a pathological, unconstructive reaction to CHD.

In summary, it may be concluded that the above theoretical views regarding the role of psychological factors in cardiac rehabilitation are useful in stimulating research, and in drawing attention to potentially important variables. However, they can not be accepted as valid explanations of the rehabilitation process without the support of empirical evidence of well designed studies.

The literature providing information regarding factors affecting rehabilitation of CHD patients is reviewed in the next chapter.

#### Summary

The extent to which a person will resume his premorbid level of functioning following a CHD is thought to be determined in a multifactorial fashion. The various factors thought to be involved can be classified into three major groups:

- a. Medical factors.
- b. Social and Occupational factors.
- c. Psychological factors.

Theoretical considerations regarding the role of each of
the three groups have been reviewed. A particular emphasis was
put on the group of psychological factors. Theoretical accounts
for the operation of these (psychological) factors are based
On work in several fields. Cognitive elements have been stressed
in studies of human behaviour under stress. The concept of
Coping has been emphasized in works concerned with illness
behaviour. These works have also drawn attention to the influence
Of personality characteristics, the operation of various
defence mechanisms and the role of physicians. It was concluded
that although the theoretical views regarding the role of
psychological factors may be useful in stimulating research and
in drawing attention to potentially important variables, they
Can not be accepted as valid without the support of empirical
evidence of well designed studies.

### CHAPTER 4:

## Review of the literature

### Factors affecting rehabilitation - studies and reports

) - Commence of the first first discussions have been

- A. Summary of findings
- B. Critical review of the literature
- C. Conclusions
- D. Summary

Information regarding variables considered to influence the rehabilitation process of CHD patients can be obtained from four major sources. The first consists of reports published from Cardiac Rehabilitation Centres. The second source are follow-up studies conducted by cardiologists on patients discharged from their hospitals. The third consists of research reports and various publications of psychiatrists or other social scientists and the fourth group consists of reports of various expert Committees and review and discussion articles.

### A. Summary of findings.

The literature derived from the above four sources has been reviewed. The variables considered by authors in the four groups to influence cardiac rehabilitation are summarised below. The review covers publications between 1935 and 1976. It is stressed that the fact that a particular variable is presented below does not indicate that it has been accepted by the author as a valid representation of reality. It merely means that other authors have considered it to influence the rehabilitation corse. Indeed, the summary is followed by a critical assessment of reports in each of the four groups with the aim of determining the degree to which their conclusions Concerning the influence of psychological variables are valid.

## 1. Effect of medical factors

Extensive cardiac damage, cardiovascular complications and incapacitating symptoms of angina and dysphoea have been reported by many authors to have an adverse effect on the course of rehabilitation (Kaufman, 1954; Kaufman, 1955; Bellak and

Haselkorn, 1956; Weiss, 1958; Hellerstein, 1959; Biorck, 1964; Johansen, 1965; Weinblatt, 1966; W.H.O., 1967; Miller, 1969). However, some disagreement with this view has been expressed in: B.M.J., 1956; Gelfand, 1960; Sharland, 1964; W.H.O., 1965; Eisher, 1970.

### 2. Effects of Social and Occupational factors

#### Age

The view that the older the patient the lesser the likelihood of resuming work and other activities is shared by many authors (Kaufman, 1954; Weiss, 1958; Hellerstein, 1959; Johansen, 1965; W.H.O., 1965; Spelman, 1966; Weinblatt, 1966; Sigler, 1967; Miller, 1969; Eisher, 1970; Nemec, 1975).

### Educational background and socioeconomic status

There is a great deal of controversy regarding the association between these variables and the rehabilitation process.

Some authors (Bellak, 1956; Hellerstein, 1959; Rosenbaum, 1959)

maintain that patients from poor educational backgrounds and low socio economic groups are more likely to fail or delay their return to work, than those in higher classes. Others suggest that there is no association between these factors and the rehabilitation process (Sharland, 1964; Eisher, 1970).

### Type of Occupation

Although various authors express the view that patients in sedentary occupations are more likely to resume work without undue delay (Kaufman, 1954; Kaufman, 1955; Weiss, 1958; Johansen, 1965; Weinblatt, 1966; Sigler, 1967; W.H.O., 1967; Eisher, 1970; Goodman, 1972; Myocardial Infarction, 1973), this was not found to be so by Sharland, (1964).

### Occupational record

It is commonly considered that patients with stable occupational histories are more likely to return to work without delay than patients with unstable occupational histories (Bellak, and Haselkorn, 1956; Hellerstein, 1959; Rosenbaum, 1959; Gelfand, 1960).

### Transport to and from work

It is expected that patients who have suitable transport Would be more likely to resume work without delay, than patients Without such arrangements. (Mulchay, 1970).

## Employers reluctance to employ heart patients and the state of the labour market

Unfavourable attitudes of employers and unemployment are expected to make it difficult for CHD patients to obtain suitable jobs. (Kaufman, 1954; Kaufman, 1955; Hellerstein, 1959; Miller, 1969).

## Financial difficulties or benefits associated with prolonged invalidism

It is expected that early resumption of work would be facilitated by financial difficulties resulting from prolonged unemployment or inhibited by benefits from sick payment benefits or insurance schemes. (Kaufman, 1954; Kaufman, 1955; Weiss, 1958; White et al, 1958; Hellerstein, 1959; Gelfand, 1960; Goldwater, 1960; Seldon, 1963; W.H.O., 1967; Miller, 1969).

## 3. Effect of Psychological factors

Fear of death and fear of recurrence are considered by many authors to be the major psychological reasons for delay

or failure in resuming work and other pre-illness activities (Circulation, 1951; Hellerstein, 1954; Kaufman, 1954; Master, 1954; Kaufman, 1955; Aldes, 1958; Weiss, 1958; White et al, 1958; Hellerstein, 1959; Clark, 1960; Goldwater, 1960; Goble, 1963; Med. J. Aus., 1963; Johansen, 1965; Klein, 1965; W.H.O., 1965; Groden, 1967; Wynn, 1967; Boujoff, 1968; O'Leary, 1968; Miller, 1969; Eisher, 1970; Josten, 1970; Seldon, 1963; Hay, 1970; Hinghara, 1970; Mulchay, 1970; Wishnie, 1971; Myocardial Infarction, 1973). The variables expected to determine the extent of the psychological disability are:

Fallacies, misconceptions and widespread folklore regarding
the prognosis of heart patients

(Master, 1954; Goldwater, 1960; Goble, 1963; W.H.O., 1967; Wynn, 1967; Boujoff, 1968; Miller, 1969).

Spol-ser 1966 Wardland 1969 Barry Lauren 195

(Spelman, 1966; Mordkoff, 1969; Berg-Larsen, 1970; Josten, 1970).

Failure of medical and nursing staff to provide adequate

reassurance and quidance to patients and their families

(Reiser, 1951; Hellerstein, 1959; Kaufman, 1954; Master, 1954;

Kaufman, 1955; Hellerstein, 1959; White et al, 1958; Gelfand,

1960; Goldwater, 1960; Seldon, 1963; Klein, 1965; Wincott, 1966;

Groden, 1967; W.H.O., 1967; Wynn, 1967; Boujoff, 1968; Croog,

1969; Miller, 1969).

## B. Critical review of the literature

Although Medical and Social and Occupational factors are considered to influence the rehabilitation process, the major aim of this review is the assessment of the validity of statements made with regard to the effects of psychological factors, in the reports referred to above.

It is commonly accepted that scientific studies should meet a number of methodological criteria in order to lead to valid conclusions. Although some of these criteria will vary from study to study, there are a few basic principles that are usually expected to be followed in any research. Firstly, the sample has to be clearly defined so that it is possible to specify the population to which conclusions could be generalised and also to enable replication of the study. Secondly, dependent and independent variables should be defined and hypotheses or questions regarding relationships between them should be made. That will specify the objectives of the study. Thirdly, an explicit and accurate report of the methods by which assessments of the variables involved were made should be given. That will enable independent assessment of the validity and reliability of the measurements and also a replication of the study. Finally, conclusions regarding relationships between dependent and independent variables should be made on the basis of appropriate analyses of the data collected by means of empirical observations.

The degree to which these and other, more specific criteria have been met are assessed in the following review of the literature. Table 4.1 summarises research reports of cardiac rehabilitation centres, cardiologists and social scientists in terms of their conclusions regarding the influence of psychological factors and in terms of their major methodological deficiencies. Reports of experts committees and discussion publications are not included in the table since they cannot be judged against methodological criteria. Four groups of methodological deficiencies are referred to in the table:

Sampling errors. — When samples are small, heterogeneus,

Table 4,1: Conclusions regarding the effects of psychological factors on the rehabilitation process, and methodological deficiencies in research reports

Methodological deficiencies Paychological factors	Sampling deficiencies	Speculative conclusions	Measurement deficiencies	Inadequate control of other relevant variables
Fear of death or rocurrence	Circulation*, 1951; Hellerstein*, 1954; Aldes*, 1958; Clark*, 1960; Gelfand*,1960; Goble*, 1963; Med. J. Aus*, 1963; Seldon*, 1963; Klein***, 1965; Wynn*, 1967, Wishnie***, 1971.	Master**, 1954; Goble*, 1963; Seldon*, 1963; Johansen**, 1965; Groden**, 1967; Wynn*, 1967; C'Leary**, 1968; Eisher**, 1970; Hay**, 1970; Hinohara**, 1970; Nulchay**, 1970	Master**, 1954; Goble*, 1963; Groden**, 1967; Wynn*, 1967; O'Leary**, 1968; Eisher**1970 Josten***, 1970	
Personality characteristics	Mordkoff***, 1968		Mordkoff***, 1968; Berg-Larson***, 1970; Josten***, 1970	Spelman***, 1966; Mordkoff***, 1966; Berg-Larson***,1970
Fallacies and miscon- ceptions regarding prognosis	Goble*, 1963; Wynn*, 1967	Master**, 1954; Goble*, 1963; Wynn*, 1970	Master**, 1954; Goble*, 1963; Wynn*, 1970	
Lack of reassurance and guidance from doctors	Hellerstein*, 1954; Gelfand*,1960; Seldon*, 1963; Klein***, 1965; Wincott***, 1966; Wynn*, 1967	Naster**, 1954; Seldon*, 1963; Groden**, 1967; Wynn*, 1967	Master**, 1954; Wincott**1966 Groden**, 1967; Wynn*, 1967	

<sup>\*</sup> Reports from cardiac rehabilitation centres

<sup>\*\*</sup> Studies carried out by cardiologists

<sup>\*\*\*</sup> Studies carried out by psychologists, psychiatrists and other social scientists

unrepresentative, inadequately described.

<u>Speculative conclusions</u> - when conclusions are made without the support of empirical evidence or without appropriate analyses of empirical data.

Measurement deficiencies — when measurement of psychological variables is done unreliably or when the methods are not described.

Inadequate control of other relevant variables — when possible effects of medical or social and occupational variables have not been taken into account in the research procedure or in the Conclusions. Studies which have satisfied these four major methodological criteria have not been included in this summary table.

Each of the four major sources of information is now examined separately with a particular emphasis on the validity of their conclusions regarding the influence of psychological variables on the rehabilitation course.

### 1. Reports from Cardiac Rehabilitation Centres (CRC)

Most CRC studies of factors affecting cardiac rehabilitation are reported from Australia and the U.S.A. Information provided by CRC studies has been widely used by expert committees of the World Health Organization (WHO) and by other international bodies dealing with cardiac rehabilitation, as a basis for conclusions and recommendations. It is therefore important that the research methods employed in CRC's should be critically reviewed. Reports of this kind published between 1951 and 1970 have been reviewed here. These were selected since they have been repeatedly referred to in the literature as sources of information regarding factors affecting cardiac rehabilitation.

The main objective of CRC's is to assist cardiac patients in resuming employment. Research carried out in these centres concentrates on two main points:

- a. Establishing the degree of their effectiveness by followup studies which provide information about the proportion of Patients who have been successfully resettled.
- b. Attempting to discover why patients had failed to resume work.

Most CRC's operate in similar ways. Patients are usually referred to them between six months and a few years after leaving hospital, when they fail to benefit from standard medical measures and their rehabilitation requires organised, comprehensive care of a type not otherwise available in the community. Referrals to CRC's are usually made by G.P.'s, hospital specialists or patients themselves.

On admission to the CRC patients go through a series of interviews aimed at determining in what way their management had failed prior to their attending the centre. This procedure also involves retrospective exploration of medical, social, industrial and domestic problems. The staff involved in the Collection of this information consists of representatives of Various disciplines, including physicians, nurses, social Workers, employment officers and others.

On the basis of this information the degree of employability of each patient is determined and a course of treatment is selected. This usually includes supervised physical exercise, occupational therapy and verbal reassurance and encouragement

to increase activity. This information is also used as the basis for conclusions regarding factors that affect the rehabilitation process.

Most CRC studies appear to reach similar conclusions.

- a. They generally agree that most patients referred to them are employable.
- b. They find that the most common reasons for unsuccessful rehabilitation are: physical disability due to cardiovascular disfunction and psychological disability mainly in the form of anxiety.
- Solution Successive Suming work after treatment) are between 50% and 70%.

There are a number of major deficiencies (listed below) shared by most studies conducted in CRC's. Some of them can be corrected by a more careful and accurate methodology, others can hardly be avoided.

### Curable deficiencies

- a. The samples in these studies, although usually large, are often highly hetrogeneous. They consist of patients of both sexes, of various types of cardiac illness, and various medical histories. Amongst the studies reviewed here, the following suffered from this deficiency: Circulation, 1951; Aldes, 1958; Goble, 1963; Seldon, 1963.
- b. The data collection procedures are reported in general terms but in most cases it is impossible to determine how the Variables were assessed. (In particular the psychological ones).

This deficiency was noticed in the following reports: Aldes, 1958; Gelfand, 1960; Goble, 1963; Med. J. Aus., 1963; Wynn, 1967.

Goble (1963) for example, argues that in 60 patients the reason for unemployment was a psychological disability. It is not, however, stated how this disability was measured and how the degree of disabling anxiety was assessed. Although it is often reported that a number of people were involved in the collection of data and interviewing the patients, it is not stated what was the degree of agreement among these judges regarding the assessments they made. Under these conditions it would be impossible to evaluate the validity of the measurements made or to replicate the studies.

Firm conclusions are drawn without the support of empirical This deficiency was noticed in the following studies: Clark, 1960; Goble, 1963; Seldon, 1963; Wynn, 1967. For example, in one paper (Goble, 1963) it is concluded that "...there is a widespread folklore about heart disease of a frightening and restricting type. All patients are exposed to it and many are receptive to it ... many patients anticipate early and sudden death, consider activity, pain or worry may be further injurious to them. Thus they dare not lift their hands above their heads, walk upstairs, lie on their left side, lift light objects, use their arms or lose their tempers." However, no report is given in the study of figures supporting these statements or of other studies providing figures of this Hence, the reader is unable to assess either the degree to which widespread folklore about heart disease exists or the degree to which it affects the behaviour of patients recovering from a heart illness.

### Incurable deficiencies

- a. According to figures presented earlier most muocardial infarction patients return to work and normal life without any special assistance. Most of these people are not referred to CRC's. Therefore, although CRC's can detect characteristics common to patients who fail to rehabilitate, they usually can not determine the extent to which these characteristics are also common to people who have returned to work and coped with their illness without any special assistance. This deficiency was noticed in 1954 by Hellerstein and was common to all the research reports.
- The high proportion of patients (79%) who are regarded as employable when assessed in CRC's could also be to some extent a result of a sampling artifact. Since patients are normally referred to CRC's by hospital out-patient clinics and Genreal Practitioners and in many cases following their own request, it could be expected that some early selection is made by these referrals. In most cases, those patients who show clear symptoms of poor cardiac output or severe dyspnoea and angina and are considered to be incapable of taking a rehabilitation Course are not referred to CRC's at all. That leaves the CRC to deal with a greater proportion of employable people amongst their population of patients. Thus it may be correct to Conclude that most patients referred to CRC's are employable but it would not justify applying this conclusion to the entire population of unsuccessfully rehabilitated patients. This deficiency is also common to all the research reports of CRC's

Patients in CRC's are almost always seen a long time after

their discharge from hospital, on the average, over a year. Information about factors that might have caused unemployment of these patients can only be obtained retrospectively. Therefore, the accuracy of this information depends to a great extent on the memory of the patient himself or of other people. It would be very difficult, using this retrospective method, to obtain reliable information regarding the management of the patients during their stay in hospital. It is also difficult to make a clear distinction between some dependent and independent variables. For example, when it is discovered that a patient whose rehabilitation has been unsuccessful suffers from deep depression, it is impossible to determine whether this depression is a cause or a result of the unsuccessful rehabilitation. This shortcoming was also noticed in all the above research reports.

In conclusion it could be argued that whilst reports coming from CRC's are of a great value in generating ideas regarding factors that affect the rehabilitation process of post coronary patients, these ideas should be thoroughly examined in prospective studies so that failure could be predicted and effective methods for its prevention could be developed.

### 2. Studies carried out by cardiologists

The major objective of studies designed by cardiologists is to collect information about the rate of survival, the rate of return to work and the speed of return to work of MI patients. They also aim at throwing light on factors responsible for delay or failure to return to work. Reports published between 1954 and 1971 which have frequently been referred to in the literature

with regard to effects of psychological factors on the rehabilitation process, have been reviewed here. The methods used were usually of the following pattern: A group of patients well defined in terms of sex, age, diagnosis, premorbid employment status and type of occupation, is followed-up one or more times after discharge from hospital. This provides information regarding rate of survival and rate and speed of return to work. Attempts to explain failure to return to work are based upon a comparison of patients who have resumed work with those who have not on a number of variables.

For many patients failure or delay in return to work are accounted for by variables specified and recorded during and after their stay in hospital. Weinblatt (1966) concludes that the factors responsible for delay or failure to return to work are age, severity of the illness and the amount of physical activity involved in the job. However, other studies find that there are patients whose delay or failure to return to work cannot be explained directly by these factors. Therefore some of them hypothesize about other factors that could provide explanations. Sharland (1964), on the basis of careful analysis concluded that Social class, physical heaviness of the job and the severity of the illness, had failed to distinguish between those who returned to work and those who did not, by six months of the illness. He reports that 16 out of 28 patients who failed to resume work by six months complained of chest pain and dyspnoea in addition to suffering from varying degrees of psychological symptoms and personality difficulties. Neither psychological symptoms' nor 'personality difficulties' were defined, but the author emphasises that the role of psychological Stresses had not been considered as it was not possible to measure them, and implies that further research is needed. Nagle and Gangola (1971) reviewed 115 patients four months after a MI. They discovered that organic heart disease and non-cardiac factors including anxiety were almost equally responsible for failure to resume work. Anxiety and depression were the commonest non cardiac causes of persistent invalidism. Although no formal psychological testing was carried out the terms anxiety and depression were defined as obvious states of mind which were readily apparent and readily admitted by the patients. The authors maintain that a more accurate psychological measurement should be made in future studies.

However, other authors are not so careful and instead of hypothesizing and pointing out the need for more systematic research, they make firm assertions regarding the role played by psychological and social factors, without specifying their methods of measurement or providing adequate evidence in support. These shortcomings were found in the following Master, 1954; Weiss, 1958; Johansen, 1965; Groden, 1967; O'Leary, 1968; Eisher, 1970; Hay, 1970; Hinohara, 1970; Mulchay, 1970. In one study for example, (Groden, 1967) it is stated that psychological factors and failure to find suitable employment as a result of an infarct explained the non-return to work of six out of a total of nine patients who failed to resume work. However, in one 63 years old fitter, the psychological illness was a severe depression, in another patient Who was a 62 year old coppersmith, the psychological problem was of being a difficult patient on the ward, trucultent, aggressive and querulous. This patient also claimed that he had suffered from breathlessness and chest pain and therefore could not Continue his work. A third 'psychological' patient was a 45 years old alcoholic docker. Obviously, each one of these three cases represents a totally different psychological problem, which would require a different type of treatment. Furthermore, it seems that there were other factors such as age and/or the type of work that made the return to work particularly difficult, irrespective of their psychological problems. This report, as well as being restricted to a small number of patients, is lacking an adequate analysis of the relationships between psychological variables and resumption of work.

Eisher (1970), although presenting an otherwise carefully designed study can serve as another example of the way in which speculations are made regarding the influence of psychological Variables. On the basis of his findings the autor concludes that the best predictor of return to work was age. People who returned to work were younger than those who did not. No relationships were found between the return to work and education, severity of the illness, or medical history. The author then infers that "... the factors which differentiate the groups do not lie so much in the medical aspects, but can be seen only in the social and psychiatric data... future studies on return to work should include psychological factors which may distinguish between the "rapid" (3 months or less) and the "slow" (four months or more) return to work groups." However, the author heither specifies what he means by "social and psychiatric data" nor does he explain why these are the only data that differentiate between patients who return to work and patients who do not. The only comment made in support of this argument is that it is consistent with a study made in a CRC (Gelfand, 1960) Which suffers from inadequacies, and whose conclusions are invalid.

Mulcahy (1970) discovered that only 9 out of 32 patients who delayed their return to work and only 3 out of 12 who failed to return to work were considered to have organic reasons for their prolonged disability. Delay or failure to return to work, he concludes, is related to social or psychological causes. Social causes were considered to be sick payment benefits and discouraging pressures from family members. The psychological factors were described as personality inadequacies and chronic anxiety; neither of these two terms were defined nor were their methods of measurement described. Although these psychological or social factors are reported to have played a role in patients who failed or delayed their return to work, it is not stated to what extent they were present among those patients who did return to work.

Hinohora (1970) attributes the retardation of rehabilitation in 28 cases to anxiety states. He does not however state the age, sex or occupations of these patients, all factors which are in fact reported by the same author to have had a significant effect on the return to work. Nor it is stated to what extent these anxieties were present in patients whose rehabilitation was not retarded. Hay (1970) found no significant correlation between delay in return to work and the severity of the original illness or with subsequent symptoms, concludes that psychological factors play a major role in this respect. His conclusion is to a great extent, based on those of another research (Goble, 1963) which was criticised earlier, rather than on statistical evidence.

It appears that in general, studies in this group satisfy

the methodological criteria with regard to the description of the samples. Their conclusions are based on empirical evidence as long as they concern factors such as age, diagnosis, severity of the illness or type of occupation. However, psychological factors that they refer to, are usually poorly defined, their methods of measurement are not clearly described, and statements regarding their influence on the resumption of work and other premorbid activities are not supported by empirical data.

In summary it could be concluded that the studies in this group are useful as sources of information regarding the rate and the speed in which MI patients return to work. The explanations they offer regarding the factors that influence the rate or return to work can be relied upon as far as factors such as age, education or severity of the illness are concerned. To establish the exact nature and the degree of the effect made by psychological factors on the return to work, more research would be needed.

# 3. Studies carried out by Psychologists, Psychiatrists and other social scientists.

The work carried out by psychologists and psychiatrists in the field of CHD has been primarily concerned with aetiological aspects. Studies have investigated the relationships between the development of CHD and various personality characteristics (Dunbar, 1943), behavioural patterns (Friedman and Rosenman, 1959) or stressful environmental conditions. Despite the Considerable amount of knowledge accumulated in the field, the Controversy is still greater than the agreement.

A secondary area of interest to psychologists and psychiatrists is the early emotional reactions of CHD patients and factors that influence these reactions (Hackett et al, 1969; Karstens et al, 1970). Particular interest has been shown in various manifestations of the operation of defense mechanisms, especially that of denial (Goldstein, 1972). Thus the emotional reaction in these studies is investigated as a dependent variable and therefore they do not provide information about the relative effects of various psychological factors on the subsequent resumption of work and 'normal' life.

To date, little interest has been shown by psychologists, psychiatrists or other social scientists in the psychological aspects of cardiac rehabilitation. The investigation of the effect on the resumption of work and normal life, of various psychological factors such as personality characteristics, perceptions of and attitudes towards the illness, or various early reactions to the illness, has been studied in a systematic manner by very few authors. A review of the studies most frequently referred to in the literature (published between 1967 and 1977) has shown that most of them suffer from serious methodological inadequacies. The samples are far too small and often inappropriately selected (Klein, 1965; Wincott, 1966; Mordkoff, 1968; Berg-Larsen, 1970; Wishnie, 1971), methods of measurement are not adequately described (Wincott, 1966; Mordkoff, 1968; Berg-Larsen, 1970; Josten, 1970), and other relevant factors are not kept under control (Spelman, 1966; Mordkoff, 1968; Berg-Larsen, 1970; Wishnie, 1971).

A few examples that represent typical deficiencies are given below. Wishnie et al (1971) interviewed 24 patients, 6 females and 18 males between the ages of 37 and 74, in order

Amongst other findings they report that 9 out of 11 patients who failed to resume work did so for psychological reasons. It would be difficult to accept this conclusion as valid since a. no comparison is reported on 'psychological variables' between people who did and did not resume work, and b. No report is given of the control of the effects of variables such as age, type of occupation, or occupational record.

In the introduction Berg-Larsen (1970) states that an unsystematic phenomenological approach was made, just so that the author could obtain some subjective experience with the reactions of patients to MI. Eleven patients were interviewed in an unstructured manner, they were males aged between 40 It is reported that restricted aggression was obvious in ten patients and six had strong traits of passive character. However these findings were determined in an entirely subjective manner. Furthermore, amongst other conclusions it is argued that "... The patient's pattern of defense mechanisms is of vital importance to his future adaptability... a life-history focusing on the patient's intrapsychic pattern and his emvironment (in a wide sense) together with observations of his adaptation to reactions in the hospital, gives a good basis for evaluating his future problems, to avoid being totally disabled for life. For some of them it is also a question of survival."

These generalizations lack adequate empirical support and also seem to be inconsistent with the stated purpose of the study (just to obtain some subjective impressions) which leads the reader to expect no more than suggestions for further research.

Klein (1965) gives a report of observations made in 20 MI Patients who were followed-up between three months and four Years after leaving hospital. It was concluded that "..The Cultural meaning of the heart attack was found to be prominently Concerned with fear of sudden death and fear of physical activity". It may be sensible to make a hypothesis of this kind, regarding the cultural meaning of heart attacks. However, it would not be possible to support or refute such a hypothesis on the basis of this study. Not only was the sample too small but it was also unrepresentative of the general population of CHD patients, since the proportion of patients who had never returned to Work (60%) was far greater than that normally reported (10-20%).

Mordkoff (1968) purports to investigate the psychological and personality correlates of mode of adaptation to CHD. 31 patients after MI were divided into three categories, according to the degree of change in their life situation. They were then administered a battery of various personality tests. No report is given as to the severity of the illness, the type of occupations, the time after the illness at which the tests were administered, the age or sex of the patients or their medical or occupational history. No specific reference is made to particular aspects of adjustment, and change is referred to only in general terms. It would be impossible to draw any conclusions on the basis of such a study as to the melative effect of various personality factors on the course of rehabilitation.

Josten, (1970) reports significant correlations between Extraversion, Neuroticism and Angina. It is neither reported When the measures of either angina or Extraversion and Neuroticism were taken, nor does it attempt to correlate these personality dimensions with aspects of rehabilitation, such as return to

In the same paper a report is given of a questionnaire work. (the subject work load) which according to the author, can distinguish between people who will return to work and achieve successful adaptation after MI and patients who will not. questionnaire was administered at follow-up (it is not clear how long after leaving hospital) and its items refer to experiences of the patient in the period following his discharge from hospital. Therefore this device cannot be used for purposes of prediction of the rehabilitation course and its Contribution to the discovery of factors affecting the rehabilitation process is limited. The same author puts forward a model suggesting relationships between the mode of adaptation to CHD and three categories of personality make-up based on combinations of Extraversion and Neuroticism scores. He does not, however, present the statistical analyses from which this model is claimed to have been derived.

In view of these serious methodological deficiencies the Conclusions of most studies can only be regarded as speculative.

However, some studies in this group have met or approximated the basic methodological requirement. Spelman (1966) carried out an investigation to test the influence of psychological and social factors upon the rehabilitation process of patients who have had an attack of coronary thrombosis. 107 patients, 92 males and 15 females, between the ages of 31 and 84 were followed-up. The patients were interviewed in hospital 21 days following admission, and at home six months later. They were divided into two groups of 'successfully' rehabilitated and 'unsuccessfully' rehabilitated, on the basis of the difference between their description of their activities on an average day a month before and six months after the illness. The

only variables that distinguished between the two groups were age and 'difficulties' resulting from admission to hospital (difficulties were classed as present if the patient, when asked in hospital, said that the admission to hospital caused difficulties in whether his financial, domestic, or work affairs). None of the subscales of form C of Cattell's 16PF questionnaire distinguished between the two groups. However, it was discovered that certain personality factors were of importance in the rehabilitation status achieved by patients with 'difficulties due to admission to hospital'. When 'admission difficulties' were present, patients who were submisive, dependent, depressed, introspective, shy, cold, consciencious, lacking self insight, anxious or hypochondriacal, were less likely to achieve successful rehabilitation than others.

Although in general the major methodological criteria Were met by this study, it is still difficult to draw conclusions regarding the effects of psychological factors since: a. 'admission difficulty' score is not clear. The authors do not state Whether these difficulties are of a long term nature and thus indicate that the patient anticipated an unsuccessful rehabilitation, or whether these are temporary difficulties which exist only during the first period of the illness. b. The measure used for the success of the rehabilitation, although overcoming the difficulty of the patients having had widely different modes of life before their illness, does not distinguish between Patients who had to resume a very active way of life and those Who merely had to continue being inactive, - especially in View of the fact that women and people as old as 84 were included in the sample. Furthermore, this measure does not Provide any information regarding specific aspects of the

rehabilitation process. c. Since the patients were interviewed at home, no medical examination was carried out at follow-up, thus the effect of symptoms was not studied.

Martin (1967) in a prospective investigation of a well defined group of 116 male MI patients concludes that premonitory distress is associated with leisure rehabilitation and attitude rehabilitation but not with work rehabilitation. In another study (Martin, 1967) she reports a significant relationship. between the adequacy of the information given to patients by doctors, and return to work, leisure and attitude rehabilitation, three and six months following the illness. She claims that the main effect of the explanation was in relieving anxiety and ambiguity. She also reports that the quality of information given by the doctor was closely associated with the patient's level of education and type of occupation. The unskilled Patient with limited education tended to be given a less adequate understanding of his illness in comparison with professional classes. It is unfortunate that the author did not investigate this point more thoroughly, since this finding may suggest that work, leisure and attitude rehabilitation were not actually affected by the explanation but rather by the level of education and the type of occupation, especially in view of the fact that people with higher levels of education tend to be in more sedentary and more interesting to go back to, occupations Which might be easier to resume after a heart attack.

Goodman (1972) demonstrated the complexity of the interrelationships amongst independent variables. It was found that
there were age differences in the ways in which patients
adapted to myocardial infarction. Older people experienced

Another example of this complexity can be seen in Croog, (1969). It was found that reported chest pain and emotional stress in hospital as an aetiological factor, varied positively with socio-economic status. Patients from lower socio-economic levels reported less discussions of the illness with their doctors. These findings emphasize the need for control of other relevant variables in the study of effects of psychological factors on the rehabilitation process.

Another carefully designed prospecive study, which investigated factors affecting the return to work of CHD patients four and twelve months following the illness is reported by Cay et al (1972). Ability to return to work and the amount of activity at work were related to residual physical symptoms of angina and dyspnoea, to the type of occupation (people in professional and sedentary occupations resumed work more often and more quickly ) and to emotional upset. The subsequent behaviour regarding return to work of patients with a diagnosis Of ischaemic heart disease did not differ from that of patients who had sustained a proven MI. The authors maintain that the Correlation between emotional upset and failure to resume work indicated that emotional upset causes failure to resume work. However, this interpretation may prove incorrect, in view of the fact that prolonged unemployment and inactivity may well be the Causes of depression and emotional upset.

In summary it could be argued that despite the need for more accurate information about the role played by personality characteristics, perceptions and attidues of patients and advice and encouragement given by doctors in rehabilitation

after CHD, little interest has been shown by psychologists.

Most of the studies investigate emotional reactions as variables dependent on the stressful consequences of a life threatening illness. Most of the studies that make conclusions about psychological determinants of return to work suffer from major methodological shortcomings. The overall impression is that in Order to study the relationship between various psychological factors and coping with the illness, further research which would incorporate adequate control of medical and social and Occupational variables is required.

## 4. Reports of expert committees, reviews and discussion articles

These publications are normally made with the aim of summarising the latest developments in the field and of translating them into practical recommendations. The influence of psychological factors on the course of rehabilitation of CHD patients has often been emphasised in these articles. It is often stressed that psychological factors should be taken into account right from the acute stages of the illness. The psychological reactions should be detected and treated together with the physiological aspects as early as possible, in order to achieve successful adjustment later on. The following reports have been reviewed: Reiser, 1951; Kaufman, 1954; Kaufman, 1955; Bellak and Haselkorn, 1956; White et al, 1958; Hellerstein, 1959; Goldwater, 1960; W.H.O., 1964; W.H.O., 1965; W.H.O., 1967; Boujoff, 1968; Miller, 1969; Myocardial Infarction, 1973.

Owing to a shortage of empirical data (reflected in the previous sections of this review) the recommendations are limited to comments speculating the possibility of influence of

various factors or to the specification of research needs (W.H.O., 1967). They rarely include clear statements regarding the exact influence of the various psychological factors that affectthe rehabilitation process. These reports cannot advise doctors about the major personality characteristics, perceptual or behavioural tendencies that characterise those people who are likely to develop undue invalidism. Nor can they suggest methods of detecting these tendencies at an early stage of the illness. Past reports of W.H.O. (1964) stressed that "the psychological condition of the patient with cardiovascular disease is the result of a set of factors operating before, during and after the development of cardiovascular disease and having an influence of varying significance on the end result." However, instead of clear specifications of the extent and the nature of the operation of these factors, an extensive use of the word may is made when they are described.

"Emotional instability and intolerance of frustration and restrictions may influence a patient's capacity for adjustment to the impairement... the patient's understanding and acceptance of his illness may vary during the clinical course.

.his psychological reaction may show exacerbations and remissions during the acute or initial episode, when he may be temporarily overwhelmed and depressed ... Psychopathogenic effects of heart disease may suddenly appear in the form of anxiety, depression with anxiety, regression, paranoid reactions, hypochondriasis, dependency or denial of the illness. Physicians and nurses particularly should be aware of the frequency of these reactions in order to deal with them... during convalescence, when healing is proceeding uneventfully, psychological effects may become more apparent or indeed may reappear during the work adjustment phase. On the other hand, many neurotic complaints may subside as congestive failure increases."

These speculations might draw the attention of cardiologists and general practitioners to certain areas of which they had not thought before. However, they do not provide empirical facts for those doctors who seek practical advice. Furthermore, the report maintains that "the psychological assessment should

include assessing mental capacity, the emotional stability, temperamental factors and motivational forces. The factors relating to emotional stability have a dominating influence on the prognosis of the rehabilitation process ... throughout the illness the emotional status of the patient should be continually re-evaluated." However, no systematic research has yet shown the exact relationship between these factors and the rehabilitation process. Nor is the reader advised how to make these assessments.

Recent reports on cardiac rehabilitation (Myocardial Infarction, 1973) recognizing the possible influence of psychological factors, tend to shift the emphasis from speculating about the nature of these factors to more specific recommendations. They advise physicians about the steps they should take from the onset of the illness in order ro prevent undue invalidism and to encourage a return to normal premorbid functioning. is mainly put on the importance of explanations of the nature of the illness, reassurance regarding prognosis, informing Patients about anticipating symptoms and guiding them with respect to their behaviour following discharge from hospital. It is stressed that awareness of exaggerated psychological reactions should be made at the early stages of the illness but it is not explained to medical and nursing staff how to detect these reactions. Although it is possible that explanation and reassurance will reduce ambiguity and anxiety during stay in hospital, it is not clear how, when or by whom these explanations should be made in order to encourage the restoration of 'normal' life after leaving hospital.

In summary, it could be argued that the practical usefulness of conclusions and recommendations of expert committees about

psychological aspects of cardiac rehabilitation is at present limited without the support of empirical data.

### Conclusions

In order to optimise rehabilitation we need to know:

- Which factors have an important influence in the rehabilitation process.
- b. How to assess these factors.
- C. What techniques can effectively minimise undue invalidism.

The above literature review indicates that much work has

Yet to be done in order to fulfil any of these requirements.

It appears that certain physiological and social and occupational factors affect the rehabilitation process. Their methods of measurement are reasonably clear and it is often possible to modify them in order to prevent undue invalidism. Physiological symptoms can sometimes be overcome by drugs or physical exercise. Patients in heavy manual occupations can be given more suitable jobs when necessary. However, whilst there is a general feeling that psychological factors have a considerable influence on the rehabilitation course, little empirical evidence is available to demonstrate their nature, the ways in which they operate, their methods of measurement or their treatment.

The present study has been designed to investigate the association between a number of psychological variables and certain aspects of rehabilitation. The influence of medical and social and occupational factors will also be studied.

### Summary

Information regarding variables considered to influence the rehabilitation process of CHD patients can be obtained from four major sources: a. Reports of Cardiac Rehabilitation Centres. b. Studies conducted by cardiologists. c. Studies Conducted by psychologists and psychiatrists and d. Reports of expert committees, and discussion or review publications.

Reports from the four sources indicate that there are three major groups of factors influencing cardiac rehabilitation:

- <u>a. Medical factors</u> These are mainly in the form of physical incapacity that hinders rehabilitation.
- b. Social and Occupational factors These consist of Educational background, Socio-economic status, type of occupation, occupational record, employers' attitudes and financial difficulties or benefits associated with prolonged invalidism.
- C. Psychological factors These consist of personality characteristics, cognitive factors fallacies, misconceptions and widespread folklore regarding the prognosis of heart patients, and failure of medical and nursing staff to provide adequate reassurance and guidance to patients. The major psychological reasons for delay or failure in resuming work and other pre-illness activities were considered to be fear of death and fear of recurrence.

A critical review of the reports in the four groups lead to the following conclusions:

- a. CRC studies are carried out in a retrospective manner.

  Their samples are not representative of the whole population of CHD patients and their methodology is often unsatisfactory. Their use is mainly in generating ideas regarding factors that affect the rehabilitation process, ideas that should be tested in prospective studies.
- b. Studies carried out by cardiologists usually satisfy the principal methodological demands. Their conclusions are based on empirical evidence as long as they concern factors such as age, diagnosis, severity of the illness or type of occupation. However, psychological factors that they refer to are usually poorly defined, their methods of measurement are not clearly described and statements regarding their influence on resumption of work and other pre-illness activities are not supported by empirical data. The major usefullness of these studies is in providing information regarding the rate and speed in which myocardial infarction patients return to work.
- been primarily concerned with aetiological aspects and with the study of psychological reaction to CHD as a dependent variable. Relatively little interest has been shown in the psychological aspects of cardiac rehabilitation. Most of the existing reports regarding rehabilitation suffer from serious methodological inadequacies. The samples are too small and often inappropriately selected, psychological variables are not clearly defined and their methods of measurement are not described and other relevant factors are often not taken into consideration.

d. Reports of expert committees and review articles are usually published to summarise the latest developments in the field and to translate them into practical recommendations. However, the practical usefulness of these reports with regard to the influence of psychological variables on the rehabilitation process is at present limited without the support of empirical data.

It is finally concluded that whilst there is a general feeling that psychological factors have a considerable influence on the course of rehabilitation little empirical evidence is available to demonstrate their nature, the ways in which they operate, their methods of measurement or their treatment.

#### CHAPTER 5:

# RESEARCH OBJECTIVES, Dependent and Independent variables

- A. Research objectives
- B. Criteria for rehabilitation the dependent variables
- C. The independent variables
- D. Discussion of psychological variables
- E. The research hypotheses
- F. Summary

#### A. Research objectives

Although many authors assume that psychological factors have a major influence on the course of rehabilitation, to date there is little empirical evidence to support these assumptions or to demonstrate the exact nature of this influence. The major objective of the present study is to investigate associations between a few selected psychological variables and some aspects of rehabilitation of CHD patients. The rehabilitation course (the dependent variable) is investigated in its broad terms and an attempt is made to assess a few of its main aspects. Psychological variables are studied when other independent factors, commonly considered to influence the rehabilitation course, are taken into consideration.

There are seven dependent variables, each representing an aspect of the rehabilitation course. They were all measured twice, once at each follow-up. The independent variables were divided into three major categories: Medical, Social and Occupational and Psychological. Some of them were measured at the time of the follow-ups (Indep. FU).

# B. Criteria for rehabilitation - the dependent variables

By definition, the concept of rehabilitation implies a maximal restoration of all aspects of 'normal life'. Since premorbid way of living differs from one person to another, different demands would be imposed on different individuals, in order to achieve complete rehabilitation. The implication is that rehabilitation should be assessed separately for each patient on the basis of a comparison between his premorbid

activities and the degree to which they are resumed after recovery. This method, however, would involve too many practical difficulties. It was therefore decided to select a few activities that are common to most patients in their premorbid lives and use them as indices for rehabilitation. The following variables were selected as indices for rehabilitation:

Return to Work (RTW).

Resumption of physical activity at work (RPA).

Resumption of mental load and responsibility at work (RML).

Resumption of daily number of hours at work (RHR).

Resumption of sexual activity (RSA).

Resumption of driving (RD).

Change in life style (CLS).

The activities covered by the above seven rehabilitation indices are commonly considered to be important elements in most peoples' lives. They are thought to be affected by cardiac illness. They could be assessed with a reasonable degree of reliability.

# C. The independent variables

Variables was made primarily for purposes of clarity, in a fashion which is to some extent arbitrary. The classification does not imply that the categories or the variables within them are totally independent of each other. The selection of independent variables for observation in the present study was made on the basis of the following criteria:

- 1. They have been considered by other authors to have affected the rehabilitation process.
- 2. They can be assessed with a reasonable degree of relability and validity.
- 3. Their method of evaluation does not impose any undue mental or emotional demands on the patient recovering from a recent heart attack.
- 4. The method of evaluation does not interfere with the routine of the ward.

The three categories of independent variables are described in detail below.

Independent variables measured during stay in hospital (Indep. Hos).

# Medical variables

The consultant

Peel index

Clinical grading

Severity of the illness

# Social and Occupational variables

Socio economic status

Educational level

Responsiblilty at work

Physical demand at work

Mental demand at work

Type of job

Type of occupation

Social and Occupational variables contd.

Whether or not self employed

Occupational record

Attitude towards the job

Availability of the job after discharge from hospital

Age

Marital status

Wife's occupation

Number of dependents

Hobbies and interests

## Psychological variables

Anxiety during the first three days in hospital.

Anxiety in the medical ward

Depression in the medical ward

Neuroticism

Extraversion

Combination of Neuroticism and Extraversion

Perception of the illness

Knowledge of how others fared after a similar illness

Perception of causes of the illness

# Independent variables measured at follow-ups

# Medical variables

Physical disability

G.P.'s advice regarding the resumption of work

Consultant's advice regarding the resumption or work

# Social and Occupational variables

Wife's opinion regarding the resumption of work

Financial difficulties

#### Psychological variables

General sense of well-being

Perception of fitness for work

Perception of causes of the illness

Intention to resume work

#### D. Discussion of psychological variables

The achievement of a complete psychological assessment of each patient, evaluating all the psychological factors thought to influence the rehabilitation process would require a long period of time and impose undesirable pressures on the heart patient and technical complications on the routine management of the ward. It was therefore necessary to select some major psychological aspects to be investigated in the present study and to leave other aspects for future research. Those psychological variables observed in the present study as independent variables are discussed below.

# I. Personality characteristics

## 1. Neuroticism

As mentioned earlier, (p.21) the patient's premorbid personality is thought to be a major determinant of the degree to which rehabilitation would be achieved. Since not all the possible relevant personality aspects could be observed within the context of the present study, a decision had to be made with regard to the selection of a. a particular personality dimension/s and b. an adequate method of measurement. The criteria on the basis of which this selection was made were as

#### follows:

- a. The personality dimension should reflect the degree of general ability of the patient to cope with life crises and stresses.
- b. There should be a fairly short, simple and valid method of its measurement.

Neutoticism seemed to satisfy both criteria.

Although there is considerable disagreement about the exact factorial structure of this personality dimension (the unifactorial view of Eysenck as opposed to the multi-factorial View of Cattell (Fabian, 1971) and about the nature of its development, hereditary determination (Eysenck, 1951), as opposed to a history of traumatic experiences and faulty attempts at adjustment, aided, perhaps by some constitutional weaknesses, (Cattell, 1961; McCranie, 1970) the concept of neuroticism is perceived in a similar way by most autors. Eysenck (1959) maintains that neuroticism is "the general emotional !lability of a person, his emotional over-responsiveness, and his liability to neurotic breakdown under stress." According to Cattell (1961) "neurosis is a condition of dynamic maladjustment." Amongst other factors that are considered by Cattell to be associated With the trait of neuroticism he mentions maladjusted and dissatisfied emotionality, depression, inability bo face emergencies, obstructive independence, discouragement and self-devaluation. McCranie (1970) focusses his understanding of neuroticism around the concept of depression. However, his definition of neuroticism is similar to that of the others. He maintains that heurotic attitudes consist of characteristic feelings such as helplessness, worthlessness, anxiousness, and hostile negativism. The neurotic behaviour pattern involves inadequate or maladaptive

techniques of satisfying needs and protecting oneself from stresses.

It appears that the perception of neuroticism as a reflection of the general ability of strength of a person to cope with stresses and emergencies is common to all the above authors.

Neuroticism is conceived as a personality variable ranging from the extremely stable nature, through the average type to the extremely unstable, poorly integrated, neurotic type of individual. It is assumed to be normally distributed in the Population (Eysenck, 1951).

The Eysenck Personality Inventory (EPI) seems to provide an adequate measure of this personality dimension and therefore it was selected to be used in the present study.

# 2. Extraversion - Introversion

This personality dimension was selected for observation mainly due to the fact that its interaction with neuroticism is believed to affect ways of adjustment and coping with illness (Josten, 1970). This dimension is described as follows:

On one extreme there is the typical extravert who according to Eysenck is:

"sociable, likes parties, has many friends, needs to have people to talk to, and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment, and is generally an impulsive individual. He is fond of practical jokes, always has a ready answer, and generally likes change; he is carefree, easy going, optimistic, and likes to 'laugh and be merry'. He prefers to keep moving and doing things, tends to be aggressive and lose his temper quickly; altogether his feelings are not kept under tight control, and he is not always a reliable person."

On the other extreme there is the typical introvert who:

"...is a quiet, retiring sort of person, introspective, fond of books rather than people; he is reserved and distant except to intimate friends. He tends to plan ahead, 'looks before he leaps' and distrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness, and likes a well-ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner, and does not lose his temper easily. He is reliable, somewhat pessimistic, and places great value on ethical standards." (Eysenck, H.J., 1959)

These two extremes are idealized end points of a continum on which the general population is normally distributed.

# II. Anxiety

The concept of anxiety has been the subject of controversy and confusion for a long time. Many attempts have been made to define it, to explain its development and to distinguish it from other concepts such as fear, fright, or the general concept of arousal. A comprehensive summary of theories and research on this subject was made by Spielberger (1972).

In order to understand the type of anxiety measured in the present study, it is necessary to emphasise the distinction made between State anxiety and Trait anxiety. This distinction was first introduced by Cattell and Schier (1961) and later elaborated by other authors. According to Spielberger (1972, p.484) State anxiety is an

"...Unpleasant emotional state or condition which is Characterised by subjective feelings of tension, apprehension, and worry, and by activation or arousal of the autonomic nervous system. An anxiety state is evoked whenever a person perceives a particular stimulus or situation as potentially harmful, dangerous or threatening to him. Anxiety states vary in intensity and fluctuate over time as a function of the amount of stress that impinges upon an individual." "...the appraisal of a particular stimulus or situation as threatening is also influenced

by a person's aptitude, abilities and past experience as well as by his level of Trait anxiety and the objective danger that is inherent in the situation."

#### Trait anxiety is

"...relatively stable individual differences in anxiety proneness as a personality trait. Trait anxiety is not directly manisfested in behaviour, but may be inferred from the frequency and the intensity of an individual's elevations in State anxiety over time. Persons who are high in Trait anxiety, for example psychoneurotics, are disposed to perceive the world as more dangerous or threatening than low Trait anxiety individuals. Consequently, high Trait anxiety individuals are more vulnerable to stress and tend to experience State anxiety reactions of greater intensity and with greater frequency over time, than persons who are low in Trait anxiety."

The type of anxiety observed in the present study is Consistent with the above definition of State anxiety.

According to Martin (1961), the best measure of State
anxiety is the observable physiological and behavioural response
patterns associated with such states. In contrast Kraus, (1961)
on the basis of an extensive review of the literature in psychology
and psychiatry, maintains that the most important and widely
accepted measure of state anxiety is an introspective verbal
report. Schachter (1964) puts the emphasis on the interaction
between cognitive and physiological factors, and Spielberger, (1972)
concludes that the best way to define the presence of an anxiety
state is on the basis of some combination of introspective
verbal reports and physiological behavioural signs.

In the present study, State anxiety during the acute stage of the illness was assessed by means of a questionnaire, (a modified version of Zuckerman's (1960) Affect Adjective Check List), on the basis of the patient's introspective verbal report. During convalescence it was assessed by the nursing staff on the basis of observations of the patient's behaviour on the ward.

#### III. Cognitive variables

The role of cognitive factors in coping with stress has been discussed before. (p.20) In view of that discussion, it was decided to assess the patients' perception of the severity of their illness, their knowledge of how others had fared after a similar illness, their perception of causes of the illness and their perception of their fitness for work. It was thought that these variables were relevant to the way in which threat was appraised by patients which is in turn expected to affect their coping.

#### E. The research hypotheses

In view of the absence of a comprehensive theory from which specific hypotheses could be derived it was decided to analyse the relationships between the dependent and the independent variables and to discuss the possible meaning of significant associations rather than to formulate specific hypotheses.

#### F. Summary

The major objective of the present study is to investigate associations between a few selected psychological variables and some aspects of rehabilitation of CHD patients. There are seven dependent variables, each representing an aspect of the course of rehabilitation. The independent variables consisted of three major groups: Medical, Social and Occupational and Psychological. Reasons for selection of psychological variables are discussed.

No specific hypotheses regarding associations between dependent and independent variables were made.

#### CHAPTER 6:

# The Method

- A. The sample
- B. Instruments
- C. Procedure

## A. The sample

The sample consisted of all 270 CHD patients who were admitted to the Coronary Monitoring Unit (CMU) of the Kingston General Hospital, Hull between February 1972 and April 1975, who met the following criteria.

- 1. Males
- 2. Under the age of 65
- 3. In full time employment prior to admission.

#### Rational for the selection of the sample

#### 1. Males

Two major reasons accounted for the selection of males only:

- a. The majority of females admitted to the CMU with suspected CHD are not employed prior to admission, and therefore the question of return to work after discharge from hospital does not exist in their case.
- b. The problem of rehabilitation of women is of a different nature from that of men in the sense that, because of the role they play in family life, pressures on them to restore employment are of a different kind and magnitude.

## Under age of 65 years

Patients who are 65 or older have normally already retired from work before their admission to hospital or intend to do so irrespective of their illness.

#### 3. Full employment

For various reasons some people retire from work before the age of 65 or are unemployed for long periods. There is a high likelihood that people of this kind will not resume work irrespective of the consequences of their illness. It was therefore decided to exclude them from the sample.

The whole of the sample was used in the analyses involving assessments of reliability and validity of the measurement instruments, reported in this chapter. However, for the major analyses of the results the sample was reduced due to the introduction of two further criteria:

4. Admission to hospital was followed by a diagnosis of first observed acute myocardial infarction (MI) (see p. 4 for a distinction between MI and other coronary heart diseases).

MI seems to be a relatively clearly defined type of heart disease and requires a relatively uniform treatment. By selecting Patients with first episode of MI it was possible to achieve Control for effects of previous experience with the illness in the course of rehabilitation.

5. They had no other apparent illnesses that could have hindered their rehabilitation. This criterion enabled to centre the study on aspects specific to cardiac rehabilitation.

The introduction of the two additional criteria reduced the sample to 183. They were not met by the remaining 87 patients.

It will be seen that the actual numbers of patients available for the statistical computations in the result chapters varied amongst the various analyses. They were almost always lower than 183. This was due to missing information on some variables for some patients.

The following reasons accounted for missing information.

- Death of the patient before the first or the second follow-up.
- Failure to attend a follow-up.
- 3. Methodological reasons it will be seen later that some measures were <u>not</u> made with an aim of assessing reliability.
- 4. Data collection on a variable began after the research had started.
- 5. A particular item was not relevant to the patient e.g. wife's occupation when a patient was a widow.
- 6. Errors that occurred in the measurement procedure: either by patients filling-in questionnaire forms incorrectly or by the researcher failing to record some information.

# B. Instruments

The methods of measurement and scoring of the variables

assessed in the study are described below in the following order:

# a. Independent variables

Measured during stav in hospital - Indep HOS

MEDICAL variables

SOCIAL and OCCUPATIONAL variables

PSYCHOLOGICAL variables

# Measured at follow-ups - Indep. FU

Medical variables

Social and Occupational variables

Psychological

# b. Dependent variables

## a. Independent variables

Indep. HOS variables

MEDICAL variables

#### 1. The consultant

In order to examine the influence of the apparent personality and policy differences between the two consultants (see p.131) a record was made of the consultant under whose care each patient was.

#### 2. Peel Index

This is a prognostic index, commonly used in cardiac research. On the basis of a number of criteria (appendix 1) each patient is given a score between 1 and 4. The higher the score the poorer the prognosis. The Peel index score was determined for each patient by the registrar. Further information about this index and evidence regarding reliability and validity can be obtained in Peel (1962).

# 3. Clinical grading

This is an index, recommended by the Ministry of Health

(Aber, 1969) for the assessment of the clinical status of MI patients on admission to hospital. The four categories of this index are described below in an increasing order of severity:

Mild - No evidence of cardiac failure or hypotension.

Cardiac failure without hypotension.

Hypotension without failure.

Hypotension with failure.

Each patient was classified on this index by the registrat.

#### 4. Severity of the illness

The assessment of this variable was made in two stages. In the first stage, information considered by the cardiologist to be necessary for the determination of the severity of the illness and the physical condition on discharge from hospital was recorded on a special form. This information included maximum rise in serum enzymes, arhythmias, cardiac arrests and complications (Appendix 2). In the second stage, the form was given to the two registrars (independently) who used it as a basis for rating the degree of their confidence in the patient's ability to resume work on a three-point scale as follows:

- 0 Mild disability The patient is expected to be back at work within three months of discharge from hospital.
- 1 Moderate disability The patient is expected to be back at work within three to six months of discharge from hospital.
- 2 Severe disability The patient's occupational future is not clear.

#### Reliability\_

A complete agreement between the two registrars occured in 88% of the cases. In the remaining cases, in which the difference between the two judgements did not exceed one point on the scale, a decision was reached through a discussion.

#### SOCIAL and OCCUPATIONAL variables

#### 1. Socio Economic Status (SES)

Despite the fact that SES is frequently used in studies in the social sciences, agreement upon a standard scoring technique has not yet been reached. Various methods emphasize different aspects of the subject's background in the determination of SES.

Educational and occupational background, housing conditions and other variables are used on various combinations for this purpose (Warner, 1949; Eels and Davis, 1951; Nevo, 1972).

Studies in the U.K. frequently use the General Registrar's classification of occupations (1970) for the determination of SES. It is particularly common in studies of rehabilitation of CHD (Spelman, 1966; Cay, 1972). This technique has been adopted in the present study.

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Each patient was assigned to one of the following five Categories on the basis of his occupation:

- i. Professional occupations.
- ii. Intermediate occupations.
- iii. Skilled occupations.
- iv. Partly skilled occupations.
- v. Unskilled occupations.

#### 2. Educational level

Patients were assigned to one of three categories:

- 0 People who left school at the age of 16 or earlier and since then had no further education.
- 1 a. People who left school after the age of 16, but took no further education.
  - b. People who have acquired occupational qualifications through training courses associated with their employment.
  - c. People who have extended their education by correspondence or evening classes and acquired a certificate.
- 2 a. People with a university degree.
  - b. Professionals who acquired their qualifications through full time long term courses.

#### 3. Responsibility at work

The aim was to distinguish between various degrees of responsibility assumed by patients at work. Three categories were used:

Low responsibility

Moderate responsibility

High responsibility

The categories were defined as follows:

- 0 Low responsibility
- The job is a very simple one, requires little skill or training, involves no or little decision making or supervision of others.
  e.g. a car-park attendant.
- 1 Moderate responsibility The job is fairly simple, requires some skill or training, involves a limited amount of decisionmaking and/or supervision of the work of others. e.g. A foremanfitter.

2 - High responsibility

- A considerable amount of responsibility is involved in the job. Major decision making, determination of policies, and supervision of others. e.g. A police chief superintendent.

The patient's description of the activities carried out by him at work was recorded by the author. This description was given to two other independent judges, one of whom was an industrial psychologist and the other one was an executive in a local factory. They were asked to assign each of the patients to one of the above categories. The same was done by the author himself.

A complete agreement between the three judges occured in 78% of the cases. On no occasion did a complete disagreement occur. In the remaining cases (22%) there was agreement between two of the three judges. In these cases the decision was made on the basis of the two agreeing judgements.

#### 4. Physical demand at work

The objective here was to assess the patient's subjective perception of the physical demand he has to cope with at work. Each patient was æked to rate his judgement on a five point scale ranging from 'Very low' to 'Very high'.

#### 5. Mental demand at work

The objective here was to assess the patient's subjective perception of the mental demand he has to cope with at work.

Each patient was asked to rate his judgement on a five point scale ranging from 'Very low' to 'Very high'.

#### 6. Type of job

The patient's occupation was assessed as Manual or Sedentary by a unanimous (80%) or majority (20%) decision of three independent observers (two industrial psychologists and a works manager). A job was considered to be manual if it involved at least a moderate amount of physical activity (e.g. motor fitter, electric welder, prison officer). A sedentary job was one in which there was little or no physical activity (e.g. hospital catering officer, industrial training officer, clerk).

#### 7. Type of occupation

Patients were divided into four groups according to their occupations:

- O Business and managerial Salesmen, manufacurers, contractors, retail store owners, executives, insurance brokers, production managers, wholesale merchandisers, estate agents, etc.
- 1 Professional Teachers, dentists, accountants, engineers, etc.
- 2 Manual workers Joiners, lorry drivers, machinists, sheet metal workers, electricians, plumbers, etc.
- 3 Clerical Clerks, bookeepers, etc.

This classification was previously used in a study by Sigler (1967).

#### 8. Whether or not self employed

Patients were divided into two groups:

0 - Not self employed

#### 1 - Self employed

#### 9. Occupational record

Patients were classified into three categories, on the basis of their self reported occupational history, as follows:

- 0 Poor occupational record Patient has not stayed for longer than four years with any single employer.
- 1 Moderate occupational record
   Patient has not stayed for longer than eight years with any single employer.
- 2 Good occupational record Patient has stayed for longer than eight years with at least one employer.

On some occasions these scoring rules were not followed and the patient's occupational record was determined on the basis of a more flexible approach. This was done in cases of the following kinds:

- 1. The patient's firm has been taken over by another firm. In these cases the patient was categorized on the basis of the total number of years he had worked for the two or more firms. (3 cases).
- 2. Frequent changes of employers are commonly practiced in the profession. Example: Building workers who work on short term contracts. The patient was categorized on the basis of the total number of years he had worked in the profession.
  (3 cases).
- 3. The patient worked for a long time with one employer but since leaving the job has not settled in a new one. Example:

A seaman who worked at sea for twenty years and since leaving it has been in and out a number of jobs. The patient was categorized on the basis of his experience after the first long term job. (2 cases).

#### 10. Attitude towards the job

Patients were assigned by the author to one of the three following categories on the basis of their answers to the question: Are you happy with your job ?

- O Positive attitude When the patient asserted that he was happy with his job, and satisfied with it.
- 1 Indifference When the patient did not express any particular likes or dislikes to his job.
- 2 Negative attitude When the patient stated that he had not liked his job and would be happy to change it.

# 11. Availability of the job after discharge from hospital

The purpose of this measure was to assess the degree to which the patient was confident that a job would be available for him with his employer when he recovered from his illness. Patients responses were classified into three groups:

- 0 A job is definitely available.
- 1 It is not clear whether a job will be available or not.
- 2 A job will definitely not be available.

#### 12. Age

The patient's age was recorded.

#### 13. Marital status

Patients were divided into five categories according to their marital status:

Married, Single, Divorced, Separated, Widower.

#### 14. Wife's occupation

Three categories:

- 0 Wife does not work.
- 1 Wife has a part time job.
- 2 Wife has a full time job.

Patients who were single, widowers, divorced or separated were not given a score on this item.

#### 15. Number of dependents

The score is the number of persons (apart from wife) who depend economically on the patient.

#### 16. Hobbies and interests

The aim here was to distinguish between patients who in addition to their jobs had hobbies or interests that could become a substitute for work, and between patients who did not have such hobbies or interests.

In the interview patients were asked whether they had had any hobbies or interests. When a positive reply was given, they were asked to describe the nature of the hobby and the number of

hours that they devoted to it weekly.

Responses were rated by two independent judges (both psychologists) as follows:

- 0 Patient does not have a serious hobby or interest.
- 1 Patient does have a serious hobby or interest.

There was a complete agreement in 84% of the cases. Cases of disagreement were raged on the basis of a discussion.

#### PSYCHOLOGICAL variables

# 1. The Affect Adjective Scale (AAS)

The AAS was used for the measurement of anxiety in the acute stages of the illness. It is a modified version of the Affect Adjective Check List (AACL) which was constructed by Zuckerman (1960) as an instrument for the measurement of changes in anxiety over short periods of time. It is considered to be a useful technique in studies where repeated assessments of anxiety have to be made within a relatively limited time interval.

In a review of theories of anxiety, Spielberger, (1972) finds the AACL to be one of the most reliable and commonly used instruments for the measurement of state-anxiety.

In the first part of this section, the AACL, its format, its scoring method, the construction procedure, and reliability and validity studies are described and discussed.

The second part deals with the modified version of the AACL, the AAS.

#### The AACL

#### a. Format and scoring method

The Zuckerman AACL consists of 21 words that proved to be significantly related to anxiety. Eleven of them are 'Anxiety plus'words (increase in checking frequency during anxiety condition) and ten are 'Anxiety minus' words (decrease in checking frequency during anxiety condition). These words are listed below:

'Anxiety plus' - Afraid, desperate, fearful, frightened, nervous,

panicky, shaky, tense, terrified, upset, worrying.

'Anxiety minus' Calm, contented, cheerful, happy, joyful, loving,

pleasant, secure, steady, thoughtful.

The subjects are presented with the twenty-one-item list and asked to check those items that describe their feelings at a particular period of time. (this is determined by the experimenter),

The AACL score is the total sum of all the points gained. The possible range of scores is 0 to 21.

#### b. Construction

The AACL was deweloped empirically as a scoring key for anxiety from a pool of adjectives with various affective connotations. Three sources of adjectives were used:

- An adjective check list test which was developed by Gough
   (1955) for the measurement of various personality traits.
- 2. A check list which was used by Nowlis (1953) in measuring changes induced by drugs given to college students.

#### 3. A thesaurus.

Adjectives that were of low frequency in the written language were excluded so that subjects of less than average intelligence could understand the items. The final list consisted of sixty-one items.

The scoring-key of twenty-one words was derived from item analyses in two studies:

- a. Persky et al. (1959) They compared a group of psychiatric patients, rated high on anxiety, with a group of normal controls rated low on anxiety, on the basis of a psychiatric interview. An item analysis was performed by comparing the frequencies in each group checking or not checking each of the adjectives.

  Twenty-four of the adjectives yielded a significant difference (p. 92), twelve 'Anxiety plus' and twelve 'Anxiety minus' words.
- b. Levitt et al (1960). They measured the effect of a hypnotecally induced anxiety state in normals. A score on the AACL key derived from the itemmanalysis in Persky's study showed a highly significant rise during the anxiety condition.

The final scoring-key of the AACL consists of the twentyOne words which proved to be significantly related to anxiety

in both studies.

#### c. Reliability

A Today version of the AACL was given to fifty students of Psychology. Today was defined as beginning from the time they awoke that morning. The test was readministered one week later.

Two kinds of reliability were tested:

- a. Internal consistency in the first testing.
- b. Retest reliability from the first to the second test.

The Today version (a version in which the subjects are asked to respond according to how they feel Today) was expected to show a high internal reliability on a single testing but low test retest reliability. Since the Today test is designed to test day to day fluctuations it is unlikely that it could be sensitive to these fluctuations and still remain stable from week to week.

Internal consistency was calculated using the Kuder-Richardson formula 20. The results were consistent with the expectations.

#### d. Validity study

The purpose of this study was to see if the Today AACL score would increase when given on an examination day. "Examination anxiety" is not usually as intensive as anxiety is in clinical cases and it varies considerably between individuals. However, it is suggested by Zuckerman that if the AACL is sensitive to "Examination anxiety" it would probably be sensitive to more intense forms of anxiety.

The results of this study showed a significant increase in Today anxiety score on examination days.

# e. Relationships with other studies

The Today version of the AACL was correlated with the Taylor Manifest Anxiety Scale (1951) in two studies. Since the MAS is a measure of trait-anxiety, no significant correlation was expected between the two measures. In one of the studies the tests correlated significantly (r=.29) contrary to the expectations. However, in both cases the correlations were low. These studies are described in more detail in Zuckerman (1961).

#### f. Conclusion

The reliability and validity studies on the AACL seem to provide satisfactory results with regard to its internal consistency and its sensitivity to fluctuations in state-anxiety levels.

#### The AAS

#### a. Format

The Affect Adjective Scale, the modified version of the AACL, consists of 19 adjectives. Eleven 'Anxiety plus' items and eight 'Anxiety minus'. All taken from the AACL. (Two 'Anxiety minus' were rejected on the basis of an item analysis).

To enable the expression of moderate degrees of feelings the subjects were presented with a six-point scale on which they were asked to rate the degree of their feeling with regard to each of the items. An example of the format is shown below.

#### AAS Format - Example

#### DEGREE OF FEELONG

 5
 4
 3
 2
 1
 0

 VERY
 EA
 VERY
 NOT AT

 ITEM
 MUCH
 MUCH
 RATHER
 LITTLE
 LITTLE
 ALL

Afraid

Calm

Worried

For each item the patient checked the category that described best the degree of his feeling at the time specified by the author. (Today, Yesterday, etc.). (An AAS form is presented in appendix 3).

#### b. Scoring method

The AACL scoring method (described on page 89 ) assumes that an absence of a response on an 'Anxiety minus' item reflects the same degree of anxiety as a presence of a response on an 'Anxiety plus' item. This assumption was not made here.

Two separate scores were calculated. One for 'Anxiety plus' items and one for 'Anxiety minus' items.

The scoring of the AAS can be done in a number of alternative ways. Three different methods were tried here of which one was adopted.

#### Method A.

This was a simple 'Likert' (1932) scaling method. The score on each item was directly related to the checked category. Thus, if category '4', for instance, was checked for 'Afraid', that item gained four points. Alternatively, if category '0' was checked, that item gained no points at all, and so on.

'Anxiety plus' score of the AAS was determined by the sum of the scores gained by the eleven 'Anxiety plus' items. Possible range 0 to 55.

'Anxiety minus' score was determined by the sum of the scores gained by the eight 'Anxiety minus' items. Possible range 0 to 40.

#### Method B

This scoring method divided the six categories into three groups:

Group A - Categories '0' to '1'.

Group B - Categories '2' and '3'.

Group C - Categories '4' and '5'.

Responses in group A were scored '0', responses in group B were scored '1' and responses in group C were scored '2'.

'Anxiety plus' score was determined by the sum of the scores gained by 'Anxiety plus' items, possible range 0 to 22.

'Anxiety minus' score was determined by the sum of the scores gained by the eight 'Anxiety minus' items, possible range 0 to 16.

#### Method C

This scoring method divided the six categories into two groups:

Group A - Categories '0', '1' and '2'.

Group B - Categories '3', '4' and .'5'.

Responses in group A were scored '0' and responses in group B were scored '1'.

'Anxiety plus' score was determined by the sum of the scores gained by 'Anxiety plus' items, possible range 0 to 11.

'Anxiety minus' score was determined by the sum of the scores gained by 'Anxiety minus' items, possible range 0 to 8.

In all three methods (A,B, and C) high degrees of anxiety were indicated by high scores on the 'Anxiety plus' scale and by low scores on the 'Anxiety minus' scale.

#### Assessment of the scoring methods

No reliable criterion for anxiety, against which the validity of the three scoring methods could be evaluated, was available.

The Pearson correlations of each of the three methods with the other two for Today and Yesterday versions and for 'Anxiety plus' and 'Anxiety minus' scales are presented in table 6.1 overleaf. The correlations amongst the three scoring methods were generally high when scales of the same sign ('Anxiety plus' or 'Anxiety minus') were correlated. The group of relatively

lower negative correlations consists of those between scales of opposite signs.

Method A was selected since it makes a greater use of the information provided by the scale.

Table 6.1: Pearson correlations among three scoring methods for AAS

				Method A				Method B				Yethod C	
				'Anx.	minus'	'Anx. plus'		1		'Anx. plus'		'Anx. minus'	
				roday	rester- day	Today	Yester -day	roday	Yester -day	roday	Yester -day	Today	Yester -day
	4.4	.snId	Today	-0.26				,					
140.1	Lethod	'Anx.	Yester -day		-0.59								
	Nethod B	minus.	l'oday	0.89	á á						*.		
		. Anx.	Yester -day		0.92								
		,snld	roday			0.94		-0.23					,
	24	·Anx.	Yester -day				0.98		-0.54			7.4	
	Method C	minus.	Today	0.82	8			0.70			4.5		
		'Anx.	Yester -day	-	0.88			, 3121 2	0.85				ik ili.
		'suld	Today			0.88			31 Ex 3	0.86	201	-0.17	Nr.
	P.C	Anx. I	Yester -day			•	0.95				0.93		-0.50

N = 150

An item analysis was performed on 'Anxiety plus' and 'Anxiety minus' scales. 150 forms from the pilot study (appendix 5) were used for this purpose.

In the 'Anxiety plus' scale correlations between item and test were higher than 0.60 and significant for all items.

In the 'Anxiety minus' scale correlations (Ferguson, 1941) between item and test were higher than 0.60 for all items apart from Thoughtful and Loving, for which r was not significant. Patients often reported confusion regarding the meaning of these two items and therefore the items were ommitted from the AAS.

#### Validity of the AAS

To determine the degree to which the AAS was sensitive to different degrees of anxiety it was administered to two groups of people:

The cardiac patients group - 41 coronary patients from the pilot study with an average age of 52, standard deviation of 8.9.

The students group - 41 male psychology students, twenty one of
whom were first year students with an average
age of 21, standard deviation 3.14 and twenty
of whom were part-time students with an average
age of 34, standard deviation 9.06.

In the patients group the AAS was administered on their second day in the CMU. In the student group it was administered towards the end of a lecture. The students had no apparent anxiety raising experience at or around the time of the test. The instructions to both groups were as follows:

1. Answer the form according to how you feel <u>Today</u>.
When that was completed a fresh form was given and they were asked to:

2. Answer the form according to how you felt <u>Yesterday</u>.
Thus for each subject two anxiety scores were available. One for Today and one for Yesterday.

In order that the test should be considered sensitive and valid, the following four hypotheses had to be confirmed:

- On <u>Yesterday</u> the patients group anxiety score would be significantly higher than that of the students group since the patients had had their heart attack on Yesterday.
- 2. Anxiety score in the patients group will be significantly higher for <u>Yesterday</u> than for <u>Today</u> since <u>Yesterday</u> was the day on which they had their heart attack.
- 3. No difference would exist between Today and Yesterday scores in the students group.
- 4. On Today anxiety score of the patients would be higher than that of the students. The difference however, is not expected to be as high as for Yesterday (hypothesis 1) since we expect a decrease in anxiety score in the cardiac group from Yesterday to Today (hypothesis 2).

A diagram illustrating the four hypotheses is presented below:

# Results

The degree to which each of the two anxiety scales ('Anxiety plus' and 'Anxiety minus') meet the above four expectations is discussed below in two separate sections. First, for the 'Anxiety plus' scale and then for the 'Anxiety minus' scale.

## 1. 'Anxiety plus' scale

a. A two-way analysis of covariance was carried out to test the possibility that age was the factor responsible for the difference in anxiety between the two groups.

Table 6.2 shows that this is not so since the effect of the group remains highly significant after a statistical adjustment has been made for the effect of age.

Further analysis was required in order to establish specific conclusions regarding the four hypotheses made above. For this purpose Sheffe's method for contrasts was selected.

b. The results of Sheffe's method for contrasts are presented in table 6.3.

# Table 6.2: Two-way analysis of covariance ('Anxiety Plus' scale)

# Group means

Group	Age	'Anxiety Plus'score	Corrected 'Anxiety Plus'score
Cardiac patients	52.098	19.695	19,531
Students	27.561	5.890	6.054

#### Day means

Day	Age	'Anxiety	Plus'score	Corrected	'Anxiety	Plus'score	
Today	38.829	9	. 231		9.231		
Yesterday	39.829	16	. 354		16.354		

# Analysis of variance

Source	SS	df	MS	<u>F</u>
Group	7813.6	1	7813.6	64.313 *
Subjects within groups	9719.4	80	121.49	61.145
Day	2079.6	1	2079.6	84.369
Group x Day	2869.5	1	2869.5	
Residual	2720.9	80	34.011	

Analysis of covariance ^

Analysis of C	201422411	SS Age x	SS	SS Correct-			
Source	SS Age			ed Anxiety		MS	F
Group	24684	13888	7813.6	2509.2	1	2509.2	20.40*
Subjects within group	12543	167.49	9719.4	9717.2	79	123.00	

<sup>\*</sup> P < 0.001

<sup>\*\*</sup> There was no need for analysis of covariance for the Day effect since the covariate (age) has no effect there. Therefore, the analysis of covariance was done only on the first two lines of the analysis of variance.

Table 6.3: Sheffe's method for contrasts

Group	<u>Today</u> <u>Mean</u>	<u>Yesterday</u> <u>Nean</u>	(Contrast) <sup>2</sup>	<u>p</u>
Cardiac Patients	11.95	27.44	239.94	0.001
Students	6.51	5.26	1.56	N.S.
Day	Cardiac patients mean	<u>Students</u> mean	(Contrast) <sup>2</sup>	<u>p</u>
Today	11.95	6.51	29.59	0.001
Yesterday	27.44	5.26	491.95	0.001

#### Conclusion

All four expectations have been confirmed and it could be concluded that the modifications introduced to form the AAS have not adversly affected the sensitivity of the test.

# 2. 'Anxiety minus' scale

The analysis applied here is the same as that of the 'Anxiety plus' scale. The reader is reminded that high scores on 'Anxiety minus' scale reflect low levels of anxiety and low scores reflect high levels of anxiety.

- a. Table 5.4 shows that the effect of the group remains highly significant after a statistical adjustment has been made for the effect of age.
- b. The results of the Sheffe method for contrasts are presented in table 6.5.

# Table 6.4; Two-way analysis of covariance ('Anxiety minus' scale)

Group means	5				0
Group	<u>Age</u>	'Anxie	ty mir	nus'score	<pre>Corrected 'Anxiety minus' score</pre>
Cardiac patients	52.098	1	9.366		17.268
Students	27.561	2	4.293		26.390
Day means	<u>Age</u>	'Anxie	ty mir	nus'score	Corrected 'Anxiety minus' score
Today	39.829	2	4.793		24.793
Yesterday	39.829	1	8.866		18.866
Analysis o	f varian	<u>ce</u>		•	
Source	<u>s</u>	<u>S</u>	df	<u>MS</u>	<u>F</u> .
Group	9	95.22	1	995.22	11.994 *
Subjects war		38.0	80	82.975	
Day	14	40.2	1	1440.2	54.540 *
Group x Day	y 22	39.2	1 .	2239.2	84.798 *
Residual	21	12.5	80	2112.5	

# Analysis of covariance \*

Source	SS Age	SS Age x Anxiety	<u>SS</u> Anxiety	SS Correct- ed Anxiety	<u>df</u>	MS <u>F</u>
Group	24684	-4956.4	995,22	1149.5	<b>1</b> ,	14.481 14.481*
Subjects within			6600.0	6071 0	70	
groups	12543	2144.6	6638.0	6271.3	79	

<sup>\*</sup> P<0.001

<sup>\*\*</sup> There was no need for an analysis of covariance for the Day effect since the covariate (age) has no effect there. Therefore, the analysis of covariance was done only in the first two lines of the analysis of variance.

Table 6.5: Sheefe's method for contrasts

	9.				
Group	Today Mean	Yester	day Mean	(Contrast) <sup>2</sup>	P
Cardiac patients	26.02	12.	71	177.16	۷0.001
Students	23.56	25.	02	2.13	N.S.
, w					
Day	Cardiac pat	ients	Students	(Contrast) <sup>2</sup>	<u>p</u>
Today	<u>Mean</u> 26.02		<u>Mean</u> 23.56	6.05	N.S.
Yesterday	12.71		25.02	151.54	<0.001

#### Conclusion

The first three hypotheses have been confirmed. However, the analysis failed to show a significant difference in anxiety scores between the two groups on the Today version of the AAS. It appears that the 'Anxiety minus' scale, although successful at discriminating between extremes of anxiety is not as sensitive as the 'Anxiety plus' one.

In this study both scales of the AAS were used (separately) for the determination of state anxiety.

# 2. Anxiety and depression on the ward scales

Anxiety and depression were rated on five-point scales, ranging from "Not at all" to "Very much".

The ratings were made by the ward Sister shortly before the patient was discharged home on the basis of impressions that she

formed from her daily contacts with him and from reports that she received from other nurses.

#### 3. The EPI

The Eysenck Personality Inventory (EPI) was constructed in 1964 by H.J. Eysenck and S.B.G. Eysenck for the measurement of two major personality dimensions, Extraversion and Neuroticism. It has two parallel forms A and B.

In the present study form A is used. (It is presented in Appendix 4).

The format of the EPI, its construction, the scoring method and evidence from reliability and validity studies are discussed below.

#### Format and scoring method

The EPI consists of 57 questions. The respondent is requested to answer each one of them by 'Yes' or 'No' depending on which of the two represents his usual way of acting.

The score for extraversion E can range between '0' and 25 and the score for Neuroticism ranges between '0' and 25 too. A third key which is used for the assessment of the degree to which the responses are affected by 'social desirability' provides a Lie score L which ranges between '0' and 9.

#### The construction of the EPI

The EPI is based on the assumption that Extraversion and

Neuroticism are two major personality dimensions that can be assessed by means of a set of questions about the usual way in which a person acts. Different extremes or degrees on each of the two dimensions are expected to be represented by different answers to a set of questions. Definitions of Extraversion and Neuroticism have been discussed before (p.6%).

#### Reliability

# Test retest reliability

Test retest reliability of form A (which is used in the present study) was tested in two groups of normal subjects. The time interval between the two administrations in the first group was about a year. In the second it was nine months. The results are given in table 6.6.

# Table 6.6; Test retest reliability of E and N scales of EPI in two groups of normal subjects

 $\underline{\mathbf{n}}$   $\underline{\mathbf{E}}$   $\underline{\mathbf{N}}$ 

Group A 92 0.82 0.84

Group B 27 0.97 0.92

Test retest reliability was re-assessed in the present study.

Two hundred patients responded to the EPI on two occassions.

Once during their stay in hospital and once four months later.

The test-retest reliability for the N scale was 0.85 and for the E scale was 0.83.

#### Validity.

The notion of "agreement with a criterion" is inapplicable

here, since no agreed criterion for either neuroticism or extraversion exists. However, assessments of the MPI (Knapp, 1962) have shown that the test fits in with predictions made from a more general theory. It is assumed that this proof would also apply to the EPI in virtue of the close similarity of the EPI scales to those of the MPI.

It has been shown (S.B.G.Eysenck, 1962; Eysenck and Eysenck, 1963) that when subjects are classified into categories of extraverted and introverted or stable and unstable, on the basis of independent judgements made by other people, the two extreme groups produce clear and predictable differences on the scales, when asked to respond to the EPI.

On the whole, it is concluded by Eysenck, that questionnaire responses given under the usual conditions, give a reasonably valid picture of the subject's habitual behaviour pattern.

# Reliability and Validity of the EPI tested in independent studies

One major advantage of the EPI as a measure of Neuroticism and Extraversion is the fact that it has been used in numerous studies since its construction. Consequently, evidence about its reliability and validity has been accumulated from many independent sources. In most cases, results give a good reason to believe that the EPI does provide a reasonably valid picture of the subject's habitual behaviour pattern. (Dakic and Filipovic, 1970).

#### Lie Scale Response sets

Neither 'Acquiescence' nor .'Desirability' response sets have

been found to play an important part under ordinary conditions (Eysenck and Eysenck, 1964).

In form A of the EPI the lie scale consists of nine questions. These items have been selected following extensive item analyses and factor analyses. (Eysenck, 1959; Gibson, 1962).

In general it is suggested that there is considerable evidence to show that a score of above 4 or 5 on the L scale shows that "Faking good" is likely to have occured and that the E and particularly the N scores should be regarded with considerable scepticism.

The mean score of a group of 651 subjects on form 'A' was 2.263 with a S.D. of 1.572 (Eysenck and Eysenck, 1964).

# Standardization

Hysteric

Table 6.7 shows the mean scores and SD's for normals and neurotics on form 'A' of the EPI. The figures are extracted from the test manual (Eysenck and Eysenck, 1964).

Mean scores and standard deviations on EPI Table 6.7: N SD Group M M SD Normal popu-4.78 lation 4.37 12.07 9.06 Neurotics Anxiety 4.04 15.79 9.45

4.35

15.16

11.74

# The effects of age, sex and social class

The figures presented in the test-manual ( Eysenck and Eysenck, 1964) show the following tendencies:

- a. There is a significant trend for N and E to decline with advancing age.
- b. Women tend to score higher than men on N and lower on E.
- c. There has been a general tendency for working class groups to be characterized by higher N scores than middle class groups. No differences were observed with respect to E.

#### Conclusion

For three major reasons it was decided to select the EPI for the present study:

- a. It provides a reliable and valid measure of Neuroticism and Extraversion.
- b. The EPI items are designed to be understood by subjects of low intelligence or education.
- c. The administration and scoring of the test do not take longer than fifteen minutes.

## The Extraversion and Neuroticism combined score

In addition to the three E, N, and L scales of the EPI, a fourth score, EN combined, was calculated for each patient. The values of this score were determined as follows:

- 0 Extraversion 'low' (between '0' and '10'), Neuroticism 'low' (between '0' and '8')
- 1 Extraversion 'high' (between '11' and '20'), Neuroticism
   'high' (between '9' and '21')
- 2 Extraversion 'low' (between '0' and '10'), Neuroticism 'high' (between '9' and '21')
- 3 Extraversion 'high' (between '11' and '20'), Neuroticism 'low' (between '0' and '8')

# 4. Perception of the illness

Patients were asked to give their views about how severe their illness had been. They were classified into two categories:

- 0 Low or moderate severity
- 1 High severity

# 5. Knowledge of how others had fared after a similar illness

Patients were asked about their knowledge of how other people (relatives, friends, neighbours or workmates) had fared following a similar illness. On the basis of their responses they were divided into four categories:

- 0 Do not know anything at all about other people who have had heart attacks.
- 1 Know about people who had fared well and returned to normal life and work after their illness.
- 2 Know about people who had fared well and returned to normal

life and work after their illness and also about people who had not fared well after their illness.

3 - Know about people who had not fared well after their illness.

#### 6. Perception of Causes of the Illness (PCI)

This scale had two major purposes:

- To record the patient's ideas regarding possible causes of his illness.
- 2. To determine the degree to which the patient attributed his illness to aspects of his work.

# a. Construction of the PCI

Seventy patients in the pilot study (details of pilot study in Appendix 5) were asked what they had thought were the major causes of their illness. Their responses were recorded and classified into sixteen different categories. Each category comprised an item on the scale. Seven additional items (a to g) were added later. To extend its flexibility the scale was completed by two more items. a. Other possible causes and b. I can not see any apparent cause. The complete twenty-five-item scale was then used in the study. (It is presented in Appendix 6)

#### b. Scoring method

The patient was presented with the twenty-five item scale. He was asked to read the list and to mark not more than five of

the items that he considered to be possible reasons for his illness. Then he was asked to rank the items that he had marked in order of importance, giving number '1' to the one he considered most important, number '2' to the second important one, and so on.

It took the patients between two and seven minutes to complete the scale.

Two scoring methods were applied. In both cases the purpose was to quantify the degree to which the patient related his illness to aspects of his job.

Due to alack of a reliable criterion it was not possible to determine at an early stage the relative accuracy of the two scoring methods and therefore both of them were used in the analyses of the results.

#### Method a

Only items that related the illness directly to aspects of the job and were marked by the patient, were scored. When an item of this kind was given number '1' by the patient it gained five points. When it was given the number '2' it gained four points, number '3' gained three points, number '4' gained two points, and number '5' gained one point. These scores were then summed up to form the final score. The possible range was between 0 (when no item that attributes the illness to aspects of work was marked) and 15 (when all the five items that were marked attributed the illness to aspects of the job).

The correlation between the two scoring methods was r = 0.87, (p = 0.001, N= 268).

# <u>Indep FU variables</u>

#### Medical variables

#### 1. Physical disability

A medical examination that was carried out at the time of the follow-up provided the cardiologists with information on the basis of which they could determine the degree to which the patient suffered a physical disability that could have hindered his rehabilitation. The major factor on the basis of which the degree of disability was determined, was the patient's report of the frequency and intensity, of his experience of chest pain and breathlessness. This report is regarded by many physicians to be the best measure of progress in patients recovering from a MI. (Master, 1954). Since this measure was taken at the time of the follow-up, it was possible that the report of symptoms would have been affected by the rehabilitation progress of the patient and/or that the doctors' assessment would be affected by his knowledge of the rehabilitation progress of the patient.

Two steps were taken in order to minimize these effects:

- a. It was attempted to determine the physical disability on the basis of activities independent of the work situation. (getting out of bed, climbing stairs, walking, gardening).
- b. The cardiologists tried to determine the score before knowing how well the patient had progressed.

Patients were rated by the cardiologist, who examined them,

on a three-point scale. The scoring criteria for each of the points were determined by the physicians at the beginning of the study.

- 0 Mild or no disability at all No adverse ECG changes from normal are present, no physical signs are found on examination, none or only occasional episodes of mild angina and/or dyspnoea on exertion are reported.
- 1 Moderate disability
- Physical signs present, minor tachycardia on examination, considerable amount of angina and/or dyspnoea reported (sufficient to interfere with normal activities and force the patient to stop and rest every now and then).

- 2 Severe disability
- Incapacitating symptoms, angina and dysphoea at rest, physical signs, heart failure, palpitations, a complete incapacitating interence with normal activities.

#### Reliability

The rating on this form was made for each patient by one of four physicians (the two consultants and the two registrars). It was not possible to determine the degree of agreement between the four physicians in the usual direct way since time did not allow

the examination of a patient by more than one doctor. As an alternative the degree of agreement was assessed by comparing the distributions of ratings made by the four physicians. This comparison is presented in table 6.8.

Table 6.8: Distribution of ratings of physical disability

made by four cardiologists in the first follow-up

	Rat		
Doctor	0	1_	2
A	19	11	0
В	30	7	0
C	37	13	0
D	58	11	3

 $x^2 = 4.11$ , df:3, p>0.20, N.S.

There was no reason to assume that any of the physicians examined a greater proportion of patients with a certain kind of disability, than any of the other physicians.

It was concluded that the lack of difference in the distribition of ratings could serve as an indication of a satisfactory 'between judges' reliability.

# 2. GP's advice regarding resuming work

Patients who had returned to work by the time of the followup were asked whether they had consulted their GP's before doing so. Patients who had not returned to work by the time of the follow-up were asked whether they had discussed the possibility of returning to work with their GP's. When patients indicated that a discussion had taken place, they were asked about their GP's opinion regarding their resumption of work. Their answers were classified into theee groups.

- 0 GP advised the patient to return to work.
- 1 GP's advice was not known or was not clear to the patient.
- 2 GP advised the patient to retire, to delay his return to work, or to wait for the hospital follow-up before returning to work.

#### 3. Consultant's advice regarding returning to work.

Here the same approach was applied as in '2' but this time the question referred to the consultant cardiologist's opinion. Responses were classified into three groups:

- 0 Consultant advised the patient to return to work.
- 1 Consultant's advice was not known or was not clear to the patient.
- 2 Consultant advised the patient to retire or to delay his return to work.

#### SOCIAL and OCCUPATIONAL variables

# 1. Wife's opinion regarding the resumption of work

The approach here was similar to that in the case of 'GP's

by D. R. Galdierni (1984)

advice' and 'consultant's advice'. The patients were asked to refer to their wife's opinions. Responses were classified into three groups:

- 0 Wife was in favour of the patient returning to work.
- 1 Wife's opinion was not known or was not clear to the patient.
- 2 Wife advised the patient not to resume work.

# 2. Financial difficulties

Patients who were not back at work by the time of the followup were asked whether being out of work had resulted in a significant decrease in earlings. Their answers were classified into two categories:

- 0 No significant decrease in earnings occured.
- 1 Significant decrease in earnings occured.

# PSYCHOLOGICAL variables

# 1. The General Health Questionnaire (GHQ)

This test was originally developed by D.P. Goldgerg (1969) for screening purposes in community surveys. Its major function was the identification of 'Potential cases' of psychiatric disturbance. According to Goldberg the GHQ is particularly useful for the detection of patients whose otherwise inexplicable

somatic symptoms are accompanied by an affective disturbance that they have not presented to the physician. It can also be used for following the progress of either individuals or cohorts of patients in longitudinal studies.

The clinical features of the psychiatiric illness that are detected by the GHQ are mainly affective neuroses in the form of minor depressions and anxiety states.

In this study the GHQ was used for the measurement of the degree of emotional disturbance or general well-being experienced by patients at each of the two follow-ups. The construction procedure, the format, the scoring method, and reliability and validity studies are described below.

#### Format

Respondents are asked to compare the extent to which they experience each item in the present with their usual experience of it. The emphasis is not on what the patient is usually like but rather on how his present state differs from his usual state. (see questionnaire form appendix 7).

# Construction

On the basis of previous research on areas that cover aspects of adjustment and 'felt distress' and on the basis of Goldberg's experience in psychiatric work, four areas were chosen from which the items were selected:

- a. Depression
- b. Anxiety and 'felt psychological disturbance'.
- c. Objectively observable behaviour. \*

#### d. Hypochondriasis

Ideas for items were obtained from various questionnaires amongst which were: Taylor Manifest Anxiety Scale, MPI, and MMPI. All the items were re-written in the form described.

The original collection of items which amounted to 140 was administered to three calibration groups that were defined as:

Normals, Mildly ill, and Severly ill, on the basis of a psychiatric interview.

Following an item analysis and a component analysis, the number of items was reduced to 60, of which the final form of the GHQ consists.

# Scoring Method

Four alternative scoring methods were considered:

- a. Discriminant function analysis separate weights are computed for each item.
- b. Simple Likert scale The first choice (Not at all) gains no points. The second choice (No more than usual) gains one point. The third choice gains two points, and the fourth gains three. (0,1,2,3).
- c. Modified Likert Basically the same as the simple Likert the only difference being that the second choice gains no points since it only indicates the usual experience of the patient with the item. (0,0,1,2).

d. GHQ method - Here a four-way response scale is condensed into a bimodal scale. The intensity of the complaint is not taken into consideration. Thus a patient who feels 'Rather more than usual' on a certain item gets the same score (one point) as one who feels 'Much more than usual' on the same item. (0,0,1,1).

Following an extensive comparison of the four methods, Goldberg concludes, that the GHQ method gives the most satisfactory results in terms of rate of misclassification and missed cases. The optimal cutting score to distinguish between 'Cases' and 'Normals' is between 11 and 12. The overall misclassification rate is 10.9%. A person who scores above the cutting score would be considered as a potential case.

Goldberg claims that taking into account the intensity has no empirical advantage in terms of misclassification rate which drops by a mere 0.7% when marginally less efficient.

Since none of the other scoring methods offers any empirical advantage and since it was used in all the reliability checks of the questionnaire, it was decided to use the GHQ scoring method in the present study.

#### <u>Reliability</u>

# a. Test-retest reliability

The highly variable nature of the quality measured by the test presents a major problem in the assessment of test retest reliability. For that reason separate test-retest reliability

checks were made for patients who improved, patients who deteriorated, and patients who had not changed in the degree of
emotional disturbance. The table below sums up the results of
this investigation:

Table 6.9: GHQ mean scores on two administrations (six months difference)

	<u>N</u> ,	1st Adm.	2nd Adm.	<u>p</u>
P's who improved	24	20	2.29	<0.001
P's stay the same	55	9.84	10.98	N.S.
P's deteriorated	15	15.66	35.06	<0.001

Changes in the clinical state were indicated here by the patient himself at follow-up.

# b. Split half reliability

That was calculated on data from 853 questionnaires. r = 0.95.

# **Validity**

#### a. Concurrent validity

That was assessed by correlating the scores with an independent assessment of severity of psychiatric disturbance by a standard psychiatric interview. N = 200, r = 0.80.

# b. Sensitivity and specifity

Sensitivity - the number of <u>true positives</u> is expressed as a percentage of all psychiatric cases = 95.7%.

Both figures are satisfactory and compare favourably with those quoted for other screening tests in Medicine.

\* ×

# c. Response Sets

- The GHQ scoring method eliminates the error of central tendency.
- 2. The problem of acquiescence tendency has been partly solved by the form of the response scale adopted. The respondants are not requested to answer Yes or No but to select one of four possible categories.
- 3. The possibility of position set has not been systematically tested, however it does not seem to be of a serious potential influence.

Goldberg reported that social desirability emerged as having very little effect on the responses to this questionnaire.

#### Conclusion

The extensive investigations associated with the construction of the GHQ indicate that it can be regatded as a sufficiently reliable and valid measure of emotional disturbance or general well-being. Items 57, 59 and 60 were ommitted in the present study since they were not considered to be of relevance. (see appendix 7). The score range was, therefore, between '0' - indicating a high level of general well-being and '57' - indicating a low level of general well-being.

# 2. Perception of fitness for work

The patients were asked to rate their degree of fitness for work on a four point scale. The judgement was made on the basis of feelings and impressions that they had formed about their fitness, since they left hospital.

- 0 Not at all fit for work.
- 1 Slightly fit for work.
- 2 Moderately fit for work.
- 3 Fully fit for work.

The patients were asked to assess their fitness for the job they carried out before the illness or a slightly modified job.

#### 3. PCI

This measure was described before (p. ). It was administered on each of the two follow-ups as well as during stay in hospital. It was thought that information obtained by patients after leaving hospital might affect their PCI which in turn may affect their behaviour.

# 4. Intention to resume work

When a patient was not back by the time of the follow-up, he was asked about his plans regarding his future employment. The answers were classified into two categories:

0 - Patient does not intend to return to work at all or does not know when he will be able to resume work. 1 - The patient has a clear intention of returning to work and can give the approximate date of his return.

# b. Dependent variables

# 1. Return to work (RTW)

Patients were classified into two categories:

- 0 Patient has returned to work.
- 1 Patient has not returned to work.

# 2. Resumption of Physical Activity at work (RPA)

Patients were asked to compare their present level of physical activity at work with the pre-illness level. They were divided into three categories according to the degree to which they felt the pre-illness level of physical activity at work was resumed:

- 0 Fully resumed. (85% 100% of the pre-illness level).
- 1 Partly resumed. (60 84% of the pre-illness level).
- 2 Considerably reduced. (Less than 60% of the pre-illness level).

#### 3. Resumption of Mental Load and responsibility at work (RML)

Patients were asked to compare their present level of mental load and responsibility at work with the pre-illness level. They were divided into three categories accirding to the degree to which they felt the pre-illness level was resumed:

- 0 Fully resumed. (85% 100% of the pre-illness level).
- 1 Partly resumed. (60% 84% of the pre-illness level).
- 2 Considerably reduced. (Less than 60% of the pre-illness level).

# 4. Resumption of daily number of hours at work (RHR)

Patients were asked to campare their present daily number of hours at work with their pre-illness one. They were divided into three categories according to the degree to which they felt the pre-illness daily number of hours at work was resumed:

- 0 Fully resumed. (85% 100% of the pre-illness level).
- 1 Partly resumed. (60% 84% of the pre-illness level).
- 2 Considerably reduced. (Less than 60% of the pre-illness level).

# 5. Resumption of Sexual Activity (RSA)

Patients were asked by the examining cardiologist to compare their present level of sexual activity with the pre-illness one. They were divided into three categories according to the degree to which they felt the pre-illness level of sexual activity was resumed:

- 0 Fully resumed. (85% 100% of the pre-illness level).
- 1 Reduced. (Less than 85% of the pre-illness level).
- 2 Not resumed at all.

In cases in which sexual activity had been terminated before the onset of the illness, a fourth category was used:

firepolicable cases

3 - Not applicable.

# Reliability

Between judges agreement was assessed in a similar way to the physical disability scale.

The decision to ask patients about their sexual behaviour was made after the beginning of the study. Consequently, very few of the patients seen by the two consultants (who examined patients at follow-up only at the beginning of the study), were asked this question.

The distribution of ratings made by the four physicians is shown in table 6.10 below.

Table 6.10: Distribution of ratings of resumption of sexual

activity made by four cardiologists in the first

follow-up

Doctor	<u>o</u>	1	2	3
A	4	1	1	4
В	7	0	4	0
, c	31	8	10	3
D	29	12	12	6

Since the numbers rated by the two consultants (A & B) were small, only the distributions of ratings made by the two registrars (C & D) were compared statistically. (Inapplicable cases were not taken into account).

$$x^2 = 0.89$$
 df = 2 p>0.50

It was concluded that this lack of difference in the distribution of the ratings could serve as an indication of a satisfactory 'between judges' reliability.

# 6. Resumption of driving (RD)

Patients were asked to compare their present amount of car driving with the pre-illness one. They were divided into three categories according to the degree to which the pre-illness driving was resumed:

- 0 Fully resumed. (85% 100% of the pre-illness level).
- 1 Reduced. (Less than 85% of the pre-illness level).
- 2 Not resumed at all.

In cases in which the patient had not driven before the onset of the illness a fourth category was used:

3 - Not applicable.

# 7. Change in Life Style (CLS)

This variable was rated on the basis of the patient's report of reductions in various activities used to be carried out before the onset of the illness. The areas referred to were:

Social activities - visiting friends, going to parties,
 active participation in various functions,

etc.

- 2. Leisure activities Travelling, sports activities, etc.
- 3. Domestic activities Gardening, painting and decorating, etc.

The patients were asked to take into account reductions they made in the three areas and to rate the over-all degree of change in their life-style at the time of the follow-up, from the one they lead before the illness, on a four point scale:

- 0 No change at all (90% 100% of the pre-illness level).
- 1 Mild change (75% 89% of the pre-illness level).
- 2 Moderate change (60% 74% of the pre-illness level).
- 3 Considerable change (Less than 60% of the pre-illness level).

# C. Procedure

#### 1. Hospital Management

The management of the patients from the onset of the symptoms that preceded their admission to the time of their discharge from hospital, is described here. The description is divided into three parts as follows:

- a. The onset of the illness.
- b. The coronary monitoring unit (CMU).
- c. The medical ward.

#### a. The onset of the illness

The onset of the illness is commonly characterised by chest pain. The pain is often reported to have radiated to other parts of the body, in particular the arms and the neck. One or more of the following symptoms are usually reported to accompany the chest-pain: profuse sweating, breathlessness,

pallor and intense anxiety associated with a feeling of doom and impending death. However, the onset of the illness does not follow a highly specific pattern. A considerable degree of variety exists in the circumstances under which it occurs and the type and intensity of the associated symptoms.

# b. The Coronary Monitoring Unit (CMU)

#### 1. Structure

All patients were admitted to the Cardiac Monitoring Unit (CMU) of the Kingston General Hospital in the centre of Hull.

The unit is a self-contained nine-bedded ward with mixed sexes. Each bed is equipped with an oscilloscope (Cardiorater, Cardiac recorders, with rectangular screen 4 x 3 inches), piped oxygen (humidified), piped suction, and an aneroid sphygmomanometer fixed to the wall above the head of each bed. The beds stand 6½ feet apart and are clearly visible from the nursing station at one end of the ward. A single channel oscilloscope incorporated in the nursing-station-desk permits the serial inspection of the nine electrocardiograms. An alarm switch to summon medical and nursing aid is placed at the head of each bed and also in the nursing station. When this is thrown, the duty registrar, house officer and three senior nurses are summoned by a multitone call system. A D.C. defibrilator, a pacemaker and an emergency drug trolley are kept in the unit.

The unit is under the joint supervision of two consultant physicians, who alternate performing a complete daily ward round. Continuous medical cover is provided by three house-officers

attached to the cardiac department, at least one of whom is in or near the unit at all times. One also sleeps in a cubicle adjoining the unit. Two registrars complete the medical complement. The nursing staff is of both sexes and consists of a male charge nurse, a sister, three staff nurses, five State enrolled nurses, and four junior nurses (students, pupils, and auxiliaries). An approximate three-shift system is worked throughout the 24 hours.

The unit provides a continuous service for emergency admissions, entry being by direct request from general practitioners, by transfers from the casualty department or other wards, or following domiciliary visits by the consultant staff. Patients of any age are eligible for admission.

For more details about the CMU see Aber et al. (1969).

#### 2. Diagnosis

Conventional medical criteria employing ECG and serum enzymes measures were used for diagnostic purposes (Marott et al, 1973).

#### 3. Routine

Patients admitted to the unit routinely received continuous humidified oxygen for 48 hours. An intravenous infusion of 5% dextrose solution was given for the same period; this also served as an immediate channel for the administration of drugs in an emergency. Patients with proven or threatened myocardial infarction were treated with intravenous heparin, and with oral phenin-

dione. These drugs were withheld when the diagnosis of ischaemic heart disease was in doubt, and when otherwise contraindicated. Apart from anticoagulants no drug was given routinely. Digoxin or Ouabain and diuretics were administered when there were clinical signs of heart failure or radiological evidence of pulmonary oedema. Heroin was given for the relief of pain. Prochlorperazine was prescribed in cases of nausea and vomiting. Valium and chlorpromazine were used to relieve excessive anxiety.

Routine investigations during the patient's stay in the unit included conventional 12-lead electrocardiograms and serum enzyme estimations for the first three days. A portable chest x-ray film, haemoglobin, white cell count, sedimentation rate, blood urea, and serum electrolytes were obtained within the first 24 hours. Arterial blood gas analyses were performed in patients with cardiac failure or persistent dysrhythmias and following resuscitation from cardiac arrest.

The duration of stay in the unit was intended to be three days in uncomplicated cases. In practice this has been sometimes prolonged to four or five days owing to a shortage of beds for 'convalescent' patients in the medical ward. Throughout this period, patients remained on bed rest but they were allowed to move, sit up, talk to each other and have visitors. They were rarely unable to feed themselves or to use the mobile commode at their bed side.

#### c. The medical ward

#### 1. Routine

This phase began following the initial three-day period of

investigations in the CMU.

All the male patients were transferred to the same medical ward. They remained under the care of one or other of the two supervising consultants for the rest of their time in hospital. Continuous medical cover on the medical ward was given by the medical staff of the cardiac department. This was consistent with the principle of continuity of the medical supervision throughout the patients' stay in hospital, advocated by the two consultants.

In uncomplicated cases bed rest was continued up to six or seven days from admission. Patients were then allowed to sit out of bed for short periods, gradually increasing their physical activity to full mobilization on about the tenth day in hospital. Provided the recovery was uncomplicated the patients stayed on the medical ward for between ten and fourteen days with an average of eleven (the average duration of the total stay in hospital was fourteen days).

#### 2. The two supervising consultants

It has been mentioned earlier that from the moment they were transferred to the medical ward patients were assigned to the care of one of the two supervising consultants of the cardiac department.

In many ways the treatment given by the two consultants

(referred to as '0' and '1') was the same but there were some

differences in their approaches. These differences are pointed

out here.

Both consultants saw their patients between two and three times a week. These visits normally took place during a ward round, and lasted about five minutes. They were carried out in the presence of the other members of the medical staff of the cardiac department who participated in the ward rounds.

The treatments regarding mobilization, diet, and drug therapy, administered by the two consultants were very much the same, although consultant '0' had a somewhat greater tendency to carryout thorough investigations of residual symptoms and complaints, to adminster drugs and to continue the prescription of anticoagulants after discharge from hospital.

The most noticeable difference between the two was in their approach to post hospital follow-up. Consultant '1' gave all his patients an early, four to six-week follow-up appointments whilst consultant '0' did not normally review his patients before six or eight months. From the point of view of the patient's return to work this difference is particularly important since a report summarising the results of the review was sent by consultant '1' to the general practionners. (GP's). These reports usually included the consultant's opinion regarding when and to what extent the patient was fit to resume work. An example of such a report is given below.

Example of Dr '1's follow-up report to General practionners

Dear Dr. G.P...

re: Mr. T.M. aged 56 years, Hull

All was satisfactory when I saw him in Outpatients to-day with no signs of cardiac failure. He has had no symptoms referrable to his heart since discharge and should be ready to resume work in a month.

Yours sincerely,

11'

The two men also differed in some personality characteristics, especially in the sense that consultant '0' tended to be more extraverted, and this was reflected in their relationships with both the patients and staff.

In summary, consultant '0' was more extraverted, carried-out more detailed investigations of residual complaints and made a somewhat greater use of drugs, both in hospital and following discharge. He reviewed his patients between six and eight months after their discharge from hospital.

Consultant '1' was of a more introverted personality. He reviewed his patients between four and six weeks following their discharge from hospital.

#### 3. Discharge from hospital

On leaving hospital patients were advised to continue their rest at home for about two weeks and then gradually to increase the amount of physical activity. No specific routine was employed in explaining the nature of the illness. Detailed instructions regarding the resumption of work, sex or other activities that were carried out prior to the illness, were not routinely given. A summary containing the diagnosis, in-patient progress and

relevant comment was sent to each patient's GP by the supervising consultant. There were no systematic differences between the two consultants in the content of these reports. An example of such a summary is given below.

# Example of a discharge letter

Dear Dr. G.P.,

#### re: Mr. G.N., age 60, Hull

This patient was admitted to my care on 10.1.74 with the clinical picture of acute myocardial infarction.

On 7.1.74 at 1600 hours he began to experience severe epigastric pain, that radiated to the substernal region and persisted for an hour. At 1850 hours on the same day he developed chest discomfort which lasted for two hours.

On 8.1.74 at 1900 hours his chest and epigastric discomfort returned.

The next day at 1545 hours, he experienced the longest attack of discomfort which remained evident for seven hours, causing his admission to hospital.

Serial ECG and myocardial enzyme studies confirmed the presence of anterior infarction.

From the clinical standpoint his immediate progress caused us some concern since he was in left heart failure. But subsequently he made reasonable headway and is now returning home to pursue a graduated convalescence, his current therapy being:

Digoxin 0.25 mg. b.d.
Lasix 80 mg daily
Slow K. 1200 mg. b.d.

He should also carry Angised for use as required. I will see

him again for review in a few month's time.

Yours sincerely,

.0.

#### Summary

The procedure through which the patients went from the onset of their symptoms till their discharge from hospital has been described.

Following the acute onset of symptoms they were admitted as emergencies to the CMU, in which they stayed for three days for primary treatment and investigations.

Subsequently they were transferred to a medical ward in which they stayed for a further eleven or twelve days.

The first six days in hospital were spent in complete bed rest following which the patients were allowed up and were gradually mobilized. After a further six or seven days they were ready for home.

When they left hospital the patients were told to continue their rest and to gradually increase their physical activity.

When the job was physically demading they were advised to modify it. No specific instructions were given as to when they should return to work or resume other activities.

It is pointed out that the routine descibed here is carried out in the Kingston General Hospital, Hull, and it may be different in other hospitals.

## 2. The research Procedure

The research procedure consisted of four separate meetings with each patient. The purpose, the time it was held, the location and the person who carried it out, are summarised for each meeting in table 6.11.

#### Table 6.11: The four meetings

#### Meeting No:

	1.	2.	3.	4.
Time held	Two or three days after admission.	Between ten and twelve days following ad-mission.	Four months after dis- charge from hospital.	after dis-
Purposes	a. To introduce the patient to the research. b. To assess anxiety.	To measure independent variables. (Indep HOS).		a. To measure dependent variables. b. To measure independent variables.
Location	Cardiac mon- itoring unit.	Medical ward.	Out-patient clinic.	Out-patient clinic.
Interview-	Psycholog- ist.(B.K.).	Psycholog- ist.(B.K.).	a. Psychol- ogist.(B.K) b. Cardiol- ogist.	a. Psycholo- gist.(B.K.). B.Cardiolo- gist.

The four meetings are further discussed below.

#### Meeting No. 1.

#### Purposes

a. To introduce the patient to the research and to obtain his

agreement to cooperate .

b. To assess his anxiety during the acute stage of the illness.

#### a. Introduction of the patient to the research

Patients were first approached on either their second or their third day in hospital (this point will be explained later). The author introduced himself to the patient and informed him that he (the patient) had been selected to participate in a research project. It was explained that the purpose of the research was to learn about the experience of various people in the first few months following their illness. The requirements of the research in terms of the patients participation were specified. It was emphasised that no direct benefit from the study was expected to be gained by the participants and that they should not feel committed to take part in it.

Only four patients refused to participate in the study.

Those patients who agreed to cooperate were asked to fill-in the Affect Adjective Scale which was used for the assessment of anxiety.

#### b. Assessment of anxiety during the acute stage of the illness

It was desirable to approach the patients at the time of admission or shortly afterwards in order to obtain a measure of their anxiety at that stage. However, this was not always possible due to the physical condition of some patients. Therefore, it was decided to approach the patients on their second day in the CMU, when they have normally been relieved of the initial

symptoms. The meeting took place between eighteen and thirty hours after admission, with an average of twenty four hours. An assessment of the level of anxiety during the initial acute stage of the illness had to be done retrospecively. In order to measure the effect of the retrospective judgement on the anxiety score some of the patients were approached on their third day in the CMU instead of the second.

Patients who were approached on their second day in hospital were first asked to respond to the .AAS according to how they feel Today (on the second day). When that was completed they were given a fresh form and were asked to answer it again, but this time according to how they felt Yesterday (the day on which they were admitted to the CMU). In the case of Today they were asked to refer to their feelings since they woke up that morning. In the case of Yesterday, they were asked to refer to their feelings from the time of admission.

This procedure provided two anxiety measures for each patient.

One for his first day in the unit and one for his second day.

Patients who were approached on their third day in hospital responded three times:

- a. According to how they feel Today (on their third day).
- b. According to how they felt Yesterday (on their second day).
- c. According to how they felt on the Day of Admission (on their first day).

That provided three anxiety measures for each patient. One for his first day in CMU, one for his second day in the CMU and

one for his third day.

Under this procedure the patients were divided into two groups. Group 'A' consisted of patients for whom AAS scores were available for each of the first three days in hospital. Group 'B' consisted of patients for whom AAS scores were available only for each of the first two days in hospital. The effect of the retrospective measurement was examined as follows. The two groups were compared with regard to:

- a. Their AAS scores on day 2 in hospital The absence of significant differences would indicate that the retrospective measure of the anxiety level on day 2 did not produce different results from the measurement taken on the actual day.
- b. Their AAS scores on day 1 in hospital for both groups this measure was retrospective. However, the measure for Group 'A'was taken 2 days after admission, whilst for group'B' it was taken 1 day after admission. The absence of significant differences would indicate that a delay of 2 days in the measurement of anxiety did not produce different results from a delay of one day.

Neither of these comparisons would provide a direct evaluation of the effect of the retrospective measurement on the AAS score for day 1. However, they will provide some estimate of this effect.

The results of the two comparisons are presented in tables 6.12 and 6.13. In both cases a t-test for unrelated measures was used.

Table 6.12: Comparison of groups 'A' and 'B' on AAS scores on day 2 in hospital

AAS scale	Group	<u>N</u>	Mean	SD	<u>t</u> <u>df</u>	p(2 - tailed)
'Anxiety plus'	A	158	4.67	4.63	-1.92 220	<0.056
	В	64	3.44	3.56		
'Anxiety minus'	A	158	8.12	4.54	3.22 220	<0.001
	В	64 1	0.11	3.06		

Table 6.13: Comparison of groups 'A' and 'B' on AAS scores on day 1 in hospital

AAS scale	Group	N	Mean	SD t df p(2 - tailed)
'Anxiety plus'	A	158	10.73	5.91 -1.07 220 < 0.288(N.S.)
	В	64	9.79	6.00
'Anxiety minus'	A	158	3.59	3.38 1.16 220 < 0.246(N.S.)
	<b>B</b>	64	4.17	3.26

The only significant difference between groups 'A' and 'B' was noticed in the 'Anxiety minus' score for day 2 in hospital.

This suggests that patients expressed a slightly higher level of anxiety with regard to day 2, when the measure was taken retrospectively. A similar tendency was noticed with regard to the

'Anxiety plus' score for day 2. The difference, however, did not reach significance level.

The whole meeting did not normally last longer than ten minutes at the end of which the patient was told that he would be seen again in about a week, in the medical ward.

#### Meeting number 2

Purpose: to collect data related to Indep HOS variables.

#### Procedure

This meeting was held in the doctors' office in the medical ward between ten and twelve days after admission to hospital.

By this stage the patients were fully mobile and were almost ready to go home. Most of the information related to SOCIAL and OCCUPATIONAL variables and PSYCHOLOGICAL variables was obtained by means of a structured interview. Self-administered questionnaires were also used during the meeting. The only PSYCHOLOGICAL variables not measured during this meeting were Anxiety and Depression expressed on the ward. These were assessed by Sister on a five point scale.

Indep HOS Medical variables were assessed for each patient by the medical staff, on the basis of information recorded in the casenotes.

By the end of the interview, that lasted about 30 minutes the patient was told that he would be seen again at the out-patient clinic in about four months time. It was explained to him that the follow-up meeting would involve a medical check-up and a short

interview.

#### Meeting number 3

#### Purposes:

- a. To collect data related to Indep FU variables.
- b. To collect data related to dependent variables.
- c. To measure test-retest reliability of the EPI.

#### Procedure

The third meeting, which was the first follow-up, took place at the out-patient clinic about four months after discharge from hospital. For some patients (those who have already been seen 4-6 weeks after discharge home for a medical check-up (most of whom under the care of consultant '1') it was the second hospital check-up. For the others it was their first hospital visit after their discharge.

Self administered questionnaires (namely the EPI, PCI and GHQ) were filled-in by the patients in the waiting room.

The data regarding Indep FU SOCIAL and OCCUPATIONAL variables, PSYCHOLOGICAL variables and MEDICAL variables concerned with GP's and consultant's advice regarding work as well as information regarding all the dependent variables but one (RSA), were obtained during an interview with the author. Information related to the remaining Indep FU MEDICAL variables and that related to RSA was obtained by the cardiologist, during the medical examination.

By the end of the meeting the patients were told that they

would be seen again in six-months time at the out-patient clinic for another medical check-up and an interview.

#### Meeting number 4

#### Purposes:

- a. To collect data related to Indep FU variables.
- b. To collect data related to dependent variables.

#### Procedure

The fourth meeting, which was the second follow-up, took place at the out-patient clinic about ten months after discharge from hospital. It was almost identical in its procedure to the third meeting. The only difference being that the EPI and the PCI measures were not taken this time.

#### CHAPTER 7:

# Results and discussion

# Introduction

- A. The structure of the result chapters
- B. The rate of survival
- C. The distribution of patients on the independent variables

#### A. The structure of the result chapters

The results of the analyses carried out to examine relationships between dependent and independent variables are reported here. There are seven chapters, each deals with one of the seven dependent variables. The seven chapters are of a similar structure. The results in each one of them are presented in the following pattern:

#### 1. Distribution of patients on the dependent variable

- a. Patients for whom information was available on both follow-ups.
- b. Patients for whom information was available on at least one follow-up.

# 2. The search for significant associations between dependent and independent variables

# First follow-up - 4 months after leaving hospital

# Univariate analyses

Independent variables whose relationship with the dependent variable were not examined

#### Results of the statistical analyses

- a. Independent variables measured during stay in hospital (Indep HOS).
- b. Independent variables measured at follow-ups (Indep FU).

Further analyses and discussions of variables found to be significantly associated with the dependent variable.

# Multivariate analysis - The Discriminant Function Analysis

- a. The relative contribution of independent variables to the discriminant function.
- b. Test of significance on eigenvectors.
- c. 'Hits and Misses' table.

## Second follow-up - ten months after leaving hospital

The same pattern as that described above for the first follow-up.

# 3. Summary and conclusions

Some of the sections of the structure presented above, are further explained below.

# 1. Distribution of patients on the dependent variable

Due to a shortage of time it was not possible to carry out the two follow-ups on all the patients included in the sample. When the data collection procedure was terminated there were patients who had not been seen for a second follow-up. Consequently there were two types of patients in the sample. Those, who were seen on two follow-ups and for whom data were available for both follow-ups and those who were seen only on the first follow-up and for whom data were available only for that follow-up. In addition there were a number of patients who did not attend any of the follow-ups. The number of patients on whom information was available, is indicated for each one of the analyses presented in the following chapters.

The distribution of patients on the values of the dependent variable presented in the chapter, at each follow-up, is shown in two different tables.

#### Patients for whom information was availabe on both follow-ups

This table includes only those patients for whom information on the dependent variable was available on both follow-ups. That enabled the assessment of the changes on the dependent variable within patients from the first to the second follow-up. Since the dependent variables were measured on 2 or 3-point scales, the most appropriate statistical test for the significance of the change would be a non-parametric one (e.g. Wilcoxon matched-pairs signed-ranks test, Siegel, 1956). However, in view of the excessive number of ties (which would make it virtually impossible to use a non-parametric test) it was decided to apply a t-test for related samples.

# Patients for whom information was available on at least one follow-up

This table includes all the patients for whom information on the dependent variable was available on at least one of the

two follow-ups. Therefore, the total number of observations here is greater than in the first table. The number of patients for whom information was available on the first follow-up is different from that on the second follow-up. The statistical analyses here were aimed at testing significant differences in the proportions of patients in the various categories, of the dependent variable between the two follow-ups (rather than changes within patients). The statistical test used was the Kolmogorov-Smirnov test for two unrelated samples (Siegel, 1956).

# 2. The search for significant associations between dependent and independent variables

# First follow-up - 4 months after leaving hospital

### Univariate analyses

These analyses were aimed at testing the association between each one of the dependent variables and independent variables.

The following statistical methods were used:

#### Nonparametric

 $x^2$  test (Siegel, 1956).

Fisher exact probability test (Siegel, 1956).

 $\phi$  - to express the magnitude of a relationship analysed by a  $x^2$  test in the case of df = 1.

$$\phi = \frac{x^2}{n}$$
 (Cohen, J., 1965).

C - to express the magnitude of a relationship analysed by  $a \times X^2$  test in the case of df >1.

$$C = \frac{x^2}{n + x^2}$$
 (Cohen, J., 1965).

Parametric (McNemar, 1955)

Biserial correlation

Point biserial correlation

Pearson product moment correlation

The statistical method applied in each case depended on the types of variables involved.

Independent variables measured during stay in hospital (Indep HOS) are separated from those measured at follow-up (Indep FU). This was done in view of doubts regarding the true independence of the Indep FU variables. When a significant relationship is found between an Indep HOS variable and a dependent variable it can be accounted for by:

- a. The influence of the Indep HOS variable on the dependent variable. OR
- b. The influence of a third variable on both OR
- c. the operation of a mediating variable.

It can not be accounted for by

d. An effect of the dependent variable on the Indep HOS variable simply because all the Indep HOS variables were measured months before the dependent variables. However, in the case of the Indep FU variables, since they were measured at the same time as the dependent variables, the possibility that explanation d. (above) accounts for the significant relationship can not be excluded. For example, a high and significant positive correlation was found between 'Return to work' and 'Perception of fitness for work',

(table 8.3 ), indicating that the greater the degree to which patients perceived themselves as fit for work, the greater the likelihood of resuming work. Both these variables were measured at the time of the follow-up, after the patient had succeeded or failed to resume work. One possible interpretation of this significant association could be that whether or not patients would return to work before the time of the follow-up, would depend on the degree to which they perceived themselves as fit for work. However, it can also be argued that the causality here is in the opposite direction. - That people who have resumed work tend to perceive themselves as fit for work to a greater degree than people who have not.

This difficulty would apply in the case of all those independent variables measured at follow-up.

Since no comprehensive theory with regard to factors affecting cardiac rehabilitation exists, and in view of the controversies and deficiencies in the existing literature it was decided not to make any specific hypotheses with regard to relationships between dependent and independent variables. In the discussion of the results it is attempted to point out the possible meanings of significant associations between dependent variables and both types of independent variables. (Indep HOS and Indep FU).

# Multivariate analysis

This type of analysis is used when values of a certain dependent variable are to be predicted on the basis of a group of independent variables which are themselves inter-related. The major usefulness of this type of analysis is in assigning different

weights to the independent variables. The values of the independent variables can then be multiplied by their weights and combined together to form the predicted score on the dependent variable. The regression equation would be of the following type:

$$Y = x_1^w_1 + x_2^w_2 + \cdots + x_n^w_n$$

Y = The value of the predicted variable  $x_1, x_2, x_n = The$  weights assigned to independent variables  $x_1, x_2, x_n = x_1, x_1, x_2, x_n = x_1, x_2, x_1, x_2, x_1, x_2, x_2, x_1, x_2, x_2, x_1, x_2, x_2$ 

The size of the relative contribution of a particular independent variable in the regression equation can be expressed by multiplying its weight by its standard deviation.

In the present study, multivariate analyses were applied in order to find out the relative contribution of the independent variables in predicting each of the dependent variables at each follow-up. In view of the fact that the dependent variables were measured on two or three-point scales, the multivariate method chosenwwas the discriminant function analysis (Cooley, 1962).

Not all the independent variables were included in the discriminant analyses. The following were excluded:

a. Those that reduced the size of the sample substantially - The discriminant function analysis is carried out only on those subjects for whom information on all variables is available. Therefore, independent variables on which the information was missing for a great number of patients, were omitted.

- b. Those in which the variance was particularly low.
- c. Those measured at follow-up In view of their doubtful true independence.
- d. Those which were not considered to be of any possible relevance to the dependent variable.

The results of the multivariate analyses are presented in a series of tables as follows:

The first table shows the relative contribution of independent variables to the distinction between the categories of the dependent variable. The following values are presented in this table.

The scaled eigenvector - it indicates the relative contribution of each independent variable to the distinction between the various categories of the dependent variables. It is calculated by multiplying the eigenvector of the independent variable by its standard deviation. The variables in the table are arranged in a decreasing order according to the size of the eigenvectors. However, it is important to remember that the fact that a certain independent variable appears low on the list, is not always an indication of a weak association with the dependent variable. It can also mean that this variable is highly correlated with another independent variable which is higher up on the list. Therefore, (despite the possible association with the dependent variable) its additional relative contribution to the distinction between the various categories of the dependent variable is low.

The eigenvector - This is the weight by which the value of the independent variable would be multiplied when included in a discriminant function.

The F value - This is obtained as a result of a one-way analysis of variance carried out in the process of the discriminant function analysis to determine to what extent a particular independent variable distinguishes between the values of the dependent variable.

The second table indicates the degree to which the discriminant function can distinguish significantly between the values of the dependent variables. It presents the results of two tests of significance - Wilk's lambda and Rao's F test.

The third table presents the accuracy with which the present sample would be predicted (in terms of the dependent variable values) if the discriminant function were applied.

# Second follow-up - 10 months after leaving hospital

The analyses of the data and the presentation of results at the second follow-up, are of the same pattern as those of the first follow-up.

# 3. Summary and conclusions

The results and main conclusions of each chapter are summarised.

### B. The rate of survival

Table 7.1 shows the rate of survival amongst the 183 patients in each of the follow-ups. Patients who were not alive at the time of the follow-up, were not included in the statistical analyses.

Table 7.1: Rate of survival at four and ten months following discharge from hospital

	Status a	ıp		
Follow-up	Alive	Dead	Total	Missing Information
First	173	10	183	0
	94.5%	5.5%	100%	
Second	130	14	144	39
	90.3%	9.7%	100%	

These figures are consistent with findings of previous studies (Chapter 2).

# C. The distribution of patients on the independent variables

Table 7.2 shows the distribution of patients on the independent variables. A distinction was made between categorised and continuous variables. For categorised variables the number and percentage of observations in each category are given. For continuous variables the mean, standard deviation (SD), the minimum value (Min) and the maximum value (Max) are given. For both types of variables the number of valid observations (Valid) and the number of missing observations (Missing) are given.

Table 7.2: Distribution of patients on the independent variables

Variable Measured during stay in hospital				v 1				
MEDICAL VARIABLES categorised	<u>0</u>	Cated 1	ory 2	<u>3</u>	4	<u>5</u>	<u>Valid</u>	Missing
The consultant	95 51.9	88 48.1	**	-	-		183	0
Peel index	_		14 9.5		2		147	36
Clinical grading	-	138 75.4	35 19.1	7 3.8	3 1.6		183	0
Severity of the illness	127 69.8	40 22	15 8.2		-		182	1
SOCIAL and OCCUPA - TIONAL variables categorised								
Socio economic statu	s -	13 7.1	37 20.2	95 51.9	21 11.5	17 9.3	183	0
Educational level		56 30.6		-	-	-	183	0
Responsibility at work	87 47.5	72 39.3		-	-	_	183	0
Physical demand at work	40 21.9		65 35.5	22 12.0	5 2.7	-	183	0
Mental demand at work	27 14.8		75 41.0		26 14.2	-	183 183	0
Type of job		122 66.7	-	-	•		183	0
Type of occupation			110 60.4	19 10.4			182	0.
Whether or not self employed	160 87.4	23 12.6	-		•		183	0
Occupational record		14 7.7	159 86.9	-	-		183	0

Table 7.2 continued:

<u>O</u>	tegory 2	<u>3</u>	<u>4</u> <u>5</u>	<u>Valid</u>	Missing
175 95.6	7 1 3.8 0.	<b>-</b> 5		183	0
164 89.6	18 1 9.8 0.	5		183	0
			4 - 2.2	183	0
			- I	177	6
117 64.3	30 19 16.5 10.	12 4 6.6	4 -	182	1
		-		183	0
Mean	SD	MAX	MIN	Valid	Missing
52.4	2 6.89	64	32	183	0
10.1	4 4.23	16	0	116	67
				STATES OF STATES OF STATES	a service a production
8.5	3 4.31	17	0	150	33
3.5		17	0	150 155	28
	4 3.39			and a second constant on	The second secon
3.5	4 3.39 6 3.02	15	0	155	28
3.54 2.40	4 3.39 6 3.02 9 4.34	15	0	155 116	28 67
	0 175 95.6 164 89.6 176 96.2 87 49.2 117 64.3 116 63.4	175 7 1 1 95.6 3.8 0.  164 18 1 89.6 9.8 0.  176 2 1 96.2 1.1 0.  87 62 28 49.2 35.0 15.  117 30 19 64.3 16.5 10.  116 67 63.4 36.6  Mean SD 52.42 6.89	0 1 2 3  175 7 1 - 95.6 3.8 0.5  164 18 1 89.6 9.8 0.5  176 2 1 0 96.2 1.1 0.5 0  87 62 28 - 49.2 35.0 15.8  117 30 19 12 64.3 16.5 10.4 6.6  116 67 63.4 36.6	0     1     2     3     4     5       175     7     1     -     -     -       95.6     3.8     0.5       164     18     1     89.6     9.8     0.5       176     2     1     0     4     -       96.2     1.1     0.5     0     2.2       87     62     28     -     -     -       49.2     35.0     15.8     -     -     -       117     30     19     12     4     -       64.3     16.5     10.4     6.6     2.2       116     67     -     -     -       63.4     36.6       Mean     SD     MAX     MIN       52.42     6.89     64     32	0     1     2     3     4     5       175     7     1     -     -     -     183       95.6     3.8     0.5     .     183       164     18     1     183       89.6     9.8     0.5     .       176     2     1     0     4     -     183       96.2     1.1     0.5     0     2.2     .       87     62     28     -     -     -     177       49.2     35.0     15.8     .     -     182       117     30     19     12     4     -     182       64.3     16.5     10.4     6.6     2.2     .       116     67     -     -     -     -     183       Mean     SD     MAX     MIN     Valid       52.42     6.89     64     32     183

# Table 7.2 continued:

Va	ri	ak	1e

201101101010101								
PSYCHOLOGICAL Continuous	Mean	SD	<u>M</u> 2	AX	MIN		<u>Valid</u>	Missing
EPI Neuroticism	9.19	4.6	51 :	21	0		183	0
EPI Lie Score	4.10	1.7	75	8	0		183	0
PCI Scoring metho	d 2.18.	2.8	B 1	L 2	0		183	0
		Catego	or.A					
Categorised	<u>o</u>	1	2	<u>3</u>	4	<u>5</u>	<u>Valid</u>	Missing
Anxiety on the ward	42 25.1	61 36.5	44 26.3	13 7.8	7 4.2	<b>-</b> .	167	16
Depression on the ward	112	38	16	0	1	-		
Perception of the illness	168 91.8	15 8.2		-	_	-	183	0
PCI Scoring method b	102 55.7		47 25.7	_	-	-	183	0
Knowledge of how others had fared	168 91.8	2	13 7.1	-	_	-	183	0
Intention to resume work	20 37.0	34 63.0	-	-	_		54	129
EPI Extraversion & Neuroticism combined	45 24.6	48 26.2	44 24.0	46 25.1		-	183	0
Measured at first follow up								Nicesia.
MEDICAL VARIABLES Categorized	<u>o</u>	1	2	<u>3</u>	4	<u>5</u>	<u>Valid</u>	Missing
Physical disabil- ity	134 83.2	27 16.8	0	-	<u>.</u>	-	161	22
GP's advice regarding work	108 65.1	41 24.7	17	_	-	•	166	17
Consultant's ad- Vice regarding Work	101 62.7	4 2.5	56 34.8	andrae gala arays s			161	22

# Table 7.2 continued:

<u>A</u> -							
<u>o</u>	Cated	gory 2	<u>3</u>	4	<u>5</u>	<u>Valid</u>	Missing
119 7558	35 22.3	3 1.9	-	-	-	157	26
			1000	-	-	161	22
52 33.5	48 31	55 35.5		-	-	155	28
20 37%	34 63%	-	-	-	_	54	129
36 67.9	17 32.1	-	-	7	-	53	130
- No. e - C						. Ka-p	
Mean	1	SD	Max		Min	Valid	Missing
		9.49	45		0	160	23
4.0	9	3.80	14		0	155	28
<u>s</u> 0	<u>1</u>	ategor 2	<u>З</u>	4	<u>5</u>		
		2 1.7	di jira	-	•	117	66
93 75.6	21 17.1	9 7.3		-		123	60
	16 9.9 52 33.5 20 37% 36 67.9 Mean 8.4 4.09	Cated  O  1  119     35     7558    22.3  16    20     9.9    12.4  52    48     33.5    31  20    34     37%    63%  36    17     67.9    32.1  Mean     8.44  4.09  S    O     1  102    13     87.2    11.1  93    21	Category  0 1 2  119 35 3 7558 22.3 1.9  16 20 43 9.9 12.4 26.7  52 48 55 33.5 31 35.5  20 34 37% 63%  36 17 - 67.9 32.1  Mean SD 8.44 9.49  4.09 3.80  Solve Categor  102 13 2 87.2 11.1 1.7  93 21 9	Category  0 1 2 3  119 35 3 -  7558 22.3 1.9  16 20 43 82 9.9 12.4 26.7 50.9  52 48 55 - 33.5 31 35.5  20 34 37% 63%  36 17 67.9 32.1  Mean SD Max 8.44 9.49 45  4.09 3.80 14  S Category 2 3  102 13 2 - 87.2 11.1 1.7	O       Category       3       4         119       35       3       -       -         7558       22.3       1.9       -       -         16       20       43       82       -         9.9       12.4       26.7       50.9       -         52       48       55       -       -         33.5       31       35.5       -       -         20       34       -       -       -         36       17       -       -       -         67.9       32.1       -       -       -         Mean       SD       Max         8.44       9.49       45         4.09       3.80       14         S       0       1       2       3       4         102       13       2       -       -         87.2       11.1       1.7       -       -         93       21       9       -       -	Category       1       2       3       4       5         119       35       3       -       -       -         16       20       43       82       -       -         9.9       12.4       26.7       50.9       -       -         52       48       55       -       -       -         33.5       31       35.5       -       -       -         20       34       -       -       -       -         36       17       -       -       -       -         67.9       32.1       -       -       -       -         Mean       SD       Max       Min         8.44       9.49       45       0         4.09       3.80       14       0              5       0       1       2       3       4       5         102       13       2       -       -       -         87.2       11.1       1.7       -       -       -         93       21       9       -       -       -	Q       Category 1       2       3       4       5       Valid         119       35       3       -       -       -       157         16       20       43       82       -       -       161         9.9       12.4       26.7       50.9       -       -       161         52       48       55       -       -       -       54         33.5       31       35.5       -       -       -       54         36       17       -       -       -       -       53         Mean       SD       Max       Min       Valid         8.44       9.49       45       0       160         4.09       3.80       14       0       155         5       0       1       2       3       4       5       Valid         102       13       2       -       -       -       117         87.2       11.1       1.7       -       -       123         93       21       9       -       -       -       -       123

Table 7.2 continued:

#### SOCIAL and OCCUPA-TIONAL Variables

		Cato	gory					
Categorized	<u>o</u>	1	2	3	4	<u>5</u>	Valid	Missing
Wife's opinion regarding work	95 79.8	19 16	5 4.2	-	<u>.</u>		119	64
PSYCHOLOGICAL Variables Categorized				á				
Perception of fit- ness for work			35 28.2	78 62.9	-	-	124	59
Intention to resume work	14 77.8	4 22.2	-		-	_	18	165
Financial difficulties	10 58.8	7 41.2	-	-	_	_	17	166
PSYCHOLOGICAL Variables		X - (		Mar.	u			
Continuous	<u>Mean</u>	a .	SD	<u>Max</u>		<u>Min</u>	<u>Vali</u>	d Missing
GHQ	6.0	5	8.95	38		0	123	60

<sup>\*</sup> Since the variance in these variables was minimal it was decided to exclude them from the analyses. It will be noticed that the number of patients in some of the categories of other variables was very small. These variables were modified, for purposes of statistical analyses, by pooling categories. Further information about modification of variables is given later.

<sup>\*\*</sup> Lower figures indicate percentage.

#### CHAPTER 8:

# Results and Discussion Return to Work (RTW)

- 1. Distribution of patients on RTW
- 2. The search for significant associations between RTW and independent variables
- 3. Summary and conclusions

#### 1. Distribution of patients on RTW

Table 8.1: Distribution of patients on RTW - only those for whom information was available on both follow-ups

	Status at f	ollow-up	
Follow-up	Back at work	Not back at work	Tota1
First	79	48	127
	62.2%	37, 8%	100%
Second	107	20	127
	84.3%	15*7%	100%

The likelihood of patients having resumed work by the time of the second follow-up was significantly higher than that in the first follow-up.

$$t = 5.49$$
,  $df = 126$ ,  $p = 0.001$ 

Almost all patients who had returned to work by the first follow-up were still at work by the second follow-up. Only two patients who had initially resumed their work left it between the two follow-ups (both of them were near the age of retirement). That would support the view that early resumption of work does not result in later ill effects. It is pointed out that all patients but one resumed work with their previous employers.

Table 8.2: Distribution of patients on RTW - all patients for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

	Status at	follow-up		Missing
Follow-up	Back at work	Not back at work	Total	Information
First	106 62%	65 38%	171 100%	2
Second	107	20	127	3
	84.3%	15.7%	100%	

Table 8.2 shows that the proportion of patients resuming work by the time of the second follow-up was significantly higher than that in the first follow-up (p<0.01). The fact that only 20 patients were not at work by the second follow-up would make it difficult to examine hypotheses regarding significant associations between RTW and independent variables.

## 2. The search for significant associations between RTW and

independent variables

First follow-up 4 months after leaving hospital

Univariate analyses

Independent variables whose relationship with RTW were not examined

Indep HOS

None

Indep FU

SOCIAL and OCCUPATIONAL Variables

Financial difficulties

PSYCHOLOGICAL Variables

Intention to resume work

The relationships of these variables with RTW were only meant to be examined in the second follow-up.

# Results of the statistical analyses

# Table 8.3: Independent variables found to be significantly associated with RTW

<u>Variable</u>	<u>N</u>	r	φ	<u>C</u>	
Indep HOS					
MEDICAL variables					
Severity of the illness	170			0.21	*
PSYCHOLOGICAL variables					
AAS 'Anxiety plus' day 1 in hospital	147	0.166	<b>.</b>	•	
AAS 'Anxiety plus' day 1 (modified) ****	147	•		0.20	*
AAS 'Anxiety minus'day 1 (modified)	147			0.24	*
AAS 'Anxiety plus' day 2	143	0.155	•		
Indep FU					
MEDICAL variables					
Physical disability	161		0.33*	**	
GP's advice regarding work	166	•		0.56	***
Consultant's advice regarding work (modified)	161		0.30*	**	•
SOCIAL and OCCUPATIONAL Variables					
Wife's opinion regarding work (modified)	157		0.34*	**	
PSYCHOLOGICAL variables					
Perception of fitness for work	161	-0 555°	***		
Perception of fitness for work (non-parametric)	161			0.49	***
Perception of causes of the illness (PCI) scoring method A	155	0.198	3**		
PCI scoring method A (modified)	155			0.24	**
PCI scoring method B	155			0.23*	

#### Table 8.3 continued:

<u>Variable</u>	N	<u>r</u>	φ	<u>c</u>
General Health Questionnaire (GHQ)	153	0.313***		
GHQ (modified)	153			0.31***

Further analyses and discussions of variables found to be associated with RTW (those presented in table 8.3)

#### Indep HOS variables

MEDICAL variables

Severity of the illness (scoring method on p. 80 )

Table 8.4: Relationship between RTW and 'Severity of the illness'

	Sever		
Status at follow-up	Mild	Moderate	Severe
Back at work	83	18	4
	68%	50%	33%
Not back at work	39	18	8
*	32%	50%	66.7%

\*\*\*\* Variables were modified by condensing their range into a smaller number of categories to enable the application of non-parametric statistics. The modifications were made either on the basis of empirical findings concerning the distribution of patients on the variable (thus distinguishing between the two extreme 25% and the middle 50% (in the case of obvious normal distributions)), dividing the sample into three equal thirds or two halfs), or on the basis of logical or theoretical considerations (e.g. EPI Lie score - higher than '5' versus equal or lower than '5').

le Trivol de in hospical, and RTC

$$N = 170$$
,  $\chi^2 = 8.24$ , df = 2, p = 0.0162

The lower the 'Severity' score, the greater the likelihood of resuming work.

It is pointed out that the construction of this score has not yet been fully completed. No specific weights have been assigned to the factors on the basis of which the score has been determined. The only test of reliability has been that between the two judges (see p. 80 ). Nevertheless the result is encouraging and shows the potential usefulness of further improvement of this score and its value in predicting the likelihood of resuming work within four months of leaving hospital.

#### PSYCHOLOGICAL variables

### AAS 'Anxiety plus' day 1 in hospital (scoring method on p 93 )

The positive correlation with RTW (table 8.3) indicates a greater tendency to return to work in patients who expressed lower levels of anxiety on day 1 in hospital. When the data were re-analysed, using a modified version of the 'Anxiety plus' score, a similar relationship was found (table 8.5).

The 'Anxiety plus' score was modified as follows:

Low - scores between '0' and '5'. 22.6% of the cases.

Moderate- scores between '6' and '15'. 54.8% of the cases.

High - scores between '16' and '22'. 22.6% of the cases.

Table 8.5 overleaf shows the relationship between AAS
'Anxiety plus' measured on the first day in hospital, and RTW.

Table 8.5: Relationship between AAS 'Anxiety plus' (modified)

day 1, and RTW

AAS 'Anxiety plus'

	score on day 1			
Status at follow-up	Low	Moderate	High	
Back at work	22 73.3%	53 63.8%	15 44.4%	
Not back at work	8	30	19	
Not buck ut noth	26.7%	36.2%	55.6%	

$$N = 147, \chi^2 = 6.28, df = 2, p = 0.0432$$

Table 8.5 shows that the lower the level of anxiety measured on the first day in hospital the greater the likelihood of returning to work within four months of leaving hospital.

One possible explanation for this significant relationship could be that patients who expressed high levels of anxiety on day 1 in hospital were anxious in general and that anxiety was also one of the factors that later prevented them from resuming work before the time of the follow-up; i.e. anxiety was measured as a trait here. On the other hand, in view of the significant association between RTW and 'severity', it can be argued that patients who expressed high levels of anxiety on day 1, did so because they sensed the severity of their illness. They later delayed their return to work because of the severity of their illness and not because they were too anxious. Theoretically it may seem unlikely that patients could sense the 'severity' score since this was based on information from various complicated tests (see p 80 ) carried out throughout the period of stay in hospital. However, it is possible that patients obtained some idea about the severity of their illness from the symptoms they

experienced at the early stages. Perhaps, this can be examined by asking patients to rate the severity of their illness shortly after their admission to hospital and to correlate their assessment with the 'severity' score given by the doctors. This was not done within the context of this study. Instead the relationship between 'Anxiety plus' and RTW was further analysed by a. calculating the significance of the association between 'Anxiety plus' and severity, and b. by examining the association between 'Anxiety plus' and RTW in each of the three levels of the 'Severity' score, separately. The results of these analyses are presented below.

a. The parametric analysis showed a significant association between 'Anxiety plus' and 'Severity'.

$$N = 155$$
,  $r = 0.27$ ,  $p = 0.001$ 

The non-parametric analysis, showed a similar trend (table 8.6). The higher the 'Severity' score the higher the level of anxiety on day 1 in hospital.

Table 8.6: Relationship between 'Anxiety plus' day 1 in hospital, (modified), and 'Severity'

	\$			
Anxiety plus'modified	Low	Moderate	High	
Low	29	5	1	
	26.4%	15.2%	8.3%	
Moderate	62	20	3	
	56.4%	60.6%	25.0%	
High	19	8	8	
	17.3%	24.2%	66.2%	

$$N = 155$$
,  $\chi^2 = 16.52$ ,  $df = 4$ ,  $p = 0.002$ 

It can be concluded that 'Anxiety plus' and the 'Severity' score were significantly associated with each other.

b.

Table 8.7: Relationship between AAS 'Anxiety plus' day 1 (modified) and RTW - only patients who were ranked 'mild' on 'Severity'

AAS 'Anxiety plus'

	day 1	(modified)	
Status at follow-up	Low	Moderate	High
Back at work	19	44	11
	76%	71%	57.9%
Not back at work	6	18	8
	24%	29%	42.1%

N = 106,  $\chi^2 = 1.77$ , df = 2, p = 0.41, not significant

Table 8.8: Relationship between AAS 'Anxiety plus' (modified)

and RTW - only patients who were ranked 'moderate' on

'Severity'

AAS 'Anxiety plus' day 1 (modified) Status at follow-up Low Moderate High 2 Back at work 3 8 75% 42.1% 25% 6 Not back at work 1 11 25% 57.9% 75%

N = 31, Numbers too small for meaningful computations

In the mild category (table 8.7) the relationship between 'Anxiety plus' and RTW was not found to be significant. The

data for the 'moderate' and 'severe' categories were insufficient for statistical computations. However, the trend seems to indicate that patients in lower levels of anxiety were more likely to return to work than those in higher levels of anxiety.

Table 8.9: Relationship between AAS 'Anxiety plus' (modified)

and RTW - only patients who were ranked 'severe' on

'Severity'

AAS 'Anxiety plus'
(modified) day 1

Status at follow-up	Low	Moderate	High
Back at work	. 0	1	2
	0%	50%	28.6%
Not back at work	1	1, 1, 1,	5
	100%	50%	71.4%

N = 10, Numbers too small for meaningful statistical computations

Although 'Anxiety plus' and 'Severity' were found to be significantly associated with each other, it is not clear yet to what extent one has influenced the other. The relationship between AAS 'Anxiety plus' and RTW should be further investigated since it is possible that an assessment of the level of anxiety on the first day in hospital could prove to be a useful tool for early detection of patients who are likely to delay their return to work.

AAS 'Anxiety minus' (modified) day 1 in hospital (scoring method on p. 93 )

This score was modified as follows:

Low - scores between '0' and '1'. 33.5% of the cases.

Moderate- scores between '2' and '6'. 46.5% of the cases.

High - scores between '7' and '15'. 20% of the cases.

The reader is reminded that higher levels of anxiety are indicated by <u>lower</u> 'Anxiety minus' scores and lower levels of anxiety are indicated by <u>higher</u> 'Anxiety minus' scores.

Table 8.10: Relationship between AAS 'Anxiety minus' (modified)

day 1 and RTW

	AAS 'Anxiety minus' (modified) day 1			
Status at follow-up	High	Moderate	Low	
Back at work	1.8	50	22	
	62.1%	72.5%	44.9%	
Not back at work	11	19	27	
	37.9%	27.5%	55.1%	

$$N = 147$$
,  $\chi^2 = 9.18$ , df = 2, p = 0.0101

Table 8.10 shows that patients who expressed low or moderate levels of anxiety on day 1 in hospital ('high' or 'moderate' 'Anxiety minus' scores) were more likely to return to work than those expressing high levels of anxiety ('low 'Anxiety minus' scores). The non-linear relationship between 'Anxiety minus' and RTW may explain why the parametric correlation between the two variables was not significant.

Patients in the 'moderate' category were more likely to resume work than patients in the 'low' category. This is consistent with the findings concerning AAS 'Anxiety plus', suggesting that lower levels of anxiety were more associated with resumption of work than higher levels of anxiety. However, the proportion

of patients resuming work in the 'high' category, although higher than that in the 'low' category, was lower than that in the 'moderate' category. This may suggest that some of the patients in the 'high' category who were expressing exaggerated high degrees of calmess, happiness, joyfulness, cheerfulness, etc. were in fact concealing their anxiety, and they actually belonged to the 'moderate' or 'low' categories. This point is worth being further investigated in future research. For example, it could be hypothesized that patients with extremely high scores on AAS 'Anxiety minus' would have extremely low scores on 'Anxiety plus' and perhaps would also score highly on the EPI Lie scale and possibly on other measures of social desirability.

The problems in interpreting this association are similar to the ones described in the case of the 'Anxiety plus' score (p. ''.') ). The relationship was, therefore, re-examined in a similar way. The results are shown below.

a. The parametric analysis showed a significant association between 'Anxiety minus' and 'Severity', N = 155, r = -0.16, p = 0.026. However, this correlation was low. The non-parametric analysis did not show a significant association between the two variables, N = 155,  $\chi^2 = 7.64$ , df = 4, p = 0.10.

b.

Table 8.11: Relationship between AAS 'Anxiety minus' day 1

(modified) and RTW - only patients who were ranked
'mild' on 'Severity'

Status at follow-up	AAS 'Anxiety High	minus' day 1 (modi Moderate	fied) Low
Back at work	13	45	16
	61.9%	80.4%	55.2%
Not back at work	8	11	13
	38.1%	19.6%	44.8%

N = 106,  $x^2 = 6.526$ , df = 2, p = 0.0383

Table 8.12: Relationship between AAS 'Anxiety minus' day 1 (modified) and RTW - only patients who were ranked 'moderate' on 'Severity'

Status at follow-up	AAS 'Anxiet High	y minus' day 1 Moderate	(modified) Low
Back at work	4	5	4
	66.7%	45.5%	28.6%
Not back at work	2	6	10
**	33.3%	54.5%	71.4%

N = 31, Numbers too small for meaningful statistical computations.

Table 8.13: Relationship between AAS 'Anxiety minus' day 1

(modified) and RTW - only patients who were ranked
'severe' on 'Severity'

Status at follow-up	AAS 'Anxiety High	AAS 'Anxiety minus' day 1 () High Moderate	
Back at work	1	0	2
	50%	0%	33.3%
Not back at work	1	2	4
	50%	100%	66.7%

N = 10, Numbers too small for meaningful statistical computations.

The relationship with RTW in the 'mild' severity category is significant and similar to the one shown in table 8.10. The data in the 'moderate' and 'severe' categories are not sufficient for statistical calculations. However, the trend in the 'moderate' category seems to indicate that patients with lower levels of anxiety were more likely to return to work than those in higher levels of anxiety.

As with 'Anxiety plus' it can be concluded that the relationship between the anxiety level on the first day in hospital and
later return to work should be further investigated. It is
possible that a measure of anxiety on the first day in hospital
could prove to be useful for early detection of patients who are
likely to delay their return to work.

#### AAS 'Anxiety plus' day 2 in hospital (scoring method p 93 )

The positive correlation with RTW (table 8.3) indicates that the lower the level of anxiety measured on day 2 in hospital, the greater the likelihood of resuming work. However, this correlation was low. A modified version of this 'Anxiety plus' score was not found to be significantly associated with RTW.

It appears, therefore, that whilst measurement of anxiety on day 1 in hospital could prove useful for purposes of predicting RTW, anxiety scores on days 2 and 3 in hospital are less likely to be of such use.

#### Indep FU variables

#### MEDICAL variables

#### Physical disability (scoring method p.112)

None of the patients was considered to be severely disabled. Patients with mild or no disability (95/134 = 70.9%) were more likely to resume work than patients with moderate disability (7/27 = 25.9%). N = 161,  $\chi^2$  = 17, df = 1, p = 0.0001.

The difficulty associated with the interpretation of relationships between Indep FU variables and dependent variables has been mentioned before (p.149). The fact that Physical disability was determined mainly on the basis of the patients' reports of their experience of symptoms (p.112) puts its true independence as a variable in doubt. It could be argued that report of symptoms depended on whether or not work had been resumed, or that the doctors' scoring could have been affected by their knowledge of whether or not the patient had returned to work. Two steps were taken in the measurement procedure (p.112) to reduce these effects:

- a. It was attempted to determine the score on the basis of activities independent of the work situation. For example: getting out of bed, climbing stairs, walking, gardening, etc.
- b. The cardiologists tried to determine the score before knowing whether or not the patient had resumed work. However, despite . these steps it has to be accepted that this scoring method was not perfectly satisfactory. a. It was not always possible to adhere to the above two principles and b. A fully objective assessment of chest pain or breathlessness can not be achieved and it will always have to be relyed upon the patient's report. Therefore,

it is possible that individual differences in tolerance of pain, tendency to complain and other personality varibles could have affected the Physical disability score.

Nevertheless, it seems sensible to believe that this result provides at least some support to the argument that patients who suffer from symptoms of angina, dyspnoea or both, are less likely to resume work within four months of leaving hospital, than patients who do not suffer from such symptoms. Although it would not be possible to use this variable at the early stages of convalescence, for purposes of prediction, it appears to be important in accounting for delay in return to work.

General practioner's (GP's) advice regarding the resumption

of work (scoring method p.114)

Table 8.14: Relationship between GP's advice regarding work and RTW

***	GP'			
Status at follow-up	Return to work	Unclear or unknown	Do not return to work	
Back at work	92	10	3	
	85.2%	58.8%	7.3%	
Not back at work	16	7	38	
	14.8%	41.2%	92.7%	

$$N = 166$$
,  $\chi^2 = 77.68$ ,  $df = 2$ ,  $p = 0.0001$ 

Table 8.14 shows that patients who reported to have been given a clear advice to return to work were more likely to do so than those who reported that the opinion of their GP's was either unclear or unknown to them. The likelihood of resuming work of patients who reported that their GP's had advised them not to

return to work was very low.

A number of different explanations can probably be put forward to account for this relationship. Two particularly opposing ones are the following:

- a. It is a reflection of the effect of the GP's advice on whether or not work should be resumed.
- b. The 'GP's advice' score was based entirely on the patient's report at the time of the follow-up, after work had or had not been resumed. Therefore, it can be argued that the relationship is a reflection of the effect of whether or not work had been resumed on the patient's report of the advice given by GPs.

If explanation b. is correct, then it can be concluded that table 8.14 is not a reliable indication of the relationship between the real advice given to the patients by GPs and RTW. One way of solving the confusion could be by asking the GPs themselves about the advice they gave to their patients. However, the work involved in such a procedure was too extensive for the present study and therefore it was not done. Nevertheless, there is some evidence suggesting that explanation b. could not have been the only one accounting for this relationship and that explanation a. can not be entirely excluded. Most patients who reported that they were advised by their GPs not to resume work also said that their GPs indicated to them that they preferred to leave the decision to the consultant cardiologist. Suggests that many GPs had a policy of not taking responsibility for encouraging patients to resume work. This seems to be consistent with previous reports (Hellerstein, 1960) which argue that

many GPs are overcautious with regard to encouraging post
MI patients to resume work. If it is accepted that GPs do,
in general, tend to refrain from encouraging their patients
to resume work, then it should be accepted that many of the 38
patients who were not back at work (table 8.14) and reported that
they were advised by their GPs not to return to work, were
actually giving reliable accounts of their GP's advice.

Further research, involving direct measures of the GP's advice would be required to clarify this matter. However, it seems likely that advice given to patients by their GPs, after leaving hospital could have a key role in determining whether or not work will be resumed.

Another possible explanation for the relationship between RTW and 'GP's advice' is that GPs gave advice not to resume work chiefly to those patients who had had a severe illness and/ or who had been disabled by symptoms of angina and/or dyspnoea. This explanation was excluded when the relationship between RTW and 'GP's advice' was re-examined on a relatively 'healthy' sample excluding those patients who failed to resume work and whose illness had been'severe' and/or whose 'Physical disability' at follow-up was ranked as moderate or 'high'. Table 8.15 shows that the relationship between RTW and 'GP's advice' remains significant and of a similar pattern.

To enable the application of a chi-square test the 'unknown or unclear' and the 'Don't return to work' categories were Pooled.

$$N = 131, \chi^2 = 42.704, df = 1, p = 0.0001$$

Table 8.15: Redationship between 'GP's advice' and RTW - only

patients whose scores on 'Severity' and 'Physical

disability'were '0'

	GP's Advice			
Status at follow-up	Return to work	Unknown or unclear		
Back at work	92	10	3	
	93 <b>.</b> 9%	76.9%	15%	
Not back at work	6	3	17	
	6.1%	23.1%	85%	

## Consultant's (Con's) advice regarding the resumption of work (scoring method p.115)

Only 4 patients reported that they had been advised by their consultants to delay their return to work, when seen for an earlier hospital review. Therefore, they were pooled with those who reported that the consultant's advice was unclear or unknown to them. Patients who reported to have received a clear advice to return to work formed the second category.

Patients in the second category (77/101 = 76.2%) were more likely to resume work than those in the first category (27/60 = 45%) N = 161,  $\chi^2 = 14.72$ , df = 1, p = 0.0001.

The consultants themselves were not asked to record the advice they had given to their patients with regard to resuming work (it was thought that such a request would affect their routine approach). Therefore, like in the case of 'GP's advice' it is difficult to interpret this relationship. The fact that 48/56(85.7%) of the patients in the 'unclear or unknown' category

had in fact not been seen for a hospital review before the fourmonth research follow-up, indicates that most of these responses were reliable accounts of the advice given by the consultant.

On the other hand, 85/101(84.1%) of the patients in the 'return to work' category were seen by the consultant, in hospital, before the follow-up. Since there is no information available from the consultants themselves on the advice given to these patients, the possiblity that their reports were affected by whether or not they had returned to work, can not be excluded.

However, it is known that the attitude of the two consultants in general, is in favour of encouraging patients to return to work as early as possible, in the absence of contra-indicating evidence.

Like in the case of 'GP's advice' this relationship has to be further investigated. Nevertheless, it seems safe to conclude that advice given by the consultant, shortly after discharge from hospital (4 - 6 weeks) could determine whether or not work would be resumed within four months. Furthermore, the consultant's Opinion could also affect the attitude and advice given to the patient by the GP. This subject has been mentioned in a previous report (Kushnir et al, 1975). The area of communication between Consultants and GPs with regard to rehabilitation should be further investigated.

SOCIAL and OCCUPATIONAL variables

Wife's opinion regarding the resumption of work (scoring method p. 115)

Only three patients reported that their wives' opinions were unclear or unknown to them. Therefore they were joined into one category with those who reported that their wives were against

their return to work. Patients whose wives were in favour of their return to work formed the second group. Patients in the second group (88/119 = 73.9%) were more likely to have resumed work than those in the first group (13/38 = 34.2%). N = 157,  $\chi^2 = 18.42$ , df = 1, p = 0.0001.

Several explanations could be put forward to account for this relationship. One could be that 'Wife's opinion' affected the patients decisions whether or not to resume work. Another could be the reverse - it could be argued that the patients' reports of their wives' opinions were affected by whether or not they had resumed work. A third explanation could be that both 'Wife's opinion' and RTW were affected by 'GP's opinion' or 'Consultant's opinion'. With the evidence available here, it can not be determined which of these explanations is the most likely. However, a further investigation of this relationship, obtaining direct information from wives, could prove usueful.

#### PSYCHOLOGICAL variables

#### Perception of fitness for work (scoring method p.122 )

The negative correlation with RTW (table 8.3) indicates that the greater the tendency of patients to perceive themselves as fit for work the greater the likelihood of patients resuming Work. When the data were re-analysed using a non-parametric analysis, a similar relationship was found (table 8.16).

Table 8.16 shows that the higher the degree to which patients perceived themselves as fit for work, the higher the likelihood of resuming work.

Table 8.16: Relationship between Perception of fitness for work

and RTW

Status at		Pe	erception of fit	ness for work	
follow-up	Fully	fit	Moderately fit	Skightly fit	Not at all fit
Back at wo	rk	69	28	5	1
g	6	84.1%	65.1%	25%	6.2%
Not back					
at work		13 15.9%	15 34.9%	15 75%	15 93.8%
				g process	121 Table 1 (27)

$$N = 161$$
,  $\chi^2 = 50.81$ , df = 3, p = 0.0001

If this relationship is an indication of the effect of the patients' self perception of their fitness for work on RTW then it can be concluded that this perception should be encouraged (mainly by doctors) from the early stages of the rehabilitation. If the relationship is an indication of an effect in the opposite direction, i.e. of RTW on the patients' self perception of their level of fitness - then it can be accepted as demonstrationg the psychological benefits of resuming work in terms of its effect on the patients' sense of well-being. However, it is not possible on the basis of the available data, to determine which of the explanations is more likely to be correct. Perhaps that can be done by assessing the 'Perception of fitness' in earlier stages of the rehabilitation.

# Perception of the causes of the illness(PCI scoring method A (scoring method p.110 )

The positive correlation with RTW (table 8.3) indicates that the lower the degree towhich the illness was related to aspects of the job the greater the likelihood of resuming work. When

the relationship was re-analysed, using a modified version of PCI scoring method A and using PCI scoring method B, similar results were obtained (tables 8.17 and 8.18).

#### PCI scoring method A (modified)

This score was modified as follows:

0 - scores of '0'. 32.5% of the cases.

1 - scores between '1' and '6'. 43.5% of the cases.

2 - scores between '7' and '14'. 37% of the cases.

Table 8,17: Relationship between PCI method A (modified) and RTW

Status at follow-up	PCI scoring metho	od A (modi	fied) 2
Back at work	40	37	20
	80%	55.2%	54.1%
Not back at work	10	30	18
	20%	44.8%	45.9%

$$N = 155, \chi^2 = 9.206, df = 2, p = 0.0100$$

Patients who did not relate their illness to any aspect of their job (category '0') were more likely to return to work than patients who partly (category '1') or strongly (category'2') related their illness to aspects of their work. The difference in the proportions of patients back/not back at work between categories '1' and '2' is minimal and is substantially smaller than that between each one of these categories and category '0'.

Therefore it seems that there is little advantage in distinguishing between the three categories of tendency to melate theillness to aspects

of and and relatives. By waste

of the job. It is sufficient to dichotomise between those who do not relate their illness to any aspect of their work and those who do.

## PCI scoring method B Table 8.18: Relationship between PCI scoring method B and RTW

•	Perception	PCI metho	
Status at follow-up	0	1	2
Back at work	41	27	29
	78.8%	56.2%	52.7%
Not back at work	11	21	26
	21.2%	43.7%	47.3%

$$N = 155$$
,  $\chi^2 = 8.97$ ,  $df = 2$ ,  $p = 0.0112$ 

Patients who did not relate their illness to any aspect of their work were more likely to resume work than those who partly or strongly related their illness to aspects of their jobs. As in PCI scoring method A (modified) it seems that it is sufficient to distinguish between those patients who did not relate their illness to any aspect of their job and those who did.

All versions of the PCI score were found to be associated with RTW in the same way. The difficulty in interpretation here is similar to the one described in the case of 'Perception of fitness for work. The PCI measure; taken during stay in hospital were not found to be significantly related to RTW (p $\langle 0.20 \rangle$ ). However, it is possible that the perception of causes of the illness changed after the patients had left hospital as a result of communications they had with friends and relatives. By assess-

ing PCI at earlier stages of the rehabilitation, it would probably be possible to obtain further information that would improve the understanding of this relationship. In view of its possible effect on the patients coping behaviour after leaving hospital, it seems that PCI should be taken into account by doctors, in advising patients regarding rehabilitation.

## General Health Questionnaire (GHQ) (scoring method p.118)

The positive correlation with RTW indicates that the higher the level of general well-being (reflected in lower GHQ scores) the higher the likelihood of resuming work. When the data were re-analysed, using a modified version of the GHQ score (table 8.19) a similar relationship was found.

#### GHQ (modiifed)

This score was modified as follows:

Low - scores between '0' and '1'. 29.4% of the cases.

Moderate- scores between '2' and '10'. 38.1% of the cases.

High - scores between '11' and '45'. 32.5% of the cases.

Table 8.19: Relationship between GHQ (modified) and RTW

8.	GI			
Status at follow-up	Low	Moderate	High	
Back at work	41	36	22	
	87.2%	59%	48.9%	
Not back at work	6	25	23	
	12.8%	41%	51.1%	

N = 153,  $\chi^2 = 16.23$ , df = 2, p = 0.0003

The table shows that the higher the expressed level of general well-being (indicated by lower GHQ scores) the higher the likelihood of resuming work. The difference in the proportion of patients back/not back at work between the 'moderate' and the 'high' categories is substantially smaller than that between the 'low' and each one of these categories. This could imply that a cut-off point between GHQ scores 'l' and '2' can be used to indicate a significant difference between patients who have returned to work and patients who have not.

The direction of the causality here is not clear. As in the case of 'Perception of fitness for work' and 'PCI' further information could be obtained by assessing GHQ at earlier stages of the rehabilitation, after discharge from hospital. However, if an effect of RTW on GHQ does occur, then it can be accepted as an indication of a desirable psychological outcome of returning to work. On the other hand, it shows the potential danger of development of symptoms of depression as a result of a prolonged delay in returning to work.

#### Multivariate analysis - The discriminant function analysis

Table 8.20: The relative contribution of independent variables to the distinction between patients who did and patients who did not return to work (expressed in scaled eigenvectors)

<u>Variable</u>	<u>Scaled</u> Eigenvector	Eigenvector	<u>F</u>
The consultant	0.583	0.099	4.43 *
Severity of the illness	-0.550	-0.079	9.58 **
'Anxiety plus' day 2	-0.387	-0.007	1.99 N.S.
Mental demand at work	-0.288	-0.021	0.21 N.S.
Physical demand at work	-0.277	-0.022	3.21 N.S.
Wife's occupation	0.268	0.032	1.90 N.S.
Whether or not self- employed	0.258	0.066	4.29 *
Responsibility at work	0.253	0.031	3.92 *
EPI Extraversion score	0.214	0.005	1.38 N.S.
'Anxiety plus' day 1	0.161	0.002	1.39 N.S.
'Anxiety minus' day 2	-0.142	-0.003	0.005 N.S.
Socio economic status	-0.116	-0.010	2.63 N.S.
EPI Lie score	-0.110	-0.005	0.77 N.S.
PCI, scoring method A	0.067	0.002	0.000 N.S.
EPI Neuroticism score	0.047	0.001	0.15 N.S.
Educational level	-0.045	-0.006	0.83 N.S.
'Anxiety minus' day 1	-0.037	-0.001	0.02 N.S.
Age	-0.008	-0.000	0.76 N.S.
Type of job	0.007	0.001	0.72 N.S.

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001 N.S. Not significant

#### Table 8.21: Significance tests on eigenvectors

Wilk's lambda criterion = 0.806

#### Rao's F test

$$F = 1.54$$
,  $df_1 = 19$ ,  $df_2 = 122$ ,  $p = 0.082$ 

Table 8.22: 'Hits and Misses' table

	Actual group name				
Forecast group name	Back at work	Not back at work			
Back at work	74	31			
Not back at work	13	24			

The 'Hits and Misses' table (table 8.22) and the significance tests on the eigenvectors (table 8.21) show that a discriminant function using the independent variables presented in table 8.20, would not make a significant distinction between patients who returned to work and patients who did not. That may imply that a combination of these independent variables would not be useful for predicting RTW.

Table 8.20 is consistent with the results of the univariate analyses in the sense that both 'severity of the illness' and anxiety on day 2 in hospital were found to make a relatively high contribution to the distinction between patients who resumed work and patients who did not. (see table 8.3). Table 8.20 is inconsistent with the results of the univariate analyses in the sense that it presents 'The consultant' as a highly important variable in discriminating between patients who did and patients who did not resume work. The results of the one way analysis of variance carried out in the process of the discriminant analysis show that patients of consultant '1' were more likely to return

to work than patients of consultant '0'. This tendency was also found in the univariate analysis, however it did not reach statistical significance (p = 0.23). Theoretically it seems acceptable that a difference in this direction would occur. Consultant '1' reviewed most of his patients within 4-6 weeks of leaving hospital whereas consultant '0' did not see most of his patients before 4-6 months of leaving hospital. It could be argued that patients of consultant '1' as well as their GPs received more reassurance and therefore were more likely to resume work before the four month follow-up. It seems important that this point should be investigated further since the timing of the first hospital follow-up may have a significant influence on the course of the rehabilitation.

#### Second follow-up - 10 months after leaving hospital

Only 20 patients were not back at work by the time of the second follow-up. Consequently the various ranks of the independent variables included small numbers of observations, making it difficult to apply meaningfully statistical analyses. Therefore, the relationship between RTW at 10 months and the independent variables would have to be studied again on a larger sample. The results of the analyses carried out on the available data are reported overleaf.

## Results of the statistical analyses Variables significantly associated with RTW at 10 months

## Table 8.23: Independent variables significantly associated with

#### RTW at 10 months

<u>Variable</u>	N	r	<u>C</u>	p
Indep HOS				
PSYCHOLOGICAL variables				
EPI Lie score	127	0.19		0.014
EPI Lie score (modified)	127		0.22	0.03
Indep FU				
MEDICAL variables				
Physical disability (modified)	117			C.0002 *
GP's advice regarding work (modified)	123			0.0001 *
Consultant's advice regarding Work (modified)	123			0.0013 *
SOCIAL and OCCUPATIONAL Variables				Collaboration
Wife's opinion regarding work (modified):	119			0.0001 *
PSYCHOLOGICAL variables		1., 1953		
Perception of fitness for work	123	-0.66		0.001 *
Perception of fitness for work (modified)	123			0.0001 *
General Health Questionnaire (GHQ)	121	0.237	To the second second	0.004 *
GHQ (modified)	121		0.22	0.049
Intention bo resume work	38			0.0001

Fisher's exact probability

Further analyses and discussions of variables found to be significantly associated with RTW (Those presented in table 8.23)

#### Indep HOS variables

#### PSYCHOLOGICAL variables

#### EPI Lie score

The positive correlation with RTW (table 8.23) indicates that the lower the Lie score, the higher the likelihood of resuming work. However, this correlation was low. When the data were re-analysed, using a modified version of this score, a similar relationship was found. (table 8.24).

#### EPI Lie score (modified)

This score was modified as follows:

Low - scores between '0' and '2'. 16.5% of the cases.

Moderate- scores between '3' and '5'. 60.6% of the cases.

High - scores between '6' and '9'. 22.8% of the cases.

Table 8.24: Relationship between RTW and EPI Lie score (modified)

	EPI Lie s	1)	
Status at follow-up	Low	Moderate	High
Back at work	21	65	21
24	100%	84.4%	72.4%
Not back at work	. 0	12	( <b>8</b> ()
	0%	15.6%	27.6%

$$N = 127$$
,  $\chi^2 = 6.98$ , df = 2, p = 0.03

The table shows that the lower the Lie score, the greater the likelihood of resuming work. The possibility of a connection between high Lie scores and extremely low anxiety scores on AAS and RTW has been mentioned before. (p. 171). More research would be needed to clarify this relationship.

#### Indep FU variables

The discussions of the difficulties related to the interpretation of relationship between RTW at 4 months and the Indep FU variables measured at the first follow-up would also apply in the case of the second follow-up. It is therefore not intended to repeat these discussions here. Only brief statements regarding these relationships will be made.

#### MEDICAL variables

#### Physical disability (modified) (scoring method p. 112)

Since only 2 patinets were considered to be severely disabled, they were pooled into one group with those who were considered to be moderately disabled. The second group consisted of those Patients with mild or no disability. Patients in the second group (92/102 = 90.2%) were more likely to resume work than those in the first group (7/15 = 40.6%). N = 117, p = 0.0002, Fisher's exact probability test.

# GP's advice regarding the resumption of work (modified) (scoring method p.114)

To enable the application of non-parametric statistics, the

'unknown or unclear' and the 'don't return to work' categories were pooled. The second group consisted of those patients who were in the 'return to work' category. Patients in the second group (87/93 = 93.5%) were more likely to return to work than patients in the first group (17/30 = 57%). N = 123, p = 0.00001, Fisher's exact probability test.

The patients were asked to refer to recent advice given to them by their GPs and not to advice given to them before the first follow-up.

Consultant's advice regarding the resumption of work (modified)

(scoring method p.115 )

Since only four patients were in the 'Don't return to work' Category they were pooled with those in the 'unknown or unclear' Category to form one group. The second group consisted of those Patients in the 'return to work' category. Patients in the second group (87/96 = 90.6%) were more likely to return to work than those in the first category (17/27 = 63%). N = 123, p = 0.0013, Fisher's exact probability test.

# SOCIAL and OCCUPATIONAL variables Wife's opionion regarding the resumption of work (modified) (scoring method p.116 )

Only five patients were in the 'unknown or unclear' category therefore they were joined into one group with those in the 'don't return to work' category. The second group consisted of those patients who were in the 'return to work' category. Patients in the second group (90/95 = 94.7%) were more likely to resume work than those in the first group (11/24 = 45.8%).

N = 119, p = 0.00001, Fisher's exact probability test.

#### PSYCHOLOGICAL variables

#### Perception of fitness for work (scoring method p.122)

The negative correlation with RTW (table 8.23) indicates that the greater the degree to which patients perceived themselves as fit for work, the greater the likelihood of resuming work. When the data were re-analysed using a modified version of the 'Perception of fitness' score, a similar relationship was found.

#### Perception of fitness for work (modified)

Categories '0' and '1' (not at all'and slightly fit') were pooled to form one group and categories '2' and '3' (moderately' and'fully' fit) were pooled to form the second group. Patients in the second group (102/113 = 90.3%) were more likely to resume work than patients in the first group (2/10 = 20%). N = 123, p= 0.0001, Fisher's exact probability test.

#### General Health Questionnaire (GHQ) (scoring method p.118)

The positive correlation with RTW (table 8.23) indicates that the higher the level of general well-being (reflected in lower GHQ scores), the greater the likelihood of resuming work. When the data were re-analysed, using a modified version of the GHQ, a similar relationship was found (table 8.25).

### GHQ (modified)

This score was modified as follows:

Low - scores of '0'. 32.5% of the cases.

Moderate - scores between '1' and '5'. 39.2% of the cases.

High - scores between '6' and '38'. 29.3% of the cases.

Table 8.25: Relationship between GHQ (modified) and RTW

	GHQ score			
Status at follow-up	Low	Moderate	High	
Back at work	37	39	26	
	94.9%	83%	74.3%	
Not back at work	2	8	9	
	5.1%	17%	25.7%	

$$N = 121$$
,  $\chi^2 = 6.00$ , df = 2, p = 0.049

Patients expressing higher degrees of general well-being (indicated by lower GHQ scores) were more likely to resume work than patients espressing lower levels of general well-being.

#### Intention to resume work (scoring method p.122)

Patients who expressed a clear intention to resume work (when asked at the first follow-up) (22/24 = 91.7% were more likely to return to work than patients who did not express a clear intention to resume work (4/14 = 28.6%). N = 38, p = 0.0001 (Fishers exact probability test). Only patients who were not back at work at the first follow-up were assessed on this variable, hence the small number.

This result indicates that the patients' reports of their intentions at the time of the first follow-up, can be useful for predicting whether or not work would be resumed by the time of the follow-up. In cases in which the patients' plans not to

resume work are unjustified and/or undesirable it could be possible for doctors, employers, relatives or others to persuade them to change decisions.

It would be interesting to record information regarding intentions to resume work before the first follow-up and to examine its relationship with RTW at four months. It may be that the 'Intention' score can be used for purposes of prediction for the first follow-up.

#### Multivariate analysis - The discriminant function analysis

Table 8.26: The relative contribution of independent variables to

the distinction between patients who did and patients

who did not return to work

		_		
<u>Variable</u>		<u>Scaled</u> <u>Eigenvector</u>	Eigenvector	<u>F</u>
Physical demand a	at work	0.913	0.081	6.17 *
'Anxiety plus',	day 1	0.524	0.008	0.08 N.S.
Type of job	*	0.506	0.103	0.43 N.S.
'Anxiety plus',	day 2	0.462	0.010	0.28 N.S.
EPI Neuroticism	score	0.403	0.009	2.64 N.S.
EPI Lie score		0.364	0.020	5.19 *
Mental demand at	work	0.329	0.028	1.16 N.S.
Severity of the	illness	0.268	0.040	0.93 N.S.
PCI, scoring meth	nod A	0.197	0.007	0.09 N.S.
Age		0.188	0.002	0.86 N.S.
Whether or not se	elf employed	0.126	0.036	1.00 N.S.
Responsibility at	t work	0.113	0.015	0.37 N.S.
'Anxiety minus'	day 2	0.053	0.001	0.07 N.S.
EPI Extraversion	score	0.051	0.001	0.13 N.S.
Socio economic si	tatus	0.050	0.005	0.09 N.S.
The consultant		0.048	0.009	0.08 N.S.
'Anxiety minus'	day 1	0.044	0.001	1.14 N.S.
*Wife's occupation	on	0.027	0.004	0.04 N.S.
Educational level	1	0.018	0.002	0.29 N.S.

<sup>\*</sup> P<0.05, \*\*p<0.01, \*\*\*p<0.001, N.S. Not significant

#### Table 8.27: Significance tests on eigenvectors

Wilk's lambda criterion = 0.78

#### Rao's F test

$$F = 1.37$$
,  $df_1 = 19$ ,  $df_2 = 95$ ,  $p = 0.157$ 

#### Table 8.28: 'Hits and Misses'table

	Actual group name		
Forecast groups name	Back at work	Not back at work	
Back at work	95	9	
Not back at work	1	10	

The significance tests on the eigenvector (table 8.27) and the 'Hits and Misses' table (table 8.28) show that a discriminant function, using the independent variables presented in table 8.26 would not make a significant distinction between patients who resumed work and patients who did not. That may imply that a combination of these independent variables would not be useful for predicting RTW.

Table 8.26 is consistent with the results of the univariate analyses in the sense that EPI Lie score was found to have made a relatively high contribution to the distinction between patients who resumed work and patients who did not. Table 8.26 is not consistent with the results of the univariate analysis in the sense that 'Physical demand at work' and 'Type of job' were found to make a relatively high contribution to the distinction between patients who resumed work and patients who did not.

It had already been pointed out that the number of patients not resuming work by the second follow-up was small. It may be necessary to obtain data on a greater sample before conclusions are made regarding this discrepancy.

#### 3. Summary and Conclusions

<u>Distribution of patients on RTW</u> - 62% of the patients were back at work by the first follow-up. This figure increased to 84% by the time of the second follow-up. Patients who resumed work by four months were highly likely to stay at work for at least another 6 months. All patients but one resumed work with their previous employer.

#### Significant associations between RTW and independent variables

At four months, RTW correlated negatively with the Severity of the illness, the level of anxiety on day 1 in hospital, the degree of physical disability experienced at follow-up and with the patients' tendency to relate the illness to aspects of their work (as measured at follow-up). It correlated positively with the advice given by consultants, GPs and wives, regarding the

resumption of work, the patients' perception of their fitness for work, and with the degree of general well-being expressed by patients at follow-up. It was also found that patients of consultant '1' were more likely to return to work than those of consultant '0'.

At ten months, RTW correlated negatively with the EPI Lie score, the physical demand at work and the physical disability (measured at follow-up). It correlated positively with the patients' perception of their fitness for work, their intention to resume work (as measured at the first follow-up) and the degree of general well-being (measured at ten months).

For early identification of patients likely to delay their return to work, two types of variables seem to be of a potential usefullness:

- a. MEDICAL variables associated with the severity of the illness and
- b. PSYCHOLOGICAL variables associated with the level of anxiety expressed by patients shortly after their admission to hospital.

  Both measures are relatively simple to administer and score, and they require minimal time and effort from staff and patients.

  Their actual usefullness however, will have to be determined in future research.

None of the SOCIAL and OCCUPATIONAL variables was found to be of relevance in this respect.

Of the Indep FU variables, most of those that could be expected to be related to RTW were found to be so. However, the exact meanings of these relationships are not clear and further

research is needed. Of particular interest would be the effects on RTW of advice given by GPs and Consultants and of PCI. All these variables seem to be of a potentially significant influence on the course of rehabilitation and they can probably be manipulated to achieve desirable results.

One of the best predictors of RTW at the second follow-up was the patients' reports regarding their <u>Intentions to resume work</u>, given in the first follow-up. This simple measure may be useful for detection of patients who are likely to develop long term rehabilitation problems. However, since only 20 patients were not back at work by the second follow-up, the relationships between RTW and various independent variables will have to be examined using larger samples.

Discriminant function analyses showed that a combination of the information on Indep HOS variables would not make a significant distinction between patients who did and patients who did not resume work at either of the two follow-ups.

In the first follow-up the discriminant analysis showed that the consultant might have played a major role in determining whether or not patients would resume work. Patients of consultant '1' were more likely to resume work than those of consultant '0'. It is possible that this difference was due to the fact that consultant '1' tended to review his patients within 4-6 weeks of leaving hospital whilst consultant '0' did not review most of his patients before a few months from leaving hospital. This early review might have provided an opportunity for consultant '1' to inform both the GP and the patient himself that work could be resumed shortly.

#### CHAPTER 9:

#### Results and discussion

#### Resumption of Physical Activity(RPA) at work

- 1. Distribution of patients on RPA
- The search for significant associations between RPA and independent variabls
- 3. Summary and conclusions

The analyses in this chapter were carried out only on those patients who had resumed work.

#### 1. Distribution of patients on RPA

Table 9.1: Distribution of patients on RPA - only those for whom information was available on both follow-ups

Follow-up		evel of physical Partly resumed	activity at work Considerably reduced	Total
First	39	21	14	74
	52.7%	28.4%	18.9%	100%
Second	48	19	7	74
	64.8%	25 <b>.7</b> %	9 <b>.</b> 5%	100%

The degree to which the pre-illness level of physical activity at work was resumed by the time of the second follow-up, was significantly greater than that in the first follow-up.

$$t = 2.88$$
,  $df = 73$ ,  $p = 0.005$ 

Table 9.2: Distribution of patients on RPA - all patients for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

Pre-illness level of activity at work				<b>∀</b> #:: 11	
Follow-up	Fully	Partiya	Considerably reduced	Total	Missing information
First	55	30	19	104	79
	52.9	28.8	18.3		
Second	60	32	13	105	78
	57.1	30.5	12.4		. ne. 117 74 7

The distribution shown in table 9.2 is similar to that in table 9.1. However, the proportion of patients in the three categories did not differ significantly between the two follow-ups (p>0.05). Although only 12.4% of the patients had made a considerable long term reduction of their pre-illness level, more than 40% of the patients did not resume their physical activity fully, even within ten months of leaving hospital. This may be an indication of the extent to which employers are prepared to assist re-employment of patients with a known heart disease.

## 2. The search for significant associations between RPA and independent variables

#### First follow-up - 4 months after leaving hospital

#### Univariate analyses

Independent variables whose relationship with RPA was not examined

As for RTW (p.162).

#### Results of the statistical analyses

The number of patients who reported to have made a considerable reduction in their pre-illness physical activity at work was relatively small (N = 19, 18.3% of all cases in the first follow-up, and N = 13, 12.4% of all cases in the second follow-up). It was therefore decided to condense the initial three-point scale (see p.123 ) on which RPA was measured to a dichotomy:

a. Physical activity fully resumed. RPA score of '0'.

b. Physical activity partly resumed. RPA scores of '1' or '2'.

#### Independent variables found to be significantly associated with RPA

#### Table 9.3: Variables significantly associated with RPA

Magnitude Variable Indep HOS MEDICAL variables Peel index (modified) 84 0.24\* SOCIAL and OCCUPATIONAL <u>variables</u> Type of job 0.42\*\*\* 104 0.41\*\*\* Type of occupation (modified) 104 Physical demand at work (modified) 104 0.27\* PSYCHOLOGICAL variables AAS 'Anxiety plus' day 3 in hospital 70 0.20\*

#### Indep FU

None

<sup>\*</sup> P<0.05, \*\* p<0.01, \*\*\*p<0.001

Further analyses and discussions of variables found to be significantly associated with RPA

#### Indep HOS

MEDICAL variables

Peel index (modified) (scoring method p.79 )

Categories '1' and '2' were pooled to form the 'low' group and categories '3' and '4' were pooled to form the 'high' group.

As expected, patients in the 'low' group (reflecting less severe illness) were more likely to fully resume their pre-illness level of physical activity at work, (43/73, 58.9%) than those in the 'high' group (2/11, 18.2%), N = 84,  $\chi^2$  = 4.84, df = 1, p = 0.0278.

## SOCIAL and OCCUPATIONAL variables Type of job (scoring method on p. 84)

As expected patients in sedentary occupations (30/36 = 83.3%) were more likely fully to resume their physical activity at work than patients in manual occupations (25/68 = 36.8%) (N = 104,  $\chi^2$  = 18.66, df = 1, p = 0.0001).

#### Type of occupation (modified) (scoring method on p. 84 )

The categories of Professional (6 patients) and Clerical (12 patients) were pooled since the numbers of patients in them were small and since they were comparable in the degree of physical activity involved in them. Three categories were then observed:

a. Professional and Clerical. b. Business and managerial.

C. Manual workers. Table 9.4 shows, in each category, the proportion

of patients who fully and partly resumed their physical activity at work.

Table 9.4: Relationship between RPA and Type of occupation (mod-

*	Type of occupation			
Physical activity at work	Clerical and professional	Business and managerial	Manual 24	
Fully resumed	15	16		
	83.3%	57.1%	41.4%	
Partly resumed	3	12	34	
	16.7%	42.9%	58.6%	

$$N = 104$$
,  $\chi^2 = 21.09$ ,  $df = 2$ ,  $p = 0.0001$ 

As expected patients in the Professional and Clerical category were more likely to resume fully their physical activity at work than patients in the other occupational groups. The lowest rate of full resumption of physical activity was amongst manual workers.

#### Physical demand at work (scoring method on p. 83 )

The original five-point scale was modified as follows:

Low - Scores of '0' or '1'. 55.8% of the cases.

Moderate - Score '2'. 31.7% of the cases.

High - Scores '3' and '4'. 12.5% of the cases.

Patients in the 'Low' category were more likely to resume

fully their physical activity at work than those in the other

two groups. There was practically no difference in the proportions

of patients fully resuming physical activity, between the 'moderate' and the 'high' categories.

Table 9.5: Relationship between RPA and the Physical demand
at work

A	Physical demand at work			
Physical activity at work	Low	Moderate	High	
Fully resumed	38	12	5	
	65.5%	36.4%	38.5%	
Partly resumed	20	21	8	
	34.5%	63.6%	61.5%	

$$N = 104$$
,  $\chi^2 = 8.41$ ,  $df = 2$ ,  $p = 0.0149$ 

It can be accepted that all three Indep HOS variables presented above are indications of the degree of physical activity involved in the job. Their relationship with RPA could be expected since patients whose jobs were lighter, had less difficulty in resuming their physical activity at work fully.

#### PSYCHOLOGICAL variables

## AAS 'Anxiety plus', day 3 in hospital (scoring method p. 93 )

The positive correlation with RPA (table 9.3) indicates that the lower the level of anxiety on day 3 in hospital, the higher the degree to which the pre-illness level of physical activity at work was resumed. However, this correlation was low. A modified version of the 'Anxiety plus' score was not found to be significantly associated with RSA.

The above analyses have clearly shown that the type of job (sedentary or manual) was a major determinant of the degree to which physical activity would be resumed. Since people in sedentary occupations had had little physical activity involved in their jobs (compared with those in manual occupations), it was decided to re-examine the relationship between RPA and the independent variables, in those patients whose jobs were classed as 'manual' and in those whose jobs were classed as 'sedentary', separately, thus controlling for the 'Type of job'. It was thought that this analyses would be more sensitive to the effects of other independent variables. Tables 9.6 and 9.8 show those variables which were found to be significantly associated with RPA in these analyses.

Analyses of the relationships between RPA and independent variables

for manual and sedentary occupations separately

### Manual occupations

Table 9.6: Independent variables found to be significantly associated with RPA - Only in patients whose occupations were classed as 'manual'

	Magni	itude
<u>Variable</u>	N	<u>C</u>
Indep HOS		
None		
Indep FU		
PSYCHOLOGICAL variables		
PCI, scoring method, A (modified)	62	0.32 *
	·	

<sup>\*</sup> P<0.05

### Further analyses and discussion of PCI, scoring method A, modified

This score was modified as follows:

Low - Score '0'. 41% of the cases.

Moderate- Scores between '1' and '6'. 41.9% of the cases.

High - Scores above '6'. 17.1% of the cases.

Table 9.7: Relationship between RPA and PCI

Physical activity	PCI score (modified)			
at work	Low	Moderate	High	
Fully resumed	15	7	2	
	57.7%	26.9%	20%	
Partly resumed	11	19	8	
	42.3%	73.1%	80%	

$$N = 62$$
,  $\chi^2 = 6.94$ ,  $df = 2$ ,  $p = 0.031$ 

Table 9.7 shows that in manual occupations, the lesser the tendency to relate the illness to aspects of the job, the greater the likelihood of fully resuming physical activity at work.

The difficulties associated with the interpretation of relationship between PCI measured at follow-up and a dependent variable (RTW, p.183) have been discussed before and they would apply here too. By taking a PCI measure at earlier stages of the rehabilitation, before the patients have returned to work, it would probably be possible to shed some light on the direction of the causality in this relationship.

#### Sedentary occupations

Table 9.8: Independent variables found to be significantly associ
ated with RPA - only patients whose occupations were

classed as 'sedentary'

<sub>22</sub> • •		Magnitude	
<u>Variable</u>	N	<u>r</u>	
Indep HOS			
PSYCHOLOGICAL variables			
EPI Neuroticism score	36	0.30 *	
Indep FU			
None	*		

The number of patients in the 'sedentary' category was not large enough to make possible a meaningful application of non-parametric statistics to ranked and/or modified variables. However, the parametric analyses (table 9.8) indicate that the lower the level of neuroticism, the greater the likelihood of fully resuming physical activity at work. This is consistent with the hypothesis made earlier regarding this relationship. However, it is not clear why this result was obtained in the sedentary catefory alone and not also in the manual category. This point will have to be further investigated.

## Multivariate analysis - The discriminant function analysis

Table 9.9: The relative contribution of independent variables

to the distinction between patients who fully resumed their pre-illness level of physical activity at work and patients who only partly resumed this level

		Contod	. ,	
V	<u>ariable</u>	<u>Scaled</u> <u>Eigenvector</u>	Eigenvector	<u>F</u>
T	ype of job	-0.913	-0.242	24.33***
•	Anxiety plus', day 2	-0.694	-0.018	0.63 N.S.
E	PI Neuroticism score	0.684	0.017	1.59 N.S.
S	ocio economic status	0.446	0.048	0.67 N.S.
M	ental demand at work	-0.377	-0.035	0.17 N.S.
•	Anxiety minus' day 2	-0.343	-0.009	1.12 N.S.
R	esponsibility at work	0.340	0.051	2.54 N.S.
W	ife's occupation	-0.312	-0.046	1.68 N.S.
P	CI, scoring method A	-0.282	-0.011	1.21 N.S.
E	ducational level	-0.250	-0.043	1.51 N.S.
•	Anxiety minus' day 1	-0.248	-0.009	0.01 N.S.
P	hysical demand at work	-0.229	-0.024	8.33**
E	PI Lie score	0.208	0.012	0.28 N.S.
s	everity of the illness	-0.162	-0.034	2.54 N.S.
T	he consultant	-0.139	-0.031	0.44 N.S.
A	ge	-0.129	-0.002	0.10 N.S.
	Anxiety plus day 1	-0.111	-0.002	2.22 N.S.
W	hether or not self employed	d 0.059	0.017	0.06 N.S.
E	PI Extraversion score	-0.025	-0.001	0.001N.S.

## Table 9.10: Significance tests on eigenvectors

Wilk's lambda criterion = 0.54

Rao's F test

F = 2.92,  $df_1 = 19$ ,  $df_2 = 65$ , p = 0.0007

<sup>\*</sup> p 0.05 \*\* p 0.01 \*\*\* p 0.001 N.S. Not significant

#### Table 9.11: 'Hits and misses'table

	Actual group name			
Forecast group name	Physical activ	vity Physical activity partly resumed		
Physical activity		•		
fully resumed	38	8		
Physical activity				
partly resumed	8	31		

The significance tests on the eigenvectors (table 9.10) and the 'Hits and misses' table (table 9.11) show that a discriminant function, using the independent variables presented in table 9.9 would make a significant distinction between patients who fully resumed their pre-illness level of physical activity at work and patients who only partly resumed this level. That may imply that a combination of these independent variables could be useful in predicting RPA.

Table 9.9 is consistent with the results of the univariate analyses in the sense that 'Type of job' and a measure of anxiety shortly after admission were found to make a relatively high contribution to the distinction between patients who fully and patients who partly resumed their pre-illness level of physical activity at work. 'Physical demand at work' was relatively low On the scaled eigenvector list, probably due to its high correlation with 'Type of Job'.

EPI Neuroticism score was found to have made a relatively high Contribution in the discriminant function. This is consistent With the finding of the separate univariate analysis carried out

on patients of sedentary occupations. This would support the argument that the level of neuroticism may be related to RPA and should be taken into account when prediction of the rehabilitation course is attempted.

Second follow-up - Ten months after leaving hospital

## Univariate analyses

Independent variables whose relationship with RPA were not examined

As for RTW at first follow-up (p.162 )

# Results of the statistical analyses Independent variables significantly associated with RPA at ten months

Table 9.12: Variables significantly associated with RPA at the second follow-up

		Mag	nitude	4 ,
<u>Variable</u>	<u>N</u>	r	Φ	<u>C</u>
Indep HOS				
MEDICAL variables	0.5			
Peel index (modified)	86		0.28**	
Clinical grading (modifie	ed)105		0.38***	
Severity of the illness				i. 1
(modified)	104		0.27**	
SOCIAL and OCCUPATIONAL				
<u>variables</u>				
Type of job	105		0.47***	
Type of occupation				
(modified)	105			0.41**
Physical demand at work	105	Let		0.37**
PSYCHOLOGICAL variables	* 1	Priville Vice		
EPI Extraversion score	105	-0.16*		
PCI, scoring method A				
(measured at first follow	r <b>-</b>			
up)	99	0.18*		
Indep FU				and the
PSYCHOLOGICAL variables				
Perception of fitness	- A			
for work	105	-0.20*		

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001

<sup>\*\*\*\*</sup> Since this measure was taken at the first follow-up, it can be considered to be completely independent of RPA at the second follow-up. Therefore it was included among the Indep HOS variables.

Further analyses and discussions of variables found to be significantly associated with RPA

## Indep HOS variables

MEDICAL variables

Peel index (modified) (scoring method p.79 )

Categories '1' and '2' were pooled to form the 'low' group (reflecting less severe illnesses), categories '3' and '4' were pooled to form the 'high' group.

Patients in the 'low' group (46/74, 62.2%) were more likely fully to resume their pre-illness level of physical activity at work than patients in the 'high' group (2/12, 16.7%).

## Clinical grading (modified) (scoring method p.79 )

As explained on p. 79, this scale is commonly used as an index for assessment of severity of myocardial infarction. It usually consists of four categories, but here, in order to enable the application of a chi-square test, these categories were condensed into two groups. One consists of patients with grade 1 of the scale (very low severity) and the other consists of patients with grades 2, 3, and 4 (moderate or high severity).

56 of the 83 patients in the first category (67.5%), fully resumed their physical activity at work, as opposed to only four of the 22(18.2%) who were in the second category. N = 105,  $\chi^2 = 15.29$ , df = 1, p = 0.0004.

## Severity of the illness (scoring method p.80 )

To enable the application of a chi-square test, this scale was condensed into two catwgories: a. Mild, b. Moderate or Severe. 52 out of 79(65.8%), in the first category fully resumed their physical activity at work as opposed to only 8 out of 25 (32% in the second category. N = 104,  $\chi^2$  = 7.56, df = 1, p = 0.0059.

It can be concluded that aspects of the severity of the illness, although not significantly associated with RPA, at the first follow-up, were related to the degree to which the pre-illness level of physical activity at work was resumed by the second follow-up.

## SOCIAL and OCCUPATIONAL variables Type of job (scoring method on p. 84 )

Patients whose jobs were classified as 'sedentary' (32/35 = 91.4%) were more likely fully to resume their physical activity at work than those in the 'manual' group (28/70 = 40%), N = 105,  $x^2 = 23.14$ , df = 1, p = 0.0001.

## Type of occupation (scoring method on p. 84 )

The categories of Professional and Clerical were pooled since the numbers of patients in them were small and since they were comparable in the degree of physical activity involved in them. Three categories were observed: a. Professional and Clerical, b. Business and Managerial, and c. Manual. Table 9.13 shows, in each category, the proportion of patients fully and

partly resuming their physical activity at work.

Table 9.13: Relationship between type of occupation and RPA

	Type of occupation		
Physical activity at work	Professional and Clerical	Business and Managerial	Manua1
Fully resumed	16	19	25
	100%	70.4%	40.0%
Partly resumed	0	8	37
	0	29.6%	59.7%

$$N = 105$$
,  $\chi^2 = 21.09$ ,  $df = 2$ ,  $p = 0.0001$ 

People in professional and clerical occupations were more likely fully to resume physical activity at work than patients in business and managerial occupations. The proportion of patients fully resuming physical activity was lowest among manual workers.

## Physical demand at work (modified) (scoring method on p.83 )

This score was modified as follows:

Low - scores of '0' or '1'. 50.5% of the cases.

Moderate - scores of '2'. 36.2% of the cases.

High - scores of '3' or '4'. 13.3% of the cases.

As in the first follow-up the physical aspects of the job

seem to have played a significant role in determining the degree
to which the pre-illness level of physical activity at work

Was resumed.

Table 9.14: Relationship between RPA and Physical heaviness of the job

Physical activity	Physical	Physical heaviness of the job			
at work	Low	Moderate	High		
Fully resumed	40	13	7		
<u> </u>	75.5%	34.2%	50%		
Partly resumed	13	25	<b>7</b>		
	24.5%	65.8%	50%		

$$N = 105$$
,  $\chi^2 = 15.72$ ,  $df = 2$ ,  $p = 0.0004$ 

Patients whose jobs involved low physical demand were more likely to resume fully their physical activity at work, than those with moderate or high physical demand.

### PSYCHOLOGICAL variables

## EPI Extraversion score (scoring method p.104 )

The negative correlation with RPA indicates that the higher the extraversion score, the higher the degree to which the pre-illness level of physical activity at work was resumed. However, this correlation was low. A modified version of the extraversion score was not found to be significantly associated with RPA.

## PCI, scoring method A (measured at first follow-up)

The positive correlation with RPA (table 9.12) indicates that the less the tendency to relate the illness to aspects of the job, the higher the degree to which the pre-illness level of physical activity at work was resumed. However, this correlation

was low. A modified version of the PCI score was not found to be significantly associated with RPA.

## Indep FU variables

PSYCHOLOGICAL variables

Perception of fitness for work

The negative correlation with RPA (table 9.12) indicates that the higher the degree to which patients perceived themselves as fit for work, the greater the likelihood of fully resuming the pre-illness level of physical activity at work. However, this correlation was low. A modified version of the perception score was not found to be significantly associated with RPA.

As in the first follow-up, the physical demands associated with the job seem to have been a major factor in determining whether or not physical activity at work would be fully resumed. The relationship between RPA and the independent variables were therefore, re-examined in those patients whose jobs were classed as 'manual' and in those whose jobs were classed as 'sedentary', separately. The results of these analyses are presented on the following page.

Analyses of the relationships between RPA and independent variables for manual and sedentary occupations, separately.

## Manual occupations

Table 9.15: Independent variables found to be significantly

associated with RPA - Only patients whose occupations

were classed as manual

	Magnitude			•	
<u>Variable</u>	N		Φ		
Indep HOS					
MEDICAL variables					
Clinical grading (modified)	70		0.29 *		
PSYCHOLOGICAL variables					
EPI Extraversion score					
(modified)	70		0.25 *		
Indep FU					
None					
		· · · · · · · · · · · · · · · · · · ·			

Further analyses and discussions of the variables in table 9.15
MEDICAL variables

Clinical grading (modified)

The way in which this score was modified has been described before (p. 215). As expected, patients in the 'low' group (25/50 50%), were more likely fully to resume their pre-illness level of physical acitivity at work than tose in the 'high' group (3/20, 15%), N = 70,  $\chi^2 = 5.90$ , df = 2, p = 0.015.

#### PSYCHOLOGICAL variables

## EPI Extraversion score (modified)

This score was modified as follows:

Low - scores between '4' and '8'. 75.7% of the cases.

High - scores between '9' and '20'. 24.3% of the cases.

Patients with high scores were more likely fully to resume their physical activity at work (11/17, 64.7%) than those with low scores (17/32.1%). N = 70,  $\chi^2 = 4.43$ , df = 1, p = 0.035.

The nature of this relationship in the manual group is not clear. However, it is consistent with the low but significant correlation between RPA and Extraversion, found for the sample as a whole (table 9.12). It may be argued that the more extraverted patients, in the manual group, had a greater social need to resume their status in the work situation and that in turn required a full resumption of the pre-illness level of physical activity. This hypothesis can only be regarded as speculative at this stage and will have to be tested in future research.

## Sedentary occupations

Table 9.16: Independent variables found to be significantly associated with RPA - only patients whose occupations were classed as sedentary

	Magnitude			
<u>Variable</u>	. <u>N</u>	<u>r</u>		
Indep HOS				
PSYCHOLOGICAL variables				
AAS 'Anxiety plus' day 1	28	0.3422 *		
EPI Neuroticism score	35	0.3169 *		
Indep FU				
None				

<sup>\*</sup> p<0.05

The number of patients in the 'sedentary' category was not large enough to enable a meaningful application of non-parametric statistics to ranked and/or modified variables. However the parametric analyses indicate (table 9.16) that the lower the level of anxiety expressed on day 1 in hospital and the lower the level of neuroticism, the greater the likelihood of fully resuming the pre-illness level of physical activity at work in the 'sedentary' category. It is not clear why this result was obtained in the 'sedentary' category alone and not also in the manual category. This point will have to be further investigated.

## Multivariate analysis - The discriminant function analysis

Table 9.17: The relative contribution of independent variables
to the distinction between patients who fully resumed
their pre-illness level of physical activity at work
and patients who only partly resumed this level

<u>Variable</u>	Scaled Eigenvector	Eigenvector	<u>F</u>
Type of job	0.634	0.164	23.44***
Severity of the illness	0.443	0.081	4.88*
EPI Extraversion score	-0.443	-0.012	2.56 N.S.
Educational level	-0.381	-0.066	8.90**
'Anxiety plus', day 1	-0.362	-0.007	0.12 N.S.
'Anxiety minus', day 2	0.359	0.008	1.14 N.S.
Mental demand at work	0.213	0.020	0.13 N.S.
Socio economic status	0.208	0.024	3.57 N.S.
Physical demand at work	0.204	0.021	8.83**
PCI scoring method A	0.191	0.007	0.02 N.S.
Wife's occupation	-0.167	-0.026	0.97 N.S.
Responsibility at work	0.164	0.025	2.76 N.S.
'Anxiety minus' day 1	-0.146	-0.005	1.14 N.S.
EPI Neuroticism score	-0.091	-0.002	0.002N.S.
EPI Lie score	0.084	0.005	0.10 N.S.
Whether or not self- employed	-0.062	-0.020	0.47 N.S.
The consultant	0.049	-0.010	0.14 N.S.

<sup>\*</sup> P<0.05 \*\* p<0.01 \*\*\* p<0.001 N.S. Not significant

#### Table 9.18: Significance tests on eigenvectors

Wilk's lambda criterion = 0.61

### Rao's F test

F = 2.36,  $df_1 = 19$ ,  $df_2 = 71$ , p = 0.004

#### Table 9.19: 'Hits and Misses' table

	Actual group name				
Forecast group name	Physical activity fully resumed	Physical activit partly resumed			
Physical activity					
fully resumed	. 40	6 .			
Physical activity					
partly resumed	9.	36			

As in the first follow-up, the significance tests on the eigenvectors (table 9.18) and the 'Hits and Misses' table (table 9.19) show that the discriminant function would make a significant distinction between patients who fully resumed their pre-illness level of physical activity at work and patients who only partly resumed this level. A combination of the independent variables could be useful in predicting RPA.

Type of job (table 9.17), again was found to have made the highest contribution in the discriminant function. This finding together with 'Severity of the illness' and EPI Extraversion score, was consistent with the results of the univariate analyses. (Table 9.12).

'Physical demand at work' was relatively low on the scaled eigenvector list. As in the first follow-up it is probably due to its high correlation with 'Type of Job'.

## 3. Summary and Conclusions

## Distribution of patients on RPA

53% of the patients who were back at work by the first follow-up, fully resumed this pre-illness level of physical activity at work. 28% partly resumed, and 19% considerably reduced this level. By the second follow-up, the respective proportions were about 57%, 31% and 12%.

#### Significant associations between RPA and independent variables

At four months, RPA correlated negatively with Peel index and with the Physical demand at work.

At ten months, RPA correlated negatively with Peel index, Clinical grading, Severity of the illness and Physical demand at work.

In conclusion it can be argued that of the Indep HOS variables, the ones strongly and significantly associated with RPA, in both follow-ups, were those related to the amount of physical demand involved in the job.

Medical aspects of the severity of the illness were more associated with RPA in the second follow-up than in the first. It is possible that they are more related to the long term than to the short term ones.

The relationship of RPA with psychological variables was less apparent. However, it seems that anxiety and neuroticism were related to RPA in both follow-ups in patients whose jobs were of a sedentary nature. This relationship will have to be further investigated in future research.

The results of the multivariate analyses on both follow-ups were, in general, consistent with those of the univariate analyses. 'Type of Job' was found to make the highest contribution to the discriminant function. Of the PSYCHOLOGICAL variables, EPI Neuroticism score and anxiety level shortly after admission were found to have made a relatively high contribution in the first follow-up and EPI Extraversion score in the second.

#### CHAPTER 10:

#### Results and discussion

## Resumption of Mental load and responsibility

#### (RML) at work

- 1. Distribution of patients on RML
- 2. The search for significant associations between RML and independent variables
- 3. Summary and conclusions

## Disyribution of patients on RML

Table 10.1: Distribution of patients on RML - Only those for whom information was available on both follow-ups

Pı	re-illness	leve1	of	menta1	load
and	responsibi	lity	at	work	*

Follow-up	Fully resumed	Partly resumed	Considerably reduced	Tota1
First	55	10	9 .	74
	74.3%	13.5%	12.2%	100%
Second	<b>57</b>	13	4	74.
	77%	17.6%	5.4%	100%

Table 10.1 shows that the degree to which the pre-illness level of mental load and responsibility at work was resumed by the time of the second follow-up, was not significantly different from that in the first follow-up (t = 1.19, df = 73, p = 0.24).

Table 10.2: Distribution of patients on RML - All patients for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

Pre-illness level of mental load and responsibility at work

Follow-up	Fully resumed	Partly resumed	Considerably reduced	Tota1	Missing Information
A		, i se te segodoli i			
First	76	18	10	104	79
	73.1%	17.3%	9.6%	100%	
Second	77	. 21	7	105	78
To a	73.3%	20%	6.7%	100%	

The distribution shown in table 10.2 is similar to that in table 10.1. The proportions of patients in each of the three categories in the two follow-ups, did not differ significantly

(p<0.05). These results could imply that modifications in the degree of mental load and responsibility at work, made at an earlynstage of resuming work, remain stable without further changes over a relatively long period of time.

## 2. The search for significant associations between RML and independent variables

## First follow-up - 4 months after leaving hospital Univariate analyses

Independent variables whose relationship with RML were not examined

As for RTW (p. 162).

## Results of the statistical analyses

The number of patients who reported to have made a considerable reduction in their pre-illness mental load and responsibility at work was relatively small (N = 10, 9.6% of all cases in the first follow-up). It was therefore decided to condense the initial three-point scale (see p.123 ) on which RML was measured to a dichotomy:

- a. Mental load and responsibility fully resumed (RML score '0').
- b. Mental load and responsibility partly resumed (RML scores'l' or '2'.

## Independent variables found to be significantly associated with RML

Table 10.3: Variables significantly associated with RML

		Magnitu	ıde
<u>Variable</u>	<u>N</u>	r	C
Indep HOS			
PSYCHOLOGICAL variables			
PCI (scoring method A)	104	0.22**	
PCI (scoring method B)	104		0.24*
AAS 'Anxiety plus' day 2	89	0.17*	
EPI Lie score	104	-0.17*	
Indep FU			
PSYCHOLOGICAL variables			
Perception of fitness for			
work	104	0.17*	The second secon
PCI (scoring method A)	96	0.38***	
PCI (scoring method A,			
modified)	96		0.39***
PCI (scoring method B)	96	*	0.32**
GHQ	103	0.17*	

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001

Further analyses and discussions of variables found to be significantly associated with RML (those presented in table 10.3)

## Indep HOS variables

#### PSYCHOLOGICAL variables

#### PCI scoring method A (scoring method p. 110)

The positive correlation with RML (table 10.3) indicates that the lower the tendency to relate the illness to aspects of the job, the higher the likellihood of fully resuming the pre-illness level of mental load and responsibility at work. However, this correlation coefficiet was low. When the data were re-analysed, using PCI scoring method B, a similar relationship was found.

## PCI scoring method B (scoring method p. 110)

Table 10.4: Relationship between RML and PCI, scoring method B

Mental load and responsibility	PCI method B		
at work	0	1	2
Fully resumed	47	16	13
	82.5%	66.7%	56.6%
Partly resumed	10	8	10
	17.5%	33.3%	43.5%

$$N = 104$$
,  $\chi^2 = 6.25$ , df = 2, p = 0.0439

Patients who had not related their illness to any aspect of their job (score '0') were more likely fully to resume their mental load and responsibility at work than those who moderately

or strongly related their illness to aspects of their work. (scores '1' and '2').

Since this PCI measure was taken in hospital, long before the follow-up, there is no doubt about its independence. Table 10.4 demonstrates the potential usefulness of PCI in predicting aspects of the rehabilitation. It is, of course, possible that modifications in the degree of mental load and responsibility were perfectly justified, on medical grounds in some patients. However, in those cases in which reducing responsibility is not necessary (medically) and it results in loss of status and frustration it could probably be prevented by early explanations and encouragement by doctors.

## AAS 'Anxiety plus' day 2 in hespital (scoring method p.93 )

The low positive correlation with RML (table 10.3) indicates that the lower the anxiety level on day 2 in hospital, the higher the degree to which the pre-illness level of mental load and responsibility at work was resumed. A modified version of the anxiety score was not found to be significantly associated with RML.

## EPI Lie score (scoring method p.104)

The negative correlation with RML (table 10.3) indicates that the higher the Lie score the higher the degree to which the pre-illness level of mental load and responsibility at work was resumed. However, this correlation coefficient was low. A modified version of the Lie score was not found to be significantly associated with RML.

## Indep FU variables

#### PSYCHOLOGICAL variables

### Perception of fitness for work

The negative correlation with RML (table 10.3) indicates that the higher the degree to which patients perceived themselves as fit for work, the higher the likelihood of fully resuming the pre-illness level of mental load and responsibility at work. However, this correlation was low. A modified version of the 'perception of fitness' score was not found to be significantly related to RML.

## PCI scoring method A (scoring method p. 110 ).

The positive correlation with RML (table 10.3) indicates that the lower the degree to which the illness was related to aspects of the job, the higher the degree to which the pre-illness level of mental load and responsibility at work was resumed. When the data were re-analysed, using a modified version of PCI, scoring method A and using PCI scoring method B, similar relationships were found (tables 10.5 and 10.6).

Table 10.5: Relationship between RML and PCI (scoring method A, modified)

•	PCI me	PCI method A, modified				
Mental load and responsibility at Work	0		2			
Fully resumed	35	28	8			
	89.7%	75.7%	40%			
Partly resumed	4	9	12			
	10.3%	24.3%	60%			

 $N = 96, \chi^2 = 17.07, df = 2, p = 0.0002$ 

## Multivariate analyses - the discriminant function analysis

Table 10.7: The relative contribution of independent variables
to the distinction between patients who fully resumed
their pre-illness level of mental load and responsibility at work and patients who only partly resumed
this level

	Scaled		
<u>Variable</u>	Eigenvector	Eigenvector	<u>F</u>
EPI Lie score	-0.495	-0.030	4.14 *
Age	0.428	0.007	3.52 N.S.
PCI, scoring method A	0.401	0.015	2.86 N.S.
Physical demand at work	-0.401	-0.041	2.36 N.S.
Mental demand at work	0.369	0.034	2.94 N.S.
The consultant	0.356	0.079	3.02 N.S.
Type of job	0.347	0.081	0.00 N.S.
'Anxiety plus' day 2	0.338	0.009	0.88 N.S.
EPI Neuroticism score	-0.302	-0.007	0.07 N.S.
Whether or not self employ	yed 0.291	0.087	3.48 N.S.
Responsibility at work	-0.291	-0.043	1.04 N.S.
Severity of the illness	-0.280	-0.058	0.15 N.S.
'Anxiety minus' day 2	-0.208	-0.005	1.58 N.S.
Socio economic status	-0.191	-0.020	1.69 N.S.
'Anxiety plus' day 1	-0.156	-0.003	0.23 N.S.
Wife's occupation	-0.109	-0.016	0.69 N.S.
Educational level	-0.084	-0.014	0.41 N.S.
'Anxiety minus' day 1	0.041	0.001	0.29 N.S.
EPI Extraversion score	0.002	0.0001	0.28 N.S.

of the partners, the greater

## Table 10.8: Significance tests on eigenvectors

Wilk's lambda criterion = 0.73

## Rao's F test

F = 1.27,  $df_1 = 19$ ,  $df_2 = 65$ , p = 0.234

<sup>\*</sup> P<0.05 N.S. Not significant

Table 10.9: 'Hits and misses' table

	Actual group name		
Forecast group name	Mental load. Fully resumed	Mental load Partly resumed	
Mental load fully resumed	53	12	
•			
Mental load partly resumed	7	13	

The significance tests on the eigenvectors (table 10.8) and the 'Hits and misses' table (table 10.9) show that a discriminant function, using the independent variables presented in table 10.7 would not make a significant distinction between patients who fully resumed their pre-illness level of mental load and responsibility at work and patients who only partly resumed this level. This function may therefore not be useful in predicting RML.

Table 10.7 is consistent with the results of the univariate analyses in the sense that the EPI Lie score and PCI were found to make a relatively high contribution to the discriminant function.

'Physical demand at work' and 'Mental demand at work' were also found to be relatively high on the scaled eigenvectors list.

Although their relationship with RML were found to be of a similar pattern in the univariate analyses, they did not reach significance level.

The table is inconsistent with the results of the univariate analyses in showing that Age made a relatively high contribution to the discriminant function. The younger the patient, the greater the likelihood of fully resuming mental load and responsibility

at work.

Second follow-up - 10 months after leaving hospital
Univariate analyses

Independent variables whose relationships with RML were not examined

As for RML in the first follow-up (p. 229)

## Results of the statistical analyses

Independent variables significantly associated with RML at 10 months

Table 10.10: Variables significantly associated with RML at the

second follow-up

	<u>Magnitude</u>				
<u>Variable</u>	<u>N</u>	r	φ	<u>c</u>	
Indep HOS					
MEDICAL variables					
The consultant	105		0.09 *		
SOCIAL and OCCUPATIONAL					
<u>Variables</u>	) tej e.				
Mental demand at work	105			0.24 *	
PSYCHOLOGICAL variables					
PCI (scoring method A)	105	0.16 *			
Indep FU					
None		100000	the men		

<sup>\*</sup> p<0.05

Further analyses and discussions of independent variables found to be significantly associated with RML

## Indep HOS variables

MEDICAL variables

The consultant (scoring method p.79 )

The patients who were under the care of consultant '1' were more likely fully to resume their mental load and responsibility at work (45/54, 83.3%) than those who were under the care of consultant '0' (32/51, 62.7%). p = 0.0305

It is difficult to point out any obvious differences between the two consultants that would account for this result. Any suggestions would be highly speculative at this stage. Further research of this particular point would be needed.

#### SOCIAL and OCCUPATIONAL variables

Mental demand at work (modified) (scoring method on p. 83 )

This score was modified as follows:

Low - Scores of '0' or '1'. 33.3% of the cases.

Moderate - Scores of '2'. 42.9% of the cases.

High - Scores of '3' or '4'. 23.8% of the cases.

Table 10.11: Relationship between RML and degree of Mental demand at work

Mental load and responsibility	Mental demand at work (modified) Low Moderate High		
at work	Low	Moderate	Hìgh
Fully resumed	31 88.6%	30 66.7%	16 64%
Partly resumed	4	15 33.3%	9 36%

## Multivariate analyses - the discriminant function analysis

Table 10.12: The relative contribution of independent variables to the distinction between patients who fully resumed their pre-illness level of mental load and responsibility of work and patients who only partly resumed this level

	Scaled	. •	
<u>Variable</u>		Eigenvector	<u>F</u>
The consultant	-0.688	-0.150	6.58 *
Physical demand atwork	0.547	-0.054	3.25 N.S.
Socio economic status	-0.493	-0.056	0.56 N.S.
'Anxiety minus' day 1	0.427	0.013	0.61 N.S.
Type of job	0.376	0.087	1.83 N.S.
Mental demand at work	0.358	0.034	2.89 N.S.
Responsibility at work	-0.229	-0.034	0.03 N.S.
Age	0.211	0.003	0.69 N.S.
'Anxiety minus' day 2	-0.206	-0.005	0.005 N.S.
'Anxiety plus' day 1	0.156	0.003	0.06 N.S.
Whether or not self employed	0.110	0.035	0.06 N.S.
EPI Lie score	0.097	0.006	0.07 N.S.
EPI Neuroticism score	0.075	0.002	0.14 N.S.
'Anxiety plus' day 2	0.074	0.002	0.00 N.S.
Educational level	0.067	0.011	0.02 N.S.
Wife's occupation	-0.046	-0.007	0.07 N.S.
PCI scoring method A	0.043	0.002	2,65 N.S.
Severity of the illness	-0.017	-0.003	0.25 N.S.
EPI Extraversion score	-0.002	-0.000	0.02 N.S.
			Control of the contro

Table 10.13: Significance tests on eigenvectors

Wilk's lambda criterion = 0.78

Rao's F test

F = 1.02,  $df_1 = 19$ ,  $df_2 = 71$ , p = 0.452

<sup>\*</sup> P<0.05

$$N = 105$$
,  $\chi^2 = 6.29$ ,  $df = 2$ ,  $p = 0.043$ 

There was almost no difference between the 'moderate' and 'high' categories in the proportion of patients fully resuming their pre-illness level of mental load and responsibility at work. This proportion was significantly higher amongst patients in the 'low' category.

Although the two variables were significantly associated with each other at 10 months, 'Mental demand at work' was not found to be significantly associated with RML in the first follow-up. This could mean that the effect of 'mental demand' on RML is of a long-term nature and it is not shown after the first few months of discharge from hospital.

## PSYCHOLOGICAL variables

## PCI scoring method A (scoring method p.110 )

The positive correlation with RML (table 10.10) indicates that the lesser the tendency to relate the illness to aspects of the job, the higher the degree to which the pre-illness level of mental load and responsibility at work was resumed. However, the correlation was low. A modified version of the PCI score was not found to be significantly related to RML.

Table 10.14: 'Hits and misses' table

	Actual group name	
Forecast group name	Mental load Fully resumed	Mental load Partly resumed
Mental load fully resumed	66	12
Mental load partly resumed	3	10

The significance tests on the eigenvector (table 10.13) and the 'Hits and misses' table (table 10.14) show that a discriminant function, using the independent variables presented in table 10.12, would not make a significant distinction between patients who fully resumed their pre-illness level of mental load and responsibility at work and patients who only partly resumed this level. This function may therefore not be useful in predicting RML.

Table 10.12 is consistent with the results of the univariate analyses in the sense that 'The consultant' was found to make a significant discrimination between the two RML groups. Of the PSYCHOLOGICAL variables, anxiety level on day 1 in hospital was found to be of a relatively high contiribution to the discriminant function.

The remaining variables of a relatively high contribution were of the SOCIAL and OCCUPATIONAL group.

PCI, although significantly distinguishing between the two RML categories (and in that sense consistent with findings of the univariate analyses) was found to have made a relatively low contribution to the discriminant function.

## 3. Summary and Conclusions Distribution of patients on RML

73.1% of the patients who were back at work by the first follow-up, fully resumed their pre-illness level of mental load and responsibility at work. 17.3% partly resumed and 9.6% considerably reduced this level. By the second follow-up, the respective proportions were 73.3%, 20% and 6.7%. The differences in these proportions between the two follow-ups were not significant. It was concluded that reductions made in the pre-illness level of mental load and responsibility at work, by four months, remained stable for at least another six months. This indicates that employers were prepared to tolerate lengthy reductions not only in physical activity but also in mental load and responsibility of employees with heart disease.

## Significant associations between RML and independent variables

At four months, RML correlated negatively with Age and with the tendency to attribute the illness to aspects of the job (as measured both during stay in hospital and at follow-up).

At ten months, RML correlated negatively with Mental demand at work and with the tendency to attribute the illness to aspects of the job (as measured during stay in hospital). It was also found that patients of consultant '1' were more likely fully to resume their pre-illness level of mental load and responsibility at work than patients of consultant '0'.

It appears that PCI was the major variable associated with RML on both follow-ups. It is possible that this variable

could be used for early identification of patients who are likely to reduce their mental duties at work.

The degree of Mental demand at work was found to be significantly associated with RML ay 10 months but not at 4 months.

This could be an indication that this, independent variable is more related to the long term than to the short term effects of the illness on RML.

The results of the discriminant function analyses on both follow-ups, in general, were consistent with those of the univariate analyses.

#### CHAPTER 11:

#### Results and discussion

Resumption of pre-illness daily number of hours at work (RHR)

- 1. Distribution of patients on RHR
- 2. The search for significant associations between RHR and independent variables

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table (1.2) and packing pagesed! ( the

3. Summary and conclusions

## 1. Distribution of patients on RHR

Table 11.1: Distribution of patients on RHR - Only those for whom information was available on both follow-ups

Follow-up		re-illness daily number of hours at work ully resumed Partly resumed Considerably reduced		
First	46	20	8	74
	62.2%	27%	10.8%	100%
Second	58	12	4	74
	78.4%	16.2%	5.4%	100%

The degree to which the pre-illness daily number of hours at work was resumed was significantly higher in the second follow-up than in the first follow-up. (t = 3.21, df = 73, p = 0.002).

Table 11.2: Distribution of patients on RHR - All those for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

Follow up	hours a Fully resumed	Partly	Considerably reduced	_Total	Missing information
First	65 61.9%	27 25.7%	13 12.4%	105	78
Second	76 72.4%	23 21.9%	6 5.7%	105	78

The distribution shown in table 11.2 is similar to that in table 11.1 with regard to the first follow-up. As to the second follow-up, the tables differ with regard to the proportions of patients in the 'Fully resumed' (the proportion in table 11.2 is smaller than that in table 11.1) and 'partly resumed' (the

proportion in table 11.2 is larger than that in table 11.1) categories. In table 11.2, the proportions of patients in the 3 categories did not differ significantly between the two follow-ups (p>.05),

It appears therefore that employers were prepared to tolerate a reduction in working hours, as well as in physical and mental activities, in employees suffering from heart disease.

# 2. The search for significant associations between RHR and independent variables

First follow-up - 4 months after leaving hospital
Univariate analyses

Independent variables whose relationship with RHR were not examined

As for RTW (p.162 ).

## Results of the statistical analyses

The number of patietns who reported having made a considerable reduction in thier pre-illness daily number of hours at work

Was relatively small. (13 = 12.4% in the first follow-up, and
6 = 5.7%, in the second follow-up). It was therefore decided to

Condense the initial three-point scale on which RHR was measured
to a dichotomy:

a. Daily number of hours at work fully resumed. RHR score of '0'.

b. Daily number of hours at work partly resumed. RHR scores of '1' or '2'.

This modification was made in order to enable the application of non-parametric statistics in the analyses of these data.

Independent variables found to be significantly associated with RHR

Table 11.3: Variables significantly associated with the resumption

of daily number of hours at work (RHR)

<u>Variable</u>		Mag	nitude	
Indep HOS	<u>N</u>	r	<u>o</u>	<u>C</u>
SOCIAL and OCCUPATIONAL Variables				
Socio economic status (modified	1)105			0.30**
Responsibility at work	105			0.29**
Mental demand at work (modified	1)105			0.26*
Type of occupation (modified)	105		0.23*	
Educational level	105			0.25*
PSYCHOLOGICAL variables				
PCI scoring method A	105	.185*		
PCI scorng method B	105			0.23*
EPI Extraversion score	1.05	166*		
Indep FU				
MEDICAL variables				
General practioner's advice (modified)	105		0.24*	
PSYCHOLOGICAL variables				
PCI scoring method A	97	.316**	History on	
PCI scoring method A (modified)	97			0.36***
PCI scoring method B	97			0.27*
GHQ	104	. 253**		
GHQ (modified)	104			0.31**
Perception of fitness for work	105	-0.20*		

<sup>\*</sup> p<0.05, \*\* p<0.01, \*\*\* p<0.001

# Further analyses and discussions of variables found to be significantly associated with RHR

## Indep HOS

#### SOCIAL and OCCUPATIONAL variables

### Socio economic status (scoring method on p. 81 )

This score was modified as follows:

High - Social classes I and II. 31.4% of the cases.

Moderate - Social class III. 50.5% of the cases.

Low - Social classes IV and V. 18.1% of the cases.

Table 11.4: Relationship between Socio economic status and RHR

	Socio economic status			
Hours at work	Low	Moderate	High	
Fully resumed	13	. 39	13	
**	68.4%	73.6%	39.4%	
Partly resumed.	6	14	20	
La company	31.6%	26.4%	60.6%	

$$N = 105, \chi^2 = 10.49, df = 2, p = 0.0053$$

People from 'low and 'moderate' Socio economic classes
Were more likely to resume their hours at work than people
from 'high' classes.

#### Responsibility at work

Table 11.5: Relationship between RHR and Responsibility at work

e •	Respon	sibility at work	
Hours at work	Low	Moderate	High
Fully resumed	31	29	5
	68.9%	67.4%	29.4%
Partly resumed	14	14	12
	31.1%	32.6%	70.6%

$$N = 105$$
,  $\chi^2 = 9.10$ ,  $df = 2$ ,  $p = 0.0106$ 

Patients with 'low' or 'moderate' degrees of responsibility at work were more likely to fully resume their hours at work, than those with 'high' levels of responsibility.

### Mental demand at work (modified) (scoring method on p.83 )

This score was modified as follows:

Low - Scores of '0' or '1'. 35.2% of the cases.

Moderate - Scores of '2'. 38.1% of the cases.

High - Scores of '3' or '4'. 26.7% of the cases.

Table 11.6: Relationship between RH and the degree of Mental tension at work

Hours at work	lental demand	atwork (modified) Moderate	High
Fully resumed	29	23	13
	78.4%	57.5%	46.4%
Partly resumed	8	17	15
	21.6%	42.5%	53.6%

$$N = 105$$
,  $\chi^2 = 7.43$ , df = 2, p = 0.0243

Patients with 'low' degrees of mental demand at work were more likely to fully resume their pre-illness number of daily hours at work than patients with 'moderate' or 'high' levels of mental demand at work.

#### Type of occupation (modified) (scoring method on p. 84 )

In order to enable the application of a non-parametric test, this score was modified as follows: Patients in 'Business and managerial' and patients in 'Professional' occupations were pooled into one group. Patients in 'manual' and patients in 'Clerical' occupations were pooled to form a second group.

Patients in the second group (Manual and Clerical) were more likely fully to resume their pre-illness hours at work (50/71,70.4%) than patients in the first group (Business and Managerial and Professional) (15/34,44.1%). N = 105,  $\chi^2 = 5.67$ , df = 1, p = 0.0172.

### Educational level (scoring method p. 82 )

Table 11.7: Relationship between RHR and Educational level

	Educa	tional level	
Hours at work	Low	Moderate	High
Fully resumed	43	18	4
	72.9%	50%	40%
Partly resumed	16	18	6
	27.1%	50%	60%

$$N = 105$$
,  $\chi^2 = 7.21$ ,  $df = 2$ ,  $p = 0.0272$ 

Patients with lower levels of Education were more likely to

fully resume their hours at work, than those with 'moderate' or 'high' levels of Education.

All the five Indep. HOS, SOCIAL and OCCUPATIONAL variables presented above, can be regarded as associated, in one way or another, with the patients status at work. They were all found to be significantly correlated with each other (table 11.8). It could be argued, therefore, that the degree to which the pre-illness daily number of hours at work is resumed would depend on the patient's status at work. The higher the status, the higher the degree to which patients can receive permission to attend work for less than full time after the illness. However, the amount of work and its nature can be modified (as shown in previous chapters) irrespective of the status.

Table 11.8: Corelation matrix of the five Indep HOS SOCIAL and

OCCUPATIONAL variables found to be significantly

associated with RHR

<b>2</b> 22	RES	MENDEM	TYPOCC	EDUC
SES	-0.63*	-0.33	0.58	-0.55
	183**	183	182	183
				• 2
RES		0.44	-0.66	0.56
		183	182	183
MENDEM			0.36	0.35
			182	183
TYPOCC				-0.51
				182

All coefficients were significant at the 0.001 level.

\* - Correlation coefficient

\*\* - Number of cases

SES - Socio economic status

RES - Responsibility at work

MENDEM- Mental demand at work

TYPOCC- Type of occupation (modified) - This score was modified as follows:

'Business and Managerial' and 'Professional' were pooled to form one group (higher status at work).

'Clerical' and 'Manual' were pooled to form the second group (lower status at work).

was the higher the charge on which

EDUC - Educational level.

### PCI, scoring method A (scoring method on p.110 )

The positive correlation with RHR (table 11.3) indicates that the lesser the tendency to relate the illness to aspects of the job, the higher the degree to which the pre-illness daily number of hours at work was resumed. This correlation was low. When the data were re-analysed, using PCI scoring method B, a similar relationship was found (table 11.9).

Table 11.9: Relationship between RHR and PCI, scoring method B

• 1	PCI (scorin	g method B	)
Hours at work	0	1	2
Fully resumed	41	14	10
	71.9%	56%	43.5%
Partly resumed	16	11	13
* ************************************	28.1%	44%	56.5%

$$N = 105, \chi^2 = 6.11, df = 2, p = 0.047$$

Again, PCI is found to be of a potential usefulness in predicting the level of rehabilitation. People with 'high' PCI scores can be identified in hospital and if their perception is found to be incorrect and if reducing their attendance at work could adversely affect their general well-being, they can be reassured by doctors and encouraged to resume full time work.

## EPI Extraversion score (scoring method on p. 104)

The negative correlation (table 11.3) with RHR indicates that the higher the Extraversion score, the higher the degree to which the pre-illness daily number of hours at work was resumed.

However, this correlation was low. The modified Extraversion score was not found to be significantly related to RHR.

### Indep FU variables

#### MEDICAL variables

GP's advice regarding the resumption of work (scoring method on p.114 )

To make possible the application of non-parametric statistics patients who reported that their GP's advice had been 'unclear' and those who reported that their GP's advice was 'negative' were pooled to form one group. The second category consisted of those patients who reported that they had been advised by their GPs to return to work.

Patients who reported to have been advised to return to work (61/91,67%) were more likely to fully resume their hours at work than those who reported that their GP's advice was 'unknown' or 'unclear' or 'negative' (4/14,28.6%). N = 105,  $\chi^2$  = 6.06, df = 2, p = 0.0138.

This could be interpreted as indicating that patients who resumed work without receiving a clear advice to do so, approached it in a more gradual way. However, since both measures were taken at the time of the follow-up, further information would be required before any conclusion can be accepted.

### PSYCHOLOGICAL variables

PCI (scoring method A) (scoring method on p.110 )

The positive correlation with RHR (table 11.3) indicates that

the lower the tendency to relate the illness to aspects of the job, the higher the degree to which the pre-illness daily number of hours at work was resumed. When the relationship was re-examined using a modified version of scoring method A and using scoring method B, the same tendency emerged. These relationships are presented in tables 11.10 and 11.11 below.

## Table 11.10: Relationship between RHR and PCI (scoring method A, modified)

PCI (method A) score was modified as follows:

Low - Scores of '0'. 41.2% of the cases.

Moderate - Scores between '1' and '6'. 28.9% of the cases.

High - Scores between '6' and '12'. 29.9% of the cases.

	PCI Scoring method A (modified)			
Hours at work	Low	Moderate	High	
Fully resumed	31	25	6	
	79.5%	65.8%	30%	
Partly resumed	8	13	14	
	20.5%	34.2%	70%	

 $N = 97, \chi^2 = 14.13, df = 2, p = 0.0009$ 

Table 11.11: Relationship between RHR and PCI (scoring method B)

	PCI Scoring	method B	
Hours at work	0	all to of	2
Fully resumed	32	15	15
	80%	53.6%	51.7%
Partly resumed	8	13	14
	20%	46.4%	48.3%

$$N = 97$$
,  $\chi^2 = 7.65$ ,  $df = 2$ ,  $p = 0.0218$ 

The potential usefulness of the PCI measure has been demonstrated again. However, since there are doubts regarding the true independence of the PCI measure taken at follow-up, it would be necessary to take these measures at earlier stages of the rehabilitation in order to examine their effect on RHR. The fact that the Indep HOS measure of PCI was found to be related to RHR, supports the view that PCI affects RHR.

#### Perception of fitness for work

The negative correlation with RHR (table 11.3) indicates that the higher the degree to which patients perceived themselves as fit for work, the greater the likelihood of fully resuming the pre-illness daily number of hours at work. However, this Correlation was low. A modified version of the 'Perception of fitness' score was not found to be significantly related to RHR.

## GHQ (scoring method on p.115 )

The positive correlation with RHR (table 11.3) indicates that the stronger the feeling of general well-being, the higher the degree to which the pre-illness daily number of hours at work was resumed. This relationship was also found when a modified version of GHQ was re-examined. GHQ was modified as follows:

Low - Scores of '0' or '1'. 41.7% of the cases.

Moderate - Scores between '2' and '10'. 35% of the cases.

High - Scores between '10' and '45'. 23.3% of the cases.

The relationship with RHR is presented in table 11.12.

Table 11.12: Relationship between RHR and GHQ (modified)

*		GHQ (modified)	
Hours at work	Low	Moderate	High
Fully resumed	35	19	11
:	81.4%	52.8%	45.8%
Partly resumed	8	17	13
· ,	18.6%	47.2%	54.2%

$$N = 104$$
,  $\chi^2 = 10.90$ , df = 2, p = 0.0043

It would be difficult to determine the direction of the causality without taking GHQ measures in earlier stages of the rehabilitation, before work has been resumed. However, this result allows the conclusion that resuming full time work is not associated with adverse effects on the general well being of the patients.

In view of the fact that RHR was strongly related to indices of the 'Status at work', it was decided to re-analyse the data, controlling for the effects of the status. This was done by distinguishing between two groups of patients:

- 1. Those with low or moderate 'Responsibility at work' scores.
- 2. Those with high 'Responsibility at work' scores.

The relationships between RHR and the independent variables were examined separately in each one of the above groups. The variables found to be significantly related to RHR were the following:

## SOCIAL and OCCUPATIONAL variables Whether or not self employed

In the 'high' responsibility group, patients who were not self employed (5/10 = 50%) were more likely to fully resume their daily hours at work than those in the low' or 'moderate' responsibility group. (0/7 = 0%). N = 14, Fisher's exact probability = 0.04.

This finding is consistent with the previous argument regarding the relationships between the 'Status at work' and RHR. It is possible that this relationship was not significant in the low responsibility group since the variance in the status and in 'whether or not self employed' in this group, was too low.

#### PSYCHOLOGICAL variables

PCI, scoring method A, (modified) (Indep FU) (in 'Low responsibility' group)

This score was modified as follows:

Low - Scores of '0'. 46.9% of the cases.

Moderate- Scores between '1' and '6'. 38.3% of the cases.

High - Scores between '7' and '14'. 14.8% of the cases.

Hours at work	PCI, scoring Low	method A, (modif Moderate	ied) High
Fully resumed	31	23	3
	81.6%	74.2%	25%
Partly resumed	7	8	9
	18.4%	25.8%	75%
			The state of the s

 $N = 81, \chi^2 = 14.35, df = 2, p = 0.0008$ 

The lesser the degree to which the illness was attributed to aspects of work (lower PCI scores), the greater the likelihood of fully resuming the pre-illness daily number of hours at work. This result is consistent with findings for the sample as a whole (table 11.3). This relationship was not found to be significant in the the 'High Responsibility' group.

### Multivariate analyses - discriminant function analysis

Table 11.13: The relative contribution of independent variables to the distinction between patients who fully resumed their pre-illness daily number of hours at work and patients who only partly resumed their hours at work

2	C1-1	•	
<u>Variable</u>	<u>Scaled</u> Eigenvector	Eigenvector	F
Type of job	0.735	0.171	0.41 N.S.
Socio-economic status	-0.5327	-0.058	6.72 *
Severity of the illness	-0.456	-0.095	1.28 N.S.
Educational level	0.402	0.070	5.63 *
Responsibility at work	-0.341	-0.051	2.37 N.S.
'Anxiety plus' day 1	0.337	0.007	0.06 N.S.
PCI scoring method A	0.328	0.013	4.76 *
Mental demand atwork	0.327	0.031	6.83 **
Whether or not self employed	0.324	0.097	4.91 *
EPI Lie score	-0.254	-0.015	0.28 N.S.
Age	0.248	0.004	2.54 N.S.
Physical demand at work	-0.173	-0.017	0.28 N.S.
Wife's occupation	0.169	0.024	0.76 N.S.
The consultant	-0.127	-0.028	0.95 N.S.
EPI Extraversion score	-0.121	-0.004	1.51 N.S.
'Anxiety minus' day 2	-0.075	-0.002	0.40 N.S.
EPI Neuroticism score	-0.060	-0.001	0.01 N.S.
'Anxiety minus' day 1	0.056	0.002	1.41 N.S.
'Anxiety plus' day 2	-0.006	-0.0001	0.11 N.S.

<sup>\*</sup> p < 0.05 \*\* p < 0.01 N.S. - Not Significant

#### Table 11.14: Significance tests on eigenvectors

Wilk's lambda criterion = 0.68

#### Rao's F test

F = 1.58,  $df_1 = 19$ ,  $df_2 = 66$ , p = 0.087

#### Table 11.15: 'Hits and misses' table

Forecast group name	Hours	Actua fully	al group resumed	name Hours	partly	resumed
Hours fully resumed		49			15	
Hours partly resumed		4			18	

The significance tests on the eigenvectors (table 11.14) and the Hits and misses' table (table 11.15) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness daily number of hours at work and those who only partly resumed their hours at work. Such a function may therefore, not be useful in predicting RHR.

Table 11.13 is consistent with the results of the univariate analyses in showing that aspects of the status at work' (such as Type of job, Socio-economic level and Educational level) were making a relatively high contribution to the discriminant function. The table also shows 'Severity of the illness' to have made a relatively high contribution.

## Second follow-up - 10 months after leaving hospital

## Univariate analyses

Independent variables whose relationship with RHR were not examined

As for RHR at first follow-up (p. 245 )

## Independent variables found to be significantly associated with RHR

Table 11.16: Variables significantly associated with RHR at the second follow-up

		Magnitu	de	
<u>Variable</u>	<u>N</u>	<u>r</u>	φ	<u>c</u>
Indep HOS				
SOCIAL and OCCUPATIONAL Variables				
Responsibility at work	105			0.28
Hobbies and interests outside work	105	0.21 *		
Age	105	0.27 **		
Age (modified)	105		0.23 *	
Number of dependents (modified)	105		0.24 *	ers.
Indep FU				
PSYCHOLOGICAL variables				
PCI, scoring method A	99	0.26 **		
				On Tox

<sup>\*</sup> P<0.05 \*\* p<0.01

Further analyses and discussions of variables found to be significantly associated with RHR

### Indep HOS

SOCIAL and OCCUPATIONAL variables

Responsibility at work (scoring method on p. 82 )

Table 11.17: Relationship between RHR and 'Responsibility at work'

	Respons	Responsibility at work			
Hours at work	Low	Moderate	High		
Fully resumed	30	39	7		
	68.2%	84.8%	46.7%		
Partly resumed	14	7	8		
	31.8%	15.2%	53.3%		

$$N = 105$$
,  $\chi^2 = 8.88$ , df = 2, p = 0.0117

Patietns with moderate degrees of responsibility at work

Were the ones most likely to resume fully their hours at work.

Patients with 'high' levels of responsibility were the ones

least likely to fully resume their hours at work.

This result is consistent with that found in the first followup for variables associated with the status of patients at work. It can probably be explained in a similar way.

## Hobbies and interests outside work (scoring method on p. 87 )

Those patients who had hobbies and interests outside work

Were more likely fully to resume their hours at work than those

Who had not had hobbies or interests outsiede work. (38/45 = 84.4%

as opposed to 38/60 = 63.3%). N = 105,  $\chi^2 = 4.72$ , df = 1, p=0.0297.

This relationship seems to be in the opposite direction to what could be expected. It would be necessary to investigate it further before any conclusions could be drawn.

#### Age

The positive correlation with RHR (table 11.16) indicates that the younger the patient, the higher the degree to which the pre-illness daily number of hours at work was resumed. The same tendency was found when the relationship was re-examined using a modified version of the Age score.

The age score was modified as follows:

- 0 Ages lower than 58.
- 1 Ages higher than 57.

Patients who were in the younger age group were more likely fully to resume their daily number of hours at work (61/77,79.2%, as opposed to 15/28, 53.6%).  $\chi^2 = 5.53$ , df = 1, p = 0.0186.

## Number of dependents (modified) (scoring method p. 87 )

## This score was modified as follows:

Dependents not present - Patients who had no dependents at all.

62% of the cases.

Dependents present - Patients who had one or more dependents.

38% of the cases.

Table 11.18: Relationships between RHR and number of dependents (modified)

Hours at work	Number of depen	dents (modified) Present
Fully resumed	41	35
	63.1%	87.5%
Partly resumed	24	5
	36.9%	12.5%

$$N = 105$$
,  $\chi^2 = 6.21$ , df = 1, p = 0.012

Patients who had dependents to support were more likely fully to resume their pre-illness daily hours at work than patients who did not have dependents. However, it is possible that this relationship has been affected by age. This argument is supported by findings obtained when the relationship was re-examined, in patients below and above the age of 58, separately. In the younger group (age 58 or less) there was no significant difference between patients who did and patients who did not have dependents, in the proportions fully resuming hours at work. (33/38 = 86.8% as opposed to 28/39 = 71.8%, N = 77,  $\chi^2 = 1.81$ , df = 1, p = 0.178). In the older groups (age above 58) only 2 patients of the total 28 had had dependents to support, therefore, no statistical analysis was applied.

## Indep FU

## PSYCHOLOGICAL variables

PCI, scoring method A (scoring method on p. 110 )

This measure of PCI was taken at the time of the first follow-up. Since this occured six months before the second

follow-up, the measure can be considered to be completely unaffected by RHR at the second follow-up. The positive correlation with RHR (table 11.16) indicates that the lesser the tendency to relate the illness to aspects of the job, the higher the degree to which the pre-illness daily number of hours at work was resumed. A modified version of this score and also PCI scoring method B were not found to be significantly associated with RHR. It may be concluded that this result is a further indication of the potential predictive use of the PCI score.

As in the first follow-up (p. 256) the relationship between RHR and the independent variables was re-examined, controlling for the effects of the 'Status at work' by distinguishing between two groups on the 'Responsibility at work' variable. The variables found to be significantly related to RHR were the following:

#### Whether or not self-employed

In the 'High Responsibility' group, patients who were not self-employed (6/8 = 75%) were more likely fully to resume their daily hours at work than those in the 'Low' or 'Moderate' responsibility' group (1/7 = 14.3%), N = 15, Fisher's exact probability = 0.03. The comments made regarding this relationship at the first follow-up (p. 257) would apply here too.

## EPI Extraversion score (modified) in the low-responsibility group

The Extraversion score was modified as follows:

Low - Scores between '0' and '8'. 28.9% of the cases.

Moderate- Scores between '9' and '13'. 45.6% of the cases.

High - Scores between '14' and '25'. 25.5% of the cases.

Table 11.19: Relationship between RHR and EPI Extraversion score (modified)

Hours at work	EPI EX	score(modified) High	
Fully resumed	15	34	20
	57.7%	82.9%	87%
Partly resumed	11	7	3
· · · · · · · · · · · · · · · · · · ·	42.3%	17.1%	13%

$$N = 90, \chi^2 = 7.49, df = 2, p = 0.02$$

Patients with moderate or high Extraversion scores were more likely to resume fully the pre-illness daily number of hours at work than patients with low Extraversion scores.

## Multivariate analysis - The discriminant function analysis

Table 11.20: The relative contribution of independent variables
to the distinction between patients who fully
resumed their pre-illness daily number of hours
at work and patients who only partly resumed their
hours at work

		4	
<u>Variable</u>	<u>Scaled</u> Eigenvector	Eigenvector	<u>F</u>
Age	0.542	0.008	4.84*
Type of job	0.455	0.105	1.21 N.S.
The consultant	-0.454	0.096	1.08 N.S.
Whether or not self- employed	0.413	0.135	2.35 N.S.
Educational level	0.373	0.062	0.35 N.S.
EPI Extraversion sco	ore -0.306	-0.008	1.35 N.S.
'Anxiety plus', day	1 -0.298	-0.006	0.06 N.S.
Socio economic statu	as 0.263	0.030	0.02 N.S.
'Anxiety minus' day	1 -0.263	-0.008	0.37 N.S.
Severity of the illr	ness 0.235	0.042	2.15 N.S.
'Anxiety plus' day 2	0.184	0.005	0.01 N.S.
EPI Neuroticism scor	e 0.134	0.003	0.18 N.S.
PCI scoring method A	-0.119	-0.004	0.01 N.S.
Mental demand at wor	ck 0.014	0.010	0.16 N.S.
Physical demand at v	work 0.070	0.007	0.05 N.S.
'Anxiety minus' day	2 0.063	0.001	0.15 N.S.
Wife's occupation	-0.059	-0.009	0.03 N.S.
Responsibility at wo	ork -0.033	-0.005	0.14 N.S.
EPI Lie score	0.028	0.002	0.01 N.S.
5 <u>0.0</u> 00 m			

<sup>\*</sup> P<0.05

#### Table 11.21: Significance tests on eigenvectors

Wilk's lambda criterion = 0.85

#### Rao's F test

F = 0.62,  $df_1 = 19$ ,  $df_2 = 71$ , p = 0.87

### Table 11.22: 'Hits and Misses' table

Forecast group name		Actual group name					
		Hours			Hours		resumed
Hours	fully resumed		62			19	
Hours	partly resumed		5			5	

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The significance tests on the eigenvectors (table 11.21) and the 'Hits and misses' table (table 11.22) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness daily number of hours at work and patients who only partly resumed their hours at work.

Table 11.20 shows that Age and aspects of the job made a relatively high contribution to the discriminant function. This is consistent with findings of the univariate analyses. However, table 11.20 shows that 'The consultant' also made a relatively high contribution. Patients of consultant '1' were more likely to resume fully their hours at work than patients of consultant '0'.

## <u>Distribution of patients on RHR</u>

62% of the patients who had returned to work by four months, fully resumed their pre-illness daily number of hours at work.

26% partly resumed and 12% considerably reduced their hours at work. At ten months, the respective figures were 72%, 22%, and 6%.

## Significant associations between RHR and independent variables

At four months, RHR correlated negatively with Socio-economic status, Responsibility at work, Mental demand at work, Educational level and the tendency to attribute the illness to aspects of the job (as measured both during stay in hospital and at follow-up). It correlated positively with GP's advice regarding work and the level of general well-being.

At ten months, RHR correlated negatively with Responsibility at work, Age, and the tendency to relate the illness to aspects of the job. It correlated positively with 'Hobbies and interests outside work'.

It can be concluded that in both follow-ups the major factors associated with RHR were those related to the status of the patient at work. A hypothesis is put forward that the higher the status the greater the degree to which patients can receive permission to attend work on a part-time basis.

Of the psychological factors PCI seems to be related to RHR on both follow-ups. Once again it appears to be of a potential use in predicting rehabilitation. However, no other psychological variable appeared to be strongly related to RHR in the sample as a whole. Further analyses of the data revealed that in patients of low responsibility at work, RHR was positively correlated with Extraversion. This seems to be consistent with a similar finding with regard to RPA (p.220 ) and may provide a basis for hypothesizing that Extraverts in low responsibility and manual jobs have a greater tendency than introverts to resume fully their activities at work.

The discriminant functions based on Indep HOS variables did not make significant distinctions between patients who fully resumed their hours at work and patients who only made a partial resumption on either follow-up. However, the findings regarding the relative contribution of variables to the discriminant function were, in general, consistent with those of the univariate analyses on both follow-ups.

## CHAPTER 12:

## Results and discussion

## Resumption of Sexual Activity (RSA)

- 1. Distribution of patients on RSA
- 2. The search for significant associations between RSA and independent variables
- 3. Summary and conclusions

#### 1. Distribution of patients on RSA

Table 12.1: Distribution of patients on RSA only those for whom information was available on both follow-ups

	Sexual activity					
Follow-up	Fully resumed	Partly resumed	Not resumed	Total		
First	42	10	17	69		
	60.9%	14.5%	24.6%	100%		
Second	39	18	12	69		
	56.5%	26.1%	17.4%	100%		

The degree to which the pre-illness level of sexual activity was resumed by the time of the second follow-up, was not significantly different form that in the first follow-up. (t = 0.28, df = 68, p = 0.78).

Table 12.2: Distribution of patients on RSA - All patients for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

	Sexual	Sexual activity				
Follow-up	Fully resumed	Partly resumed	Not resumed	Total	Missing Information	
First	66 60%	18 16.4%	26 23.6%	100	83 *	
Second	57	24	18	99	84 **	
	57.6%	24.2%	18,2%			

<sup>\*</sup> out of whom 8 had terminated their sex life prior to the illness.

<sup>\*\*</sup> out of whom 13 had terminated their sex life prior to the illness.

The distribution shown in table 12.2 is similar to that in table 12.1. The proportions of patients in the 3 categories did not differ significantly between the two follow-ups.

It may be concluded that patients who fully resume their pre-illness level of sexual activity by four months are likely to continue maintaining this level for at least another six months. Some of those who did not resume their sexual activity by four months, made a partial resumption by ten months of leaving hospital. These findings are consistent with those of Bloch (1975).

# 2. The search for significant associations between RSA and independent variables

First follow-up - 4 months after leaving hospital

Univariate analyses

Independent variables whose relationship with RSA were not

examined

Indep HOS

MEDICAL variables

None

SOCIAL and OCCUPATIONAL variables

Responsibility at work
Physical demand at work
Mental demand at work
Type of job
Type of occupation
Whether or not self-employed
Occupational record
Availability of the job
Wife's occupation
Number of dependents
Hobbies and interests outside work

These variables were not considered to be of possible relevance to the dependent variable.

## PSYCHOLOGICAL variables

Perception of the causes of the illness - the PCI score was related to the work specifically and was not considered to be of any possible relevance here.

## Indep FU

### PSYCHOLOGICAL variables

PCI - See indep HOS.

## Results of the statistical analyses

Independent variables found to be significantly associated with

RSA

Patients who reported that they had terminated their sexual activity before admission to hospital, were not included in the analyses.

Table 12.3: Independent variables significantly associated with

RSA

Variable	<u>N</u>	• <u>Magnitude</u> <u>r</u>	<u>C</u>
Indep HOS			
MEDICAL variables			
Severity of the illness (modified)	109		0.28 **
Clinical grading (modified)	110		0.24 *
PSYCHOLOGICAL variables			
AAS 'Anxiety minus' day 1	93	-0.24**	
AAS 'Anxiety minus' day 1 (modified)	93		0.33 **
AAS 'Anxiety minus' day 3	86	-0.27**	
AAS 'Anxiety minus' day 3 (modified)	86		0.33 *
AAS 'Anxiety plus' day 3	86	0.17*	A CONTRACTOR OF A CONTRACTOR O
EPI Neuroticism score	110	0.16*	. 115
EPI Lie score	110	0.16*	
EPI Extraversion and Neuroticism combined	110		0.29 *
Indep FU		147.45	
MEDICAL variables			
Physical disability	110		0.25 *
PSYCHOLOGICAL vairables			and the contract of the contra
Perception of fitness for Work	109	-0.35***	
Perception of fitness for Work (modified)	109		0.33 ***
GHQ	106	0.24**	
GHQ (modified)	106		0,39 ***

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001

Further analyses and discussions of independent variables found to be significantly associated with RSA

## Indep HOS variables

### MEDICAL variables

Severity of the illness (modified) (scoring method on p. 80 )

This score was modified as follows:

Low - Scores of '0'. 78% of the cases.

High - Scores of '1' or '2'. 22% of the cases.

Table 12.4: Relationships between RSA and Severity of the illness

		Severity of the illness	
Sexual activity at four mon	nths	Low	High
Fully resumed	•	57	8
		67.1%	33.3%
Partly resumed		12	6
Mariana -		14.1%	25%
Not resumed		16	10
•		18.8%	41.7%

$$N = 109, \chi^2 = 9.00, df = 2, p = 0.01$$

Patients with low'severity' scores were more likely fully to resume their pre-illness level of sexual activity, than those whose 'severity' scores were high.

This result can be regarded as another indication of the potential usefulness of assessing the severity of the illness when patients are discharged from hospital. In giving the 'Severity' score the cardiologists attempted to predict only

return to work. This result shows that this prediction could be generalised to other aspects of the rehabilitation.

### Clinical grading (modified) (scoring method on p.79 )

This score was modified as follows:

Low - Scores of '1'. 60.9% of the cases.

High - Scores between '2' and '4'. 39.1% of the cases.

Table 12.5: The relationship between RSA and Clinical grading (modified)

Sexual activity at four months	Clinical grad	ing (modified) High
Fully resumed	58	8
	65.9%	36.4%
Partly resumed	13	5
	14.8%	22.7%
Not resumed	17	9
	19.3%	40.9%

$$N = 110, \chi^2 = 6.7, df = 2, p = 0.03$$

As expected, patients with lower 'clinical grading' scores (reflecting less severe illnesses) were more likely to resume fully their pre-illness level of sexual activity than patients with higher clinical grading scores.

## PSYCHOLOGICAL variables

AAS 'Anxiety minus' day 1 in hospital (scoring method on p. 93

The negative correlation with RSA (table 12.3) indicates that

the lower the anxiety level, on day 1 in hospital, the higher the degree to which the pre-illness level of sexual activity was resumed. This relationship was re-examined using a modified 'Anxiety minus' score. Table 12.6 shows that the same tendency was found. It is pointed out that low 'Anxiety minus' scores reflect high levels of anxiety and high scores reflect low levels of anxiety.

The 'Anxiety minus' score was modified as follows:

Low - Scores between '0' and '2'. 58.1% of the cases.

High - Scores between '3' and '15'. 41.9% of the cases.

Table 12.6: Relationship between RSA and AAS 'Anxiety minus' score on day 1 in hospital

Sexual activity at four months	AAS 'Anxiety minus High	(modified) Low
Fully resumed	30	23
	76.9%	42.6%
Partly resumed	5	12
	12.8%	22.2%
Not resumed	4	19
	10.3%	35.2%

$$N = 93, \chi^2 = 11.47, df = 2, p = 0.003$$

The possible connection between 'Severity' and AAS scores has been discussed before (p. 166). No further analysis of the relationship will be carried out here since the number of observations in the cells would be too small. Further research would

be needed in order to cross validate this relationship. However, it is encouraging to find that the anxiety score is associated with yet another aspect of the rehabilitation since it could prove to be a simple and useful tool for the early detection of patients who are likely to delay their rehabilitation.

### AAS 'Anxiety minus', day 3 in hospital (scoring method p. 93 )

The negative correlation with RSA (table 12.3) indicates that the lower the anxiety on day 3 in hospital, the higher the likelihood of fully resuming the pre-illness level of sexual activity. When the data were re-analysed, using a modified version of the 'Anxiety minus' score, a similar relationship was found. (table 12.7).

# AAS 'Anxiety minus', day 3 in hospital (modified)

This score was modified as follows:

Low - Scores between '0' and '7'. 26.7% of the cases.

Moderate - Scores between '8' and '13'. 51.2% of the cases.

High - Scores between '4' and '16'. 22.1% of the cases.

Table 12.7: Relationship between RSA and 'Anxiety minus' day 3 (modified)

Sexual activity at four months	AAS 'Anxiet High	y minus'day 3 Moderate	Modified) Low
Fully resumed	12	28	ali tat
the latest by the proof the his	63.2%	63.6%	47.8%
Partly resumed	4 21.1%	9 20.5%	1 4.3%
Not resumed	3 15.8%	7 15.9%	11 47.8%

$$N = 86$$
,  $\chi^2 = 10.49$ , df = 4, p = 0.032

Patients with 'high' or 'moderate' scores were more likely fully to resume their pre-illness level of sexual activity than patients with 'low' scores. (The lower the 'Anxiety minus' score, the higher the level of anxiety).

### AAS 'Anxiety plus' day 3 in hospital

The positive correlation with RSA (table 12.3) indicates that the lower the level of anxiety on day 3 in hospital, the higher the likelihood of fully resuming the pre-illness level of sexual activity. However, this correlation was low. A modified version of the 'Anxiety plus' score was not found to be significantly associated with RSA.

# EPI Neuroticism score (scoring method on p. 104)

The positive correlation with RSA (table 12.3) indicates that the lower the level of neuroticism, the higher the degree to which sexual activity was resumed. However, this correlation was low. The modified version of the score was not found to be significantly associated with RSA.

# EPI Lie score (scoring method on p. 104 )

The positive correlation with RSA (table 12.3) indicates that the lower the Lie score the higher the degree to which sexual activity was resumed. However, this correlation was low. The modified version was not found to be significantly associated with RSA.

# EPI Extraversion and Neuroticism combined (EN) (scoring method on p. 104)

For the purpose of this analysis, the RSA score was modified.

Patients who partly resumed their pre-illness level of sexual

activity, were pooled with those who did not resume their sexual

activity, to form one group. The second group consisted of those

Patients who fully resumed their pre-illness level of sexual

activity.

Table 12.8: Relationship between RSA and EN

Sexual activity at four months	Low E Low N	High E High N	Low E High N	High E Low N
Fully resumed	20 71.4%	18 72%	9 34.6%	19 61.3%
Partly resumed	8	7	17	12
	28.6%	28%	65.4%	38.7%

$$N = 110, \chi^2 = 10.026, df = 3, p = 0.018$$

The table clearly shows that those patients who had a Combination of low Extraversion and High Neuroticism scores were less likely fully to resume their pre-cllness level of sexual activity, than patients with any other combinations of scores on the two dimensions. This finding is consistent with those of Josten (1970), although there were no significant differences in the proportions of patients fully resuming sex among the other three categories.

Indep FU variables

MEDICAL variables

Physical disability

Table 12.9: Relationship between RSA and 'Physical disability'

	Physical disa	ability
Sexual activity at four months	Low	Moderate
Fully resumed	60	6
	63.8%	37.5%
Partly resumed	16	2
	17.0%	12.5%
Not resumed	18	8
	19.1%	50%

 $N = 110, \chi^2 = 7.25, df = 2, p = 0.026$ 

No patient was considered to be severely disabled.

As expected, patients with lower physical disability scores were more likely fully to resume the pre-illness level of sexual activity. The ambiguity concerning the true independence of the 'physical disability' score had been discussed earlier (p. 174).

# PSYCHOLOGICAL variables

# Perception of fitness for work (scoring method on p. 122 )

The negative correlation with RSA (table 12.3) indicates that the greater the tendency of patients to perceive themselves as fit for work, the greater the likelihood of fully resuming sexual activity. When the data were re-examined (using a modified version of this score) the same relationship was found. Table 12.10 shows the results of this analysis.

The 'Perception of fitness' score was modified as follows:

Low fitness - Scores between '0' and '2'. 42.2% of the cases.

High fitness - Scores of '3'. 57.8% of the cases.

Table 12.10: Relationship between 'Perception of fitness for work' and RSA

Sexual activity at four months	Perception of fitness High fitness	for work (modified) Low fitness
Fully resumed	55	10
	64%	43.5%
Partly resumed	17	1
	19.8%	4.3%
Not resumed	14	12
	16.3%	52.2%

$$N = 109$$
,  $\chi^2 = 13.69$ , df = 2, p = 0.001

Patients who perceived themselves as perfectly fit for work were more likely fully to resume their sexual activity than the others.

The significant association between the two variables may imply that the 'perception of fitness for work' score was based on a more general perception of fitness which covered other areas as well.

The difficulties associated with the interpretation of relationship between a dependent variable and 'perception of fitness for work' have been discussed earlier (p. 180 ). These

difficulties would apply here too.

No conclusions regarding causality can be made before further research is carried out, in which the 'perception of fitness' would be measured at earlier stages of the rehabilitation.

### General Health Questionnaire (GHQ) (scoring method p. 118 )

The positive correlation with RSA (table 12.3) indicates that the stronger the feeling of general well-being (reflected in lower GHQ scores) the higher the degree to which the sexual activity was resumed. The same relationship was found when the data were re-analysed using a modified version of GHQ score. The results of this analysis are shown in table 12.11. The GHQ score was modified as follows:

Low - Scores between '0' and '1'. 32.1% of the cases.

Moderate - Scores between '2' and '10'. 43.4% of the cases.

High - Scores between '10' and '45'. 24.5% of the cases.

Table 12.11: Relationship between GHQ (modified) and RSA.

GHQ (modified)			
Low	Moderate	High	
28	25	10	
82.4%	54.3%	38.5%	
3	11	3	
8.8%	23.9%	11.5%	
3	10	13	
8.8%	21.7%	50%	
	28 82.4% 3 8.8%	Low Moderate  28 25 82.4% 54.3%  3 11 8.8% 23.9%  3 10	

N = 106,  $\chi^2 = 18.78$ , df = 4, p = 0.0009

Patients with low GHQ scores (high general well-being) were more likely to resume fully their sexual activity than those with 'Moderate' or 'High' GHQ scores.

The question of causality, or its direction, are not clear and as with other Indep FU variables, a further examination of this relationship would have to be carried out by administering the GHQ at earlier stages of the rehabilitation. However, it seems safe to conclude that resumption of sexual activity is not associated with adverse effects on the general well-being of patients.

### Multiavariate analysis - the discriminant function analysis

Table 12.12: The relative contribution of independent variables
to the distinction between patients who fully
resumed their pre-illness level of sexual activity
and patients who only partly resumed this level.

Variable	<u>Scaled</u> Eigenvector	Eigenvector	<u>F</u>
'Anxiety plus' day 2	0.585	0.015	0.002 **
Severity of the illness	-0.573	-0.119	6.55 *
Educational level	0.514	0.089	1.85 N.S.
'Anxiety minus' day 2	0.457	0.010	1.32 N.S.
'Anxiety minus day 1	0.424	0.014	2.89 N.S.
The consultant	-0.397	-0.085	1.15 N.S.
EPI Lie score	-0.357	-0.021	0.99 N.S.
EPI Neuroticism	-0.239	-0.006	1.17 N.S.
Age	-0.269	-0.004	0.25 N.S.
Socio economic status	0.101	0.012	0.10 N.S.
EPI Extraversion score	-0.084	-0.002	0.001N.S.
'Anxiety plus' day 1	0.029	0.0006	0.93 N.S.

N.S. Not significant

### Table 12.13: Significance tests on eigenvectors

Wilk's lambda criterion = 0.81

### Rao's F test

$$F = 1.49$$
,  $df_1 = 12$ ,  $df_2 = 76$ ,  $p = 0.143$ 

Table 12.14: 'Hits and misses' table

Forecast group name	Actual group Sexual activity fully resumed	name Sexual activity partly resumed
Sexual activity fully resumed	45	14
Sexual activity partly resumed	6	24

The significance tests on the eigenvectors (table 12.13) and the 'Hits and misses' table (table 12.14) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness level of sexual activity and patients who only made a partial resumption of this level. It may therefore, not be useful for prediction purposes. However, table 12.12 shows that variables such as anxiety level shortly after admission to hospital and 'Severity of the illness' made the highest contribution to the discriminant function. In that sense these findings are consistent with those of the univariate analyses.

### Second follow-up - 10 months after leaving hospital

# Univariate analyses

Independent variables whose relationship with RSA were not examined

As in first follow-up (p.261 )

### Results of the statistical analyses

Independent variables found to be significantly associated with RSA

Table 12.15: Independent variables significantly associated with RSA

• • • • • • • • • • • • • • • • • • • •		Mac	nitude	
<u>Variable</u>	N	r	<u>C</u>	
Indep HOS				
MEDICAL variables				
The consultant	99		0.25	*
SOCIAL and OCCUPATIONAL variables	- /33			
Age	99	0.20	*	
Age (modified)	99		0.29	**
PSYCHOLOGICAL variables			e i janetykie	reservices
EPI Extraversion	99	-0.16	🛨 i sá faraice.	
EPI Neuroticism	99	0.21	**	
EPI Neuroticism (modified)	99		0.31	*
Indep FU				
PSYCHOLOGICAL variables		Andrew American		2,35
General Health Questionnain (GHQ)	e 99	0.36	***	
GHQ (modified)	99		0.30	*

<sup>\*</sup> p < 0.05

Further analyses and discussions of independent variables found to be significantly related to RSA

### Indep HOS variables

### MEDICAL variables

The consultant (scoring method on p. 79 )

Table 12.16: Relationship betwen 'The consultant' and RSA

	The consu	ltant
Sexual activity at ten months	0	1
Fully resumed	30	27
	63.8%	51.9%
Partly resumed	6	18
	12.8%	34.6%
Not resumed	11	7
	23.4%	13.5%

$$N = 99, \chi^2 = 6.81, df = 2, p = 0.0332$$

The table shows that of the patients who were under the care of consultant '1' the proportion who were in the 'partly resumed' category was considerably greater than that of the patients who were under the care of consultant '0'. However, the differences between the proportions in the two extreme categories ('Fully' and 'Partly' resumed) were relatively small. In fact, when the relationship between 'The consultant' and RSA was re-analysed excluding all patients in the 'Partly resumed category, it was not found to be statistically significant. It can only be concluded that patients of consultant '0' had had a greater tendency to fall in the extremes of the RSA score than those patients who were under the care of consultant'1'.

There is no apparent difference in the approaches of the two consultants that could explain this particular relationship.

### SOCIAL and OCCUPATIONAL variables

#### Age

The positive correlation with RSA (table 12.15) indicates that the lower the age, the higher the degree to which sexual activity was resumed. This tendency was also found when the data were re-analysed, using a modified age score.

The results of this analysis are shown below.

### Age (modified)

The age score was modified as follows:

- a. Age below 58 74.7% of the cases.
- b. Age above 57 25.3% of the cases.

The age of 58 was chosen as a cut -off point since it distinguished better than any other age between patients who resumed work and patients who did not at 4 months. It was later decided to use this modified score in analyses of other dependent variables.

Table 12.17: Relationship between age (modified) and RSA

		Age (modi:	fed)
Sexual activity at	ten months	Below 58	Above 57
Fully resumed		40 66.2%	8 32%
Partly resumed	plant diverse	15 20.3%	9 36%
Not resumed		10 13.5%	8 32%

$$N = 99, \chi^2 = 9.21, df = 2, p = 0.0100$$

Patients who were below the age of 58 were more likely fully to resume their sexual activity than those who were above the age of 57.

An attractive explanation here would be that the natural decline in sexual activity with age, has been accelarated by the effects of the illness. However, it may also be argued that this result is a reflection of the greater embarrasement, for younger patients in admitting incomplete sexual adequacy. Unfortunately, it is not possible, on the basis of the available data, to determine the relative validity of these explanations. It is stressed that these findings are consistent with those of Bloch (1975).

### PSYCHOLOGICAL variables

#### EPI Extraversion score

The negative correlation with RSA (table 12.15) indicates that the higher the extraversion score the higher the degree to which sexual activity was resumed. However, this correlation was low. The modified Extraversion score was not found to be sitnificantly associated with RSA.

### EPI Neuroticism score

The positive correlation with RSA (table 12.15) indicates that the lower the neuroticism level, the higher the degree to which sexual activity was resumed. This tendency was also found when the data were re-analysed, using a modified Neuroticism

score. The relationship of the modified score is presented in table 12.18.

### EPI Neuroticism score (modified)

This score was modified as follows:

Low - Scores between '0' and '6'. 32.3% of the cases.

Moderate - Scores between '7' and '13'. 48.5% of the cases.

High - Scores between '13' snd '21'. 19.2% of the cases.

Table 12.18: Relationship between EPI Neuroticism score (modified)
and RSA

Sexual activity at ten	EPI Neutoricism score (modified)			
months	Low	Moderate	High	
Fully resumed	21	27	9	
	65.6%	56.2%	47.4%	
Partly resumed	8	14	2	
	25%	29.2%	10.5%	
Not resumed	3	7	8	
	9.4%	14.6%	42.1%	

$$N = 99, \chi^2 = 10.36, df = 4, p = 0.034$$

The lower the Neuroticism score, the higher the likelihood of fully resuming sexual activity. It is possible that patients with higher Neuroticism scores were more concerned about a recurrence resulting form sexual activity and therefore were less likely fully to resume their pre-illness sexual activity.

# Indep FU variables

### PSYCHOLIGICAL variables

### General Health Questionnaire (GHQ)

The positive correlation with RSA (table 12.15) indicates that the higher the level of general well-being (reflected in lower GHQ scores), the higher the degree to which sexual activity was resumed. The same relationship was found when the data were re-analysed using a modified version of the GHQ score. The results of this analysis are shown in table 12.19.

### GHQ (modified)

This score was modified as follows:

Low - scores of '0'. 35.4% of the cases.

Moderate- scores between '1' and '5'. 34.3% of the cases.

High - scores between '5' and '38'. 30.3% of the cases.

Table 12.19: Relationship between GHQ (modified) and RSA

GHQ (mc		
Low	Moderate	High
25	21	11
71.4%	61.8%	36.7%
7	8	9
20.0%	23.5%	30.0%
3	5	10
8.6%	14.7%	33.3%
	25 71.4% 7 20.0%	Low Moderate  25 21 71.4% 61.8%  7 8 20.0% 23.5%  3 5

$$N = 99, \chi^2 = 10.017, df = 4, p = 0.0401$$

The table shows that the lower the GHQ score (indicating higher levels of general well-being) the greater the likellihood of fully resuming sexual activity.

The discussion of the relationship between GHQ and RSA at the first follow-up (p.284 ) would be applicable here.

### Multivariate analysis - the discriminant function analysis

Table 12.20: The relative contribution of independent variables
to the distinction between patients who fully
resumed their pre-illness level of sexual activity
and patients who only partly resumed this level

<u>Variable</u>	Scaled Eigenvector	<u>Eigenvector</u>	F
'Anxiety plus', day 2	-0.510	-0.013	0.44 N.S.
The consultant	0.443	0.096	0.88 N.S.
EPI Neuroticism score	0.416	0.009	0.18 N.S.
Age	0.396	0.006	1.37 N.S.
Severity of the illness	0.372	0.065	0.33 N.S.
EPI Lie score	0.359	0.023	0.78 N.S.
'Anxiety minus' day 2	-0.229	0.005	0.22 N.S.
'Anxiety minus' day 1	0.223	0.006	0.86 N.S.
Socio economic status	0.205	0.025	0.005N.S.
EPI Extraversion score	-0.187	0.005	0.74 N.S.
Educational level	-0.155	0.027	0.26 N.S.
'Anxiety plus' day 1	-0.141	0.002	0.66 N.S.

N.S. Not significant

Table 12.21: Significance tests on eigenvectors

Wilk's lambda criterion = 0.93

Rao's F test

F = 0.41,  $df_1 = 12$ ,  $df_2 = 74$ , p = 0.95

Table 12.22: 'Hits and misses'table

Forecast group name	Actual group name  Sexual activity Sexual activity fully resumed partly resumed				
Sexual activity fully resumed	34	20			
Sexual activity partly resumed	15	18			

The significance tests on the eigenvectors (table 12.21) and the 'Hits and misses' table (table 12.22) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness level of sexual activity and patients who only made a partial resumption of this level. This function may therefore, not be useful for prediction purposes. However, table 12.20 shows that 'The Consultant' and EPI Neuroticism score made a relatively high contribution to the discirminant function. The level of anxiety on the second day in hospital was found to have made the highest Contribution.

# 3. Summary and Conclusions

<u>Distribution of patients on RSA</u> - 60% of the patients fully resumed their pre-illness level of sexual activity by the time of the first follow-up. 16.5% partly resumed and 24% terminated

their sexual activity. By the second follow-up, the respective proportions were 58%, 24% and 18%.

### Significant associations between RSA and independent variables

At four months, RSA correlated negatively with the Severity of the illness, Physical disability and AAS anxiety during the first three days of admission to hospital. It correlated positively with patients' perception of their physical fitness and their expressed level of general well-being, measured at follow-up.

At ten months, RSA correlated negatively with Age and Neuroticism. It correlated positively with the expressed level of general well-being, measured at follow-up.

From the medical point of view, the 'normal' pre-illness level of sexual activity can be resumed within a few weeks of leaving hospital (Hellerstein, 1970). Psychologically, it appears that resumption of sexual activity is positively associated with general well-being. It can therefore be accepted that patients should be encouraged to resume their pre-illness sex-life. It has been shown here that patients who are particularly likely to modify their sexual activity are those whose illness has been severe, those who expressed high levels of anxiety shortly after admission, those of older age and those with high neuroticism scores. All four variables can be used for early identification of patients who are likely to modify their sex life following the illness, so that reassurance and encouragement can be given. It may be necessary for doctors to bring up the subject themselves since patients may be too inhibited to initiate a discussion. It is quite possible that the attitudes

of wives play an important role in this context and it may be useful to involve wives in such discussions. Unfortunately it has not been possible to interview wives in the present study. This could be a useful and interesting subject for future research.

The discriminant functions based on Indep HOS variables did not make significant distinctions between patients who fully resumed their sexual activity and patients who only made a partial resumption, on either follow-up. However, the findings regarding the relative contribution of variables to the discriminant functions were, in general, consistent with those of the univariate analyses, on both follow-ups.

### CHAPTER 13:

# Results and discussion

# Resumption of driving (RD)

- 1. Distribution of patients on RD
- The search for significant associations between RD and independent variables
- 3. Summary and conclusions

### 1. Distribution of patients on RD

Table 13.1: Distribution of patients on RD - only those for whom information was available on both follow-ups

	Driving				
Follow-up	Fully resumed	Partly resumed	Not resumed	Total	
First	49	9	5	. 63	
	77.8%	14.3%	7.9%	.100%	
Second	49	11	3	63	
· _ v	77.8%	17.5%	4.7%	100%	

The degree to which the pre-illness driving was resumed by the time of the second follow-up, was not significantly different from that in the first follow-up (f = -0.38, df = 62, p = 0.71).

Table 13.2: Distribution of patients on RD - all patients for

whom information was available on the first followup and all those for whom information was available
on the second follow-up.

	D	riving	* 40 P 14 14 Y		Missing Information	
Follow-up	Fully resumed	Partly resumed	Not resumed	Total		
First	71 75.5%	15 16%	8 8•5%	94 100%	89 *	
Second	71	15	3		94 **	
	79.8%	16.9%	3.4%	100%		

<sup>\*</sup> out of whom 22 had not driven prior to the illness.

The distribution shown in table 13.2 is similar to that in

<sup>\*\*</sup> out of whom 21 had not driven prior to the illness.

table 13.1. The proportion of patients in the 3 categories did not differ significantly between the two follow-ups. (p>0.05).

It may be concluded that patients who fully resume driving by 4 months are likely to maintain this level for at least another 6 months. Some of those who do not resume driving by 4 months, later make a partial resumption.

# 2. The search for significant associations between RD and independent variables

### Results of the statistical analyses

Patients who had not driven before their admission to hospital were excluded from the analyses. Since the number of patients not resuming driving at all was small (8 in the first and 3 in the second follow-up) they were pooled with the 'partly resumed' category. RD was therefore measured on a two point scale.

a. Driving fully resumed and b. Driving partly, or not resumed.

# First follow-up - 4 months after leaving hospital Univariate analyses

Independent variables whose relationships with RD were not examined.

As for RSA (p.273 ).

# Independent variables significantly associated with RD

Table 13.3: Independent variables significantly associated with RD

and	• .	Magnitude			
<u>Variable</u>	<u>N</u>	<u>r</u> .	Φ	<u>C</u>	
Indep HOS					
SOCIAL and OCCUPATIONAL Variables					
Age	94	-0.21 *	a a		
Indep FU					
MEDICAL variables					
GP's advice regarding work (modified)	93		0.23 *		
SOCIAL and OCCUPATIONAL Variables	8				
Wife's opinion regarding work (modified)	91		0.35 ***		
PSYCHOLOGICAL variables	8 4 8				
Perception of fitness for work	93	0.30 **			
General Health Questionn- aire (GHQ)	92	-0.22 **			
GHQ (modified)	92			0.2	

<sup>\*</sup> p<0.05 \*\* p<0.01

<sup>\*\*\*</sup> p<0.001

Further analyses and discussions of variables found to be Significantly associated with RD

Indep HOS variables

SOCIAL and OCCUPATIONAL variables

Age (scoring method on p. 86 )

The negative correlation with RD (table 13.3) indicates that the younger the patient, the greater the likelihood of fully resuming driving. A modified version of the age score was not found to be significantly associated with RD. It may be argued that in older patients, activities involving driving have decreased and therefore the need to resume driving fully is not as great as in younger patients. However, it is pointed out that this correlation was low.

# Indep FU variables

### MEDICAL variables

GP's advice regarding work (modified) (scoring method on p. 114)

This score was modified as follows: patients who were advised not to resume work and patients who were unclear about their GP's advice were pooled together into one group. Patients who had been given clear advice to return to work formed the second group. Patients in the second group(53/64=82.8%) were more

likely to resume fully driving than those in the first group (17/29 = 58.6%). N = 93,  $\chi^2$  = 5.04, df = 1, p = 0.0247.

A few alternative explanations can account for this significant relationship.

- a. The relationship could be a result of the resumption of work acting as a mediating variable. Patients who did not resume work had reduced their driving (due to lack of immediate pressure to drive to work) and hence the significant relationship between GP's advice and RD.
  - b. Patients who did not receive clear advice to resume work generalised their restricted behaviour to other areas including driving.
  - C. GPs who advised to delay work also advised to restrict driving.

Since no direct information was available about GPs' opinion, it is difficult to determine which of these explanations are correct. However, the first explanation received support from findings obtained when the relationships was re-analysed in patients who did and patients who did not return to work, separately. In those who returned to work, there was no significant difference in the proportions fully resuming driving between patients in the two 'GP's advice' categories.

(48/55 = 87.3%, in the second group as opposed to 8/9 = 88.9% in the first group, p = 0.75). In those who did not return to work, there was also no significant difference in the proportions of patients fully resuming driving (5/9 = 55.6% in the second group, as opposed to 9/20 = 45% in the first group, p = 0.90). It can be clearly seen that the proportions fully resuming driving were considerably lower in those patients not returning to work

than in those who did return to work.

# SOCIAL and OCCUPATIONAL variables Wife's opinion regarding the resumption of work (modified) (scoring method on p.116 )

This score was modified as follows: patients who were advised not to resume work and patients who were unclear about their wives' opinions were pooled into one group. Patients whose wives were clearly in favour of their return to work formed the second group. Patients in the second group (58/69 = 84.1%) were more likely to resume driving than those in the first group (10/22 = 45.5%).  $\chi^2 = 11.19$ , df = 1, p = 0.0008.

The difficulties in explaining this relationship are similar to the ones related to GP's advice.

#### PSYCHOLOGICAL variables

### Perception of fitness for work (scoring method p.122 )

The positive correlation with RD (table 13.3) indicates that the higher the tendency of patients to perceive themselves as fit for work, the greater the likelihood of fully resuming driving. The modified version of this score was not found to be significantly associated with RD.

### General Health Questionnaire (GHQ) (scoring method on p. 119 )

The negative correlation with RD indicates that the higher the level of general well-being, the greater the likelihood of fully resuming driving. A similar relationship was found when the data were re-analysed, using a midified GHQ score (table 13.4).

### GHQ (modified)

This score was modified as follows:

Low - scores between '0' and '1'. 31.5% of the cases.

Moderate- scores between '2' and '10'. 43.5% of the cases.

High - scores between '11' and '45'. 25% of the cases.

Table 13.4: Relationship between GHQ (modified) and RD

	GHQ (	GHQ (modified)				
Driving at 4 months	Low	Moderate	High			
Fully resumed	26	31	14			
	89.7%	77.5%	60.9%			
Partly resumed	3 .	9	9			
SE 1	10.3%	22.5%	39.1%			

$$N = 92$$
,  $\chi^2 = 6.03$ ,  $df = 2$ ,  $p = 0.049$ 

The higher the expressed level of general well-being (lower GHQ scores), the greater the likelihood of fully resuming driving. Although the causality here is unclear, it can be safely concluded that resumption of driving is positively associated with general well-being.

### Multivariate analysis - the discriminant function analysis

Table 13.5: The relative contribution of independent variables

to the distinction between patients who fully resumed

their pre-illness level of driving and patients who

only partly resumed this level

<u>Variable</u>	Scaled Eigenvector	Eigenvector	<u>F</u>
Age	0.715	0.012	2.61 N.S.
'Anxiety minus', day 1	-0.524	-0.018	0.01 N.S.
The consultant	0.414	0.097	0.64 N.S.
EPI Extraversion score	0.378	0.012	1.86 N.S.
EPI Neuroticism	-0.356	-0.009	1.08 N.S.
'Anxiety minus', day 2	0.320	0.008	1.31 N.S.
Severity of the illness	0.276	0.071	1.48 N.S.
EPI Lie score	-0.230	-0.015	0.89 N.S.
Socio economic status	0.221	0.029	0.89 N.S.
Educational level	-0.188	-0.033	1.73 N.S.
'Anxiety plus', day 2	-0.099	-0.003	1.62 N.S.
'Anxiety plus', day 1	-0.033	-0.0007	0.03 N.S.

N.S. - Not significant

### Table 13.6: Significance tests on eigenvectors

Wilk's lambda criterion = 0.82

### Rao's F test

F = 1.10,  $df_1 = 12$ ,  $df_2 = 61$ , p = 0.37

Table 13.7: 'Hits and misses' table

		Actual	group na	ame	,	
Forecast group name	Driving	fully	resumed	Driving	partly	resumed
Driving fully resumed	1	54		= 2	10	
Driving partly resume	<u>ed</u>	4			6	

The significance tests on the eigenvectors (table 13.6) and the 'Hits and misses' table (table 13.7) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness level of driving and patients who only made a partial resumption of this level. This function may therefore not be useful for prediction purposes of RD.

Table 13.5 is consistent with the results of the Univariate analyses in showing that Age made a relatively high contribution to the discriminant function.

# Second follow-up - 10 months after leaving hospital

# <u>Univariate analyses</u>

Independent variables whose relationship with RD were not examined

As for RD at first follow-up (p.301 ).

# Results of the statistical analyses

Independent variables significantly associated with RD at ten months

Table 13.8: Variables significantly associated with RD at the second follow-up

		Magi	nitude	9			
<u>Variable</u>	$\underline{N}$	r	Φ	<u>C</u>	$x^2$	<u>df</u>	p
Indep HOS							
MEDICAL variables							
The consultant	89		0.21		4.03	1	0.04
PSYCHOLOGICAL variables							
AAS 'Anxiety minus' day 3 in hospital	62	0.27					0.015
AAS 'Anxiety minus' day 3 (modified)	62			0.33	7.60	2	0.02
AAS 'Anxiety plus' day 3 in hospital	62	-0.31					0.007
Perception of the illness (modified)	89		0.21		4.03	1	0.04
Indep FU							
MEDICAL variables							
GP's advice regarding work	89	80.00					0.002*
PSYCHOLOGICAL variables				n in			
Perception of fitness for Work (modified)	89						0.001*

<sup>\*</sup> Fisher's exact probability test.

Further analyses and discussions of variables found to be Significantly associated with RD

<u>Indep HOS variables</u>

MEDICAL variables

The consultant

Patients who were under the care of consultant '0' (37/41 = 90.2%) were more likely fully to resume driving than patients under consultant '1' (34/48 = 70.8%). N = 89,  $\chi^2 = 4.03$ , df = 2, p = 0.04. There are no apparent differences in the approaches of the two consultants that could explain this result It would be necessary to conduct further investigations before making any conclusions.

### PSYCHOLOGICAL variables

### AAS 'Anxiety minus' on day 3 in hospital

The positive correlation with RD (table 13.8) indicates that the lower the level of anxiety expressed on day 3 in hospital, the greater the likelihood of fully resuming driving. When the data were re-analysed, using a modified version of 'Anxiety minus' a similar relationship was found. (table 13.9).

### AAS 'Anxiety minus' on day 3 in hospital (modified)

This score was modified as follows:

Low - scores between '0' and '7'. 24.2% of the cases.

Moderate- scores between '8' and '13'. 50% of the cases.

High - scores between '14' and '16'. 25.8% of the cases.

Table 13.9: Relationship between RD and 'Anxiety minus' on day 3 in hospital (modified)

Driving at 10 months	AAS 'Anxiety High	minus' day 3 ( Moderate	modified) High
Fully resumed	. 7	6	1
	46.7%	19.4%	6.2%
Partly resumed	8	25	15
	53.3%	80.6%	93.8%

$$N = 62, \chi^2 = 7.60, df = 2, p = 0.02$$

As expected, the lower the level of anxiety expressed on day 3 in hospital (high 'Anxiety minus' scores), the greater the likelihood of fully resuming driving.

### Perception of the illness (modified)

This score was modified as follows: patients who perceived their illness to have been of mild or moderate severity were pooled into one group. Patients who perceived their illness to have been severe formed the second group.

Patients in the first group were more likely fully to resume driving (68/81 = 84%) than those in the second group (3/8 = 37.5%) P = 0.001 (Fisher's exact probability test).

# Indep FU variables

### MEDICAL variables

GP's advice regarding the resumption of work (modified)

Patients who were unclear about their GP's opinions and

patients who were advised by their GPs not to resume work were joined together into one category. Patients who had received a Clear advice to resume work formed the second group.

Patients in the second group were more likely fully to resume driving (61/70 = 87%) than those in the first group (10/19 = 50%). P = 0.002 (Fisher's exact probability test). The interpretation of this relationship has been discussed before with regard to the first follow-up (p. 303), that discussion would be applicable here too.

### PSYCHOLOGICAL variables

### Perception of fitness for work (modified)

This score was modified as follows:

Low fitness - scores of '0' or '1'. 6.8% of all the cases.

High fitness - scores of '2' or '3'. 93.2% of all the cases.

Patients who perceived themselves to be fit (high) (70/83=82%) were more likely to fully resume driving than those in the 'Low fitness' group (1/6 = 16.6%) p = 0.001.

### Multivariate analysis - the discriminant function analysis

Table 13.10: The relative contribution of independent variables to the distinction between patients who fully resumed their pre-illness level of driving and patients who only partly resumed this level

<u>Vari</u> able	Scaled Eigenvector	Eigenvector	<u>F</u>
		•	_
'Anxiety plus', day 2	0.672	0.018	1.23 N.S.
'Anxiety plus', day 1	-0.664	-0.013	0.61 N.S.
The consultant	0.618	0.147	7.56 **
EPI Neuroticism score	-0.508	-0.014	1.98 N.S.
'Anxiety minus', day 1	-0.501	-0.016	0.69 N.S.
Severity of the illness	0.388	0.071	1.98 N.S.
Socio economic status	0.217	0.027	0.01 N.S.
'Anxiety minus', day 2	0.211	0.005	1.16 N.S.
Age	0.190	0.003	0.48 N.S.
Edcuational level	0.161	0.028	0.08 N.S.
EPI Lie score	-0.063	-0.004	0.04 N.S.
EPI Extraversion score	-0.043	-0.001	0.27 N.S.

<sup>\*\*</sup> p < 0.01 N.S. - Not significant

### Table 13.11: Significance tests on eigenvectors

Wilk's lambda criterion = 0.78

### Rao's F test

F = 1.49,  $df_1 = 12$ ,  $df_2 = 66$ , p = 0.147

Table 13.12: 'Hits and misses' table.

	Acti				
Forecast group name	Driving	fully	resumed	Driving resumed	partly
Driving fully resumed		59		11	
Driving partly resumed		4		5	

The significance tests on the eigenvectors (table 13.11) and the 'Hits and misses' table (table 13.12) show that the discriminant function did not make a significant distinction between patients who fully resumed their pre-illness level of driving and patients who only made a partial resumption of this level. This function may therefore not be useful for prediction purposes of RD.

Table 13.10 is consistent with the results of the univariate analyses in showing that the anxiety level shortly after admission and 'The consultant' made a relatively high contribution to the discriminant function.

# 3. Summary and conclusions

<u>Distribution of patients on RD</u> - 76% of the patients fully resumed their pre-illness driving by the time of the first follow-up. 16% partly resumed and 8% did not resume their driving at all.

The respective figures for the second follow-up were 80%, 17% and 3%.

### Significant associations, between RD and independent variables

At four months, RD correlated negatively with Age. It Correlated positively with GP's advice and Wife's opinion regarding Work, with patients' perception of their fitness for work and With the expressed level of general well-being, as measured at follow-up.

At ten months, RD correlated negatively with the level of anxiety on day 3 in hospital and with patients' perception of the severity of their illness (as measured during stay in hospital). It correlated positively with GP's advice regarding work and with Patients' perception of their fitness (as measured at follow-up).

The resumption of driving at the first follow-up seems to have been related to almost none of the Indep HOS variables.

Only age was found to be significantly related to RD and that Correlation was low. It would therefore be impossible to make an early prediction of RD at 4 months on the basis of the Indep HOS variables. However, RD at 10 months appears to have been significantly related to the level of anxiety expressed on day 3 in hospital and to the perception of the illness.

GP's advice and Wife's opinion regarding work and the perception of fitness for work were all found to be significantly associated with RD on both follow-ups. There is a strong possibility, however, that these associations resulted from a mediating effect of RTW.

The resumption of driving on the first follow-up was found to be positively related to general well-being (as measured by GHQ).

The discriminant functions based on Indep HOS variables did not make significant distinctions between patients who fully resumed their driving and patients who only made a partial resumption, on either follow-up. However, the findings regarding the relative contribution of variables to the discriminant functions were, in general, consistent with those of the univariate analyses on both follow-ups.

### CHAPTER 14

# Results and discussion Change in life-style (CLS)

- 1. Distribution of patients on CLS
- 2. The search for significant associations between CLS and independent variables
- 3. Summary and conclusions

### 1. Distribution of patients on (CLS)

Table 14.1: Distribution of patients on CLS - only those for whom information was available on both follow-ups

Follow-up	No Change	Change Mild Change	in life-sty Moderate Change	Considerable Change	Total
First	30	35	38	13	116
	25.8%	30.2%	32.8%	11.2%	100%
Second	30	45	32	9	116
	25.8%	38.8%	27.6%	7.8%	100%

The degree of change reported by patients at the time of the second follow-up, was not significantly different from that in the first follow-up.(t = 1.32, df = 115, p = 0.191).

Table 14.2: Distribution of patients on CLS - all patients for whom information was available on the first follow-up and all those for whom information was available on the second follow-up

	Ch	ange in	life-style		1.045	
Follow-up	No Change	Mild Change	Moderate Change	Considerable Change		Missing Inform- ation
First	38 23.6%	42 26.1%	57 35.4%	24 14.9%	161 100%	22
Second	30	47	35	11	123	60
	24.4%	38.2%	28.5%	. 8.9%	100%	C. S. M. P. C. H.

The distribution shown in table 14.2 is similar to that in table 14.1. The proportions of patients in the four categories in the two follow-ups did not differ significantly (p>0.05). However, it appears that the 'mild' category tended to increase

between the two follow-ups at the expense of the 'moderate' and 'considerable' categories. That shows that changes that did occur between the two follow-ups were largely in the form of improvement. It is pointed out that only 26% of the patients reported having made no change at all in their life-styles following the illness.

# 2. The search for significant associations between CLS and independent variables

First follow-up - 4 months after leaving hospital
Univariate analyses

Independent variables whose relationships with CLS were not examined

As for RSA (p. 273 )

### Results of the statistical analyses

In order to make possible the use of non-parametric techniques in the various univariate analyses and for the application of multivariate analyses the CLS score was modified as follows:

Patients in the 'No change' and 'Mild change' categories were joined together to form one group. Patients in the other two categories i.e. 'Moderate change' and 'Considerable change', were joined together to form a second group. Thus, in the analyses in which non-parametric techniques were used and in the multivariate analyses CLS was measured on a two-point scale. In the parametric univariate analyses the original CLS score was used.

Independent variables found to be significantly associated with CLS

Table 14.3: Variables found to be significantly associated with CLS

Variable         N         r         Magnitude         C           Indep HOS         SOCIAL and OCCUPATIONAL variables         Socio economic status (modified)         161         0.20 *           PSYCHOLOGICAL variables         AAS 'Anxiety minus' day 1, (modified)         139         0.23 *           EPI Neuroticism score         161         0.17**         EPI Lie score (modified)         161         0.21**           EPI Lie score (modified)         161         0.21**         0.22 *           EPI Extraversion and Neuroticism combined (EN)         161         0.22 *           Indep FU         MEDICAL varibles         Very advice regarding work         161         0.20 *           Consultant's advice regarding work         161         0.18*         0.20 *           Consultant's advice regarding work (modified)         157         0.16*         0.16*           SOCIAL and OCCUPATIONAL variables wifes opinion regarding work (modified)         157         0.16*         0.16*           ESYCHOLOGICAL variables Perception of fitness for work (modified)         161         0.16*         0.16*           GHQ (modified)         159         0.41***         0.27 ***			Magn	l tudo	
SOCIAL and OCCUPATIONAL variables  Socio economic status (modified) 161 0.20 *  ESYCHOLOGICAL variables  AAS 'Anxiety minus' day 1, (modified) 139 0.23 *  EPI Neuroticism score 161 0.17**  EPI Lie score (modified) 161 0.21**  EPI Lie score (modified) 161 0.25 **  EPI Extraversion and Neuroticism combined (EN) 161 0.22 *  Indep FU  MEDICAL varibles  Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables wifes opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 0.16*  GHQ 159 0.41***	Variable	<u>N</u>			<u>c</u>
Socio economic status (modified) 161 0.20 *  PSYCHOLOGICAL variables  AAS 'Anxiety minus' day 1, (modified) 139 0.23 *  EPI Neuroticism score 161 0.17**  EPI Lie score (modified) 161 0.21**  EPI Lie score (modified) 161 0.25 **  EPI Extraversion and Neuroticism combined (EN) 161 0.22 *  Indep FU  MEDICAL varibles  Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables wifes opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 159 0.41***	Indep HOS				
AAS 'Anxiety minus' day 1, (modified)  EPI Neuroticism score  EPI Lie score  EPI Lie score (modified)  EPI Extraversion and Neuroticism combined (EN)  EDICAL varibles  Physical disability  GP's advice regarding work  Consultant's advice regarding work  Wife's opinion regarding work  (modified)  ESYCHOLOGICAL variables  Perception of fitness for work (modified)  GHQ  A. 23 *  0.23 *  0.21 *  0.25 **  161  0.25 **  161  0.22 *  0.18 *  0.18 *  0.18 *  0.20 *  0.19 **  157  0.16 *  157  0.16 *  157  0.16 *  157  0.16 *  159 0.41 ***	SOCIAL and OCCUPATIONAL variables			,	
AAS 'Anxiety minus' day 1, (modified)  EPI Neuroticism score  EPI Lie score  EPI Lie score (modified)  EPI Extraversion and Neuroticism combined (EN)  Indep FU  MEDICAL varibles  Physical disability  GP's advice regarding work  Consultant's advice regarding work  SOCIAL and OCCUPATIONAL variables  Wifes opinion regarding work  (modified)  Perception of fitness for work  (modified)  GHQ  139  0.17**  0.22 *  0.18*  0.20 *  0.19**	Socio economic status (modified)	161			0.20 *
### BPI Neuroticism score	PSYCHOLOGICAL variables				
EPI Lie score (modified) 161 0.21**  EPI Lie score (modified) 161 0.25 **  EPI Extraversion and Neuroticism Combined (EN) 161 0.22 *  Indep FU  MEDICAL varibles  Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables wifes opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 159 0.41***		139	•	,	0.23 *
EPI Lie score (modified)  EPI Extraversion and Neuroticism combined (EN)  Indep FU  MEDICAL varibles  Physical disability  GP's advice regarding work  Consultant's advice regarding work  SOCIAL and OCCUPATIONAL variables  Wife's opinion regarding work  (modified)  PSYCHOLOGICAL variables  Perception of fitness for work (modified)  Ferception of fitness for work (modified)  GHQ  161  0.25 **  0.22 *  0.18*  0.20 *  0.20 *	EPI Neuroticism score	161	0.17**		
EPI Extraversion and Neuroticism combined (EN)  Indep FU  MEDICAL varibles  Physical disability  GP's advice regarding work  Consultant's advice regarding work  SOCIAL and OCCUPATIONAL variables Wife's opinion regarding work (modified)  PSYCHOLOGICAL variables  Perception of fitness for work (modified)  Perception of fitness for work (modified)  GHQ  161  0.22 *  0.18*  0.20 *	EPI Lie score	161	0.21**		
Indep FU  MEDICAL varibles  Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables  Wife's opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work 161 0.16*  GHQ 159 0.41***	EPI Lie score (modified)	161			0.25 **
MEDICAL varibles  Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables  Wife's opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 161 0.16*  GHQ 159 0.41***		161			0.22 *
Physical disability 158 0.18*  GP's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables  Wife's opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 161 0.16*  GHQ 159 0.41***	Indep FU				
Consultant's advice regarding work 161 0.20 *  Consultant's advice regarding work 160 0.19**  SOCIAL and OCCUPATIONAL variables wife's opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables Perception of fitness for work 161 -0.27***  Perception of fitness for work 161 0.16*  GHQ 159 0.41***	MEDICAL varibles				
Consultant's advice regarding Work 160 0.19**  SOCIAL and OCCUPATIONAL variables Wife's opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 161 0.16*  GHQ 159 0.41***	Physical disability	158		0.18*	
Work  SOCIAL and OCCUPATIONAL variables  Wife's opinion regarding work (modified)  PSYCHOLOGICAL variables  Perception of fitness for work (modified)  Perception of fitness for work (modified)  GHQ  160  0.19**  0.16*  0.16*	GP's advice regarding work	161			0.20 *
wifes opinion regarding work (modified) 157 0.16*  PSYCHOLOGICAL variables  Perception of fitness for work 161 -0.27***  Perception of fitness for work (modified) 161 0.16*  GHQ 159 0.41***		160		0.19**	
(modified)  PSYCHOLOGICAL variables  Perception of fitness for work  Perception of fitness for work  (modified)  GHQ  157  0.16*  161  0.16*  0.16*	SOCIAL and OCCUPATIONAL variables				
Perception of fitness for work  Perception of fitness for work  (modified)  GHQ  161  0.16*  0.41***	Wifes opinion regarding work (modified)	157		0.16*	
Perception of fitness for work (modified)  GHQ  161  0.16*  159  0.41***	PSYCHOLOGICAL variables	•			
(modified) 161 0.16* GHQ 159 0.41***	Perception of fitness for work	161	-0.27***		
: [Head Town Control of the Control	Perception of fitness for work (modified)	161		0.16*	
GHQ (modified) 153 0.27 **	GHQ	159	0.41***		
	GHQ (modified)	153			0.27 **

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001

Further analyses and discussions of variables found to be significantly associated with CLS

# Indep HOS variables

SOCIAL and OCCUPATIONAL variables

Socio economic status (modified) (scoring method p, 81 )

This score was modified as follows:

Low - SES iv or v. 21.1% of the cases.

Moderate - SES iii. 50.9% of the cases.

High - SES i or ii. 28% of the cases.

Table 14.4: Relationship between Socio economic status and CLS

	Socio economic status (modified)				
Change in life-style	Low	Moderate	High		
Mild or none	20	45	15		
	58.8%	54.9%	33.3%		
Moderate or considerable	14	37	30		
	41.2%	45.1%	66.7%		

$$N = 161, \chi^2 = 6.83, df = 2, p = 0.0328$$

Patients in low and moderate socio economic classes had a lower tendency to report changes in life-style than those who were in high economic classes.

A hypothesis may be put forward that people in higher socio

economic classes are more intensively involved in more activities

and therfore the changes they have to make are greater. On the

other hand it may be argued that people in higher socio economic classes are more cautious about resuming their leisure and social activities than those in lower classes.

It is impossible to determine which explanation is correct without further research. Bor instance, it would be necessary to obtain evidence about differences in the pre-illness life-styles, amongst various socio-economic groups in order to take into account the degree to which change was demanded in the various groups. It has not been possible to conduct investigations of this kind in the present project.

### PSYCHOLOGICAL variables

AAS 'Anxiety minus' day 1 in hospital (modified) (scoring method p. 93 )

This score was modified as follows:

Low - scores of '0' or '1'. 35.3% of the cases.

Moderate - scores between '2' and '6'. 46.7% of the cases.

High - scores between '7' and '15'. 18% of the cases.

Table 14.5: Relationship between AAS 'Anxiety minus' day 1 (modified) and CIS.

	AAS 'Anxiety minus' day 1 (modified)				
Change in life-style	High	Low			
Mild or none	14	38	16		
	56%	58.5%	32.7%		
Moderate or considerable	11	27	33		
	44%	41.5%	67.3%		

$$N = 139, \chi^2 = 8.05, df = 2, p = 0.0178$$

Patients with 'Moderate' or 'High' Anxiety minus scores (indicating low anxiety) were less likely to report changes in life-style than patients whose 'Anxiety minus' scores were low (indicating high anxiety levels).

This result can be regarded as another indication of the potential usefulness of the AAS measures in predicting rehabilitation.

### EPI Neuroticism score (scoring method p.104 )

The positive correlation with CLS (table 14.3) indicates that the lower the level of neuroticism, the lower the degree of Change in life-style reported. However, this correlation was low. A modified version of the neuroticism score was not found to be significantly associated with CLS.

# EPI Lie score (scoring method p. 104 )

The negative correlation with CLS (table 14.3) indicates that the higher the Lie score, the lesser the tendency to report changes in life-style. When the data were re-analysed, using a modified version of the score, a similar relationship was found (table 14.6).

# EPI Lie score (modified) (scoring method p.104 )

This score was modified as follows:

Low - scores between '0' and '2'. 18% of the cases.

Moderate - scores between '3' and '5'. 60.2% of the cases.

High - scores between '6' and '8'. 21.7% of the cases.

Table 14.6: Relationship between EPI Lie score (modified) and CLS

*	EPI Lie so	get at a sure .	
Change in life-style	High	Moderate	Low
Mild or none	26	41	13
	74.3%	42.3%	44.8%
Moderate or considerable	9	56	. 16
	25.7%	57.7%	55.2%

$$N = 161, \chi^2 = 10.88, df = 2, p = 0.0043$$

Patients in the 'High' category were less likely to report Changes in life-style than patients in the other two categories.

Since the CLS score was assessed totally on the basis of the Patient's report, it is difficult to determine the degree of its Validity. The significant correlation may indicate that patients With high Lie scores had a lesser tendency to report changes but did not actually make less changes than patients with Low or Moderate Lie scores. An objective criterion of the degree of Change in life-style would be reuired in order to achieve a better Understanding of this relationship.

EPI Extraversion and Neuroticism combined (EN) (scoring method P.104)

Table 14.7: Relationship between CLS and EN

E		EN		
	Low E	High E	Low E	High E
Change in life-style	Low N	High N	Low N	Low N
None or mild	24	24	1.2	20
wone of mild				
·	58.5%	57.1%	30%	52.6%
Moderate or	17	18	28	18
Considerable	41.5%	42.9%	70.0%	47.4%

$$N = 161, \chi^2 = 8.55, df = 3, p = 0.03$$

There appears to be little difference in the proportions of Patients in the two categories of CLS amongst three of the EN Categories. However, the proportion of patients reporting none or mild changes in the Low E, High N category was considerably lower. This result is consistent with previous findings (Josten, 1970).

Although neither Extraversion nor Neuroticism alone were found to be strongly related to CLS, the combination of low Extraversion and High Neuroticism seems to be more associated with the report of changes in life-style than any of the other three Possible combinations of these scores. If this result is repeated in future studies it may justify the use of the EPI in Predicting rehabilitation.

### Indep FU

#### MEDICAL variables

### Physical disability

Patients who were regarded as not suffering from any physical disability (60/133 = 45.1%) were less likely to report changes in life-style than those who were regarded as moderately disabled (18/25 = 72.1%). N = 158,  $\chi^2$  = 5.05, df = 1, p = 0.0245. None of the patients was regarded as severely disabled.

### 2. GP's advice regarding resumption of work

Table 14.8: Relationship between GP's advice regarding work
and CLS

GP's advice regarding work				
Change in life-style	Return to work	Unknown or Unclear	Do not return to work	
Mild or none	58	10	12	
	54.7%	58.8%	31.6%	
Moderate or consider				
able	48	7	26	
1 (1)	45.3%	41.2%	68.4%	

$$N = 161, \chi^2 = 6.62, df = 2, p = 0.0364$$

Patients who were advised to resume work were less likely to report changes in life-style than patients in the other two Categories.

# Consultant's advice regarding work (modified) (scoring method on p. 115 )

Since only 4 patients reported to have been advised to delay

their return to work, they were pooled with patients who reported to have been unclear about their consultant's opinion regarding work. The second group consisted of patients who reported to have received a clear advice to resume work.

Patients in the second category (42/100 = 42%) were less likely to report changes in life-style than patients in the first group (38/60 = 63.3%). N = 160,  $\chi^2$  = 6.00, df = 1, p = 0.0143.

### SOCIAL and OCCUPATIONAL variables

Wife's opinion regarding the resumption of work (scoring method on p.116 )

Since only 3 patients were unclear about their wives'

Opinions regarding the resumption of work they were joined into

One category with those who reported that their wives had been

against their resumption of work. The second group was formed

by those patients who reported that their wives were in favour

of their resuming work.

Patients in the second group were less likely to report changes in life-style (54/119 = 45.4%) than those in the first group (25/38 = 65.8%). N = 157,  $\chi^2$  = 4.01, df = 1, p = 0.045.

### PSYCHOLOGICAL variables

Perception of fitness for work (scoring method on p. 122)

The negative correlation with CLS (table 14.3) indicates that the higher the degree to which patients perceived themselves as fit for work, the lower the likelihood of reporting changes in life-style. When the data were re-analysed, using a modified

Version of 'perception of fitness' a similar relationship was found.

### Perception of fitness for work (modified)

This score was modified as follows:

Low fitness - scores of '0' or '1'. 22.4% of the cases.

High fitness - scores of '2' or '3'. 77.6% of the cases.

Patients in the 'High fitness' group were less likely to report changes in life-style (57/125 = 45.6%) than those in the 'Low fitness' group (24/66.7%). N = 161,  $\chi^2$  = 4.15, df = 0.0415.

It seems possible that the 'perception of fitness for work' score reflected a more general perception of fitness and not one specific to work. However, as stated before, due to the fact that both measures (CLS and 'perception of fitness') were taken at the time of the follow-up, it is not possible to make conclusions regarding causality. This matter can be better understood by further research, taking a measure of 'perception of fitness' at earlier stages of the rehabilitation.

### General Health Questionnaire (GHQ)

The positive correlation with CLS (table 14.3) indicates that the higher the level of general well-being, the lower the likeli-hood of reporting changes in life-style. When the data were re-analysed using a modified version of GHQ, a similar relationship was found.

### GHQ (modified)

This score was modified as follows:

Low - scores of '0' or '1'. 30.7% of the cases.

Moderate - scores between '2' and '10'. 39.9% of the cases.

High - scores between '11' and '45'. 29.4% of the cases.

Table 14.9: Relationship between GHQ (modified) and CLS

Change in life-style	Low	GHQ (modified) Moderate	High
Mild or none	28	37	13
	59.6%	60.7%	28.9%
Moderate or considerable	19	24	32
	40.4%	39.3%	71.1%

$$N = 153$$
,  $\chi^2 = 12.46$ , df = 2, p = 0.002

Patients with 'Low' or 'moderate' scores were less likely to report changes in life-style than patients in the 'High' Category. It appears that there is no difference in the likelihood of reporting change in life-style amongst GHQ scores of 'O' to '10'. A sharp difference occurs between GHQ scores of above and below '10'. This is consistent with Goldberg's findings (1969) of the score of GHQ between '11' and '12' as the Cut-off point distinguishing between patients who were psychiatrically upset and patients who were not.

Although it is impossible to determine the direction of the Causality in this relationship, it can be safely concluded that general well-being was positively and strongly associated with

a resumption of the pre-illness life-style.

# Multivariate analysis - the discriminant function analysis

Table 14.10: The relative contribution of independent variables to the distinction between patients who made none or mild change in their pre-illness life-style and patients who reported to have made moderate or considerable changes

<u>Variable</u>	Scaled Eigenvector	Eigenvector	<u>F</u>
Severity of the illness	-0.439	-0.065	3.25 N.S.
EPI Neuroticism score	-0.409	-0.008	4.69 *
EPI Lie score	0.406	0.020	4.94 *
The consultant	0.371	0.065	1.41 N.9.
Educational level	-0.311	-0.043	6.04 *
Socio economic status	0.275	0.024	3.43 N.S.
'Anxiety plus' day 1	0.258	0.004	0.06 N.S.
'Anxiety minus' day 1	0.256	0.006	2.54 N.S.
Age	0.242	0.003	0.95 N.S.
'Anxiety plus' day 2	-0.233	-0.005	0.59 N.S.
'Anxiety minus' day 2	-0.184	-0.004	0.34 N.S.
EPI Extraversion score	0.142	0.003	0.25 N.S.

<sup>\*</sup> p < 0.05

N.S. - Not significant

### Table 14.11: Significance tests on eigenvectors

Wilk's lambda criterion = 0.83

#### Rao's F test

F = 1.91,  $df_1 = 12$ ,  $df_2 = 119$ , p = 0.039

Table 14.12: 'Hits and misses' table

Forecast group name	Actual group None or mild change in Life-style		name Moderate or considerable change in life-style		
None or mild change in life-style	48		22		
Moderate or considerable change in life-style	20		42		

The significance tests on the eigenvectors (table 14.11) and the 'Hits and misses' table (table 14.12) show that the discriminant function would make a significant distinction between the two categories of the modified CLS. This function may therefore be useful for prediction purposes of CLS.

Table 14.10 is consistent with the results of the univariate analyses in showing that EPI Neuroticism and Lie scores were of a relatively high contribution to the discriminant function. It also showed that 'Severity of the illness' made a relatively high contribution to the function.

# Second follow-up - 10 months after leaving hospital

# Univariate analyses

As for RSA (p.273 ).

### Results of the statistical analyses

# Independent variables found to be significantly associated with CLS

Table 14.13: Variables found to be significantly associated with CLS at 10 months

		Magn	itude	
<u>Variable</u>	N	r	Φ	<u>C</u>
Indep HOS				
PSYCHOLOGICAL variables				
AAS 'Anxiety minus' day 1	81	-0.21*		
AAS 'Anxiety minus' day 2	108	-0.17*	¥ "	
AAS 'Anxiety minus' day 2 (modified)	108			0.28 **
Indep FU				
MEDICAL variables			- 1.7.1 - 1.14 - 1.7.1 - 1.14	
Physical disability	117		0.19*	
<pre>Consultant's advice regard- ing work (modified)</pre>	123		0.26**	
SOCIAL and OCCUPATIONAL Variables				
Wife's opinion regarding work	119		0.33***	Lacatore
PSYCHOLOGICAL variables				
Perception of fitness for work	123	-0.34***		
Perception of fitness for Work (modified)	123		0.30***	
General Health Questionnaire (GHQ)	122	0.27***		
GHQ (modified)	122	in the same	the cape	0.27 **

<sup>\*</sup> p < 0.05

<sup>\*\*</sup> p <0.01

<sup>\*\*\*</sup> p<0.001

Further analyses and discussions of variables found to be significantly associated with CLS

Indep HCS variables

PSYCHOLOGICAL variables

AAS 'Anxiety minus' day 1 in hospital (scoring method on p. 93 )

The negative correlation with CLS (table 14.13) indicates that the lower the level of anxiety on day 1 in hospital, the lower the degree of change in life-style, reported. A modified version of the 'Anxiety minus' score was not found to be significantly associated with CLS.

AAS 'Anxiety minus' day 2 in hospital (scoring method on p. 93 )

The negative correlation with CLS (table 14.13) indicates a similar relationship to AAS 'Anxiety minus' day 1, above. When the data were re-analysed, using a modified version of 'Anxiety minus' a similar relationship was found (table 14.14).

AAS 'Anxiety minus' day 2 in hospital (modified) (scoring method on p. 93 )

This score was modified as follows:

Low - scores between '0' and '5'. 24.1% of the cases.

Moderate- scores between '6' and '11'. 50.9% of the cases.

High - scores between '12' and '17:. 25% of the cases.

Table 14.14: Relationship between AAS 'Anxiety minus' score
on day 2 in hospital

		ety minus' day 2	
Change in life-style	High	Moderate	Low
Mild or none	24	30	16
	88.9%	54.5%	61.5%
Moderate or considerable	3	25	10
	11.1%	45.5%	38.5%

$$N = 108$$
,  $\chi^2 = 9.52$ , df = 2, p = 0.0085

Patients who expressed low levels of anxiety (high 'Anxiety minus' scores) on day 2 in hospital were less likely to report changes in life-style than patients with moderate or high levels of anxiety.

# Indep FU variables

#### MEDICAL variables

### Physical disability (modified) (scoring method on p.112 }

Only 2 patients were considered to suffer a severe physical disability. They were therefore pooled with the 'Moderately severe' category to form one group. The second group consisted of those patients with mild or no disability.

Patients in the second group were less likely to report Changes in life-style (35/102 = 34.3%) than those in the first group (10/15 = 66.7%). N = 117,  $\chi^2$  = 4.49, df = 1, p = 0.034.

Consultant's advice regarding the resumption of work (modified)
(scoring method on p. 115)

Only 4 patients reported that their consultant was not in favour of their return to work. These patients were joined into one group with those who were unclear about their consultant's opinion. The second group consisted of those patients who reported that they had been given a clear advice by their consultant to resume work.

Patients in the second group (29/96 = 30.2%) were less likely to report changes in life-style than those in the first group (17/27 = 63%). N = 123,  $\chi^2$  = 8.3, df = 1, p = 0.0039.

It may be argued that the consultant's advice was affected by the 'Physical disability'. Patients who on previous examinations were found to be disabled, were advised by their consultants to 'slow down' in general. A greater sample and a more direct measure of the Consultant's advice would be required to clarify this relationship.

# SOCIAL and OCCUPATIONAL variables Wife'S opinion regarding the resumption of work (modified) (scoring method on p. 116 )

Only 5 patients were unclear about their wives' opinions. They were therefore joined together into one group with those whose wives were against their return to work. The second group consisted of patients whose wives were clearly in favour of their return to work.

Patients in the second group (27/95 = 28.4%) were less likely to report changes in life-style than those in the first group (17/24 = 70.8%). N = 119,  $\chi^2 = 13.02$ , df = 1, p = 0.0003.

### PSYCHOLOGICAL variables

### Percoetion of fitness for work

The negative correlation with CLS (table 14.13) indicates that the higher the degree to which patients perceived themselves as fit for work, the lower the degree of change in life-style, reported. When the data were re-analysed, using a modified version of 'percpetion of fitness', a similar relationship was found.

### Percpetion of fitness for work (modified)

Patients were divided into two groups. One group, 'Low fitness', consisted of patients with scores of '0', '1' or '2' (37% of the cases). The second group, 'High fitness', consisted of those patients with scores of '3' (63% of the cases).

Patients in the 'High fitness' group were less likely to report changes in life-style (20/78 = 25.6%) than those in the 'Low fitness' category (26/45 = 57.8%). N=123,  $\chi^2$ =11.25,df=1,and p = 0.0001.

# General Health Questionnaire(GHQ)

The positive correlation with CLS (table 14.13) indicates that the higher the level of general well-being the lower the

degree of change in life-style, reported. When the data were re-analysed, using a modified GHQ score, a similar relationship was found. (table 14.15).

#### GHQ (modified)

This score was modified as follows:

Low - scores of '0'. 32.2% of the cases.

Moderate- scores between '1' and '5'. 38.8% of the cases.

High - scores between '5' adn '38'. 28.9% of the cases.

Table 14.15: Relationship between GHQ (modified) and CLS

Change in life-style	GHQ (modified) Low Moderate High			
Mild or none	30	31	. 15	
	76.9%	66%	42.9%	
Moderate or considerable	9	16	20	
	23.1%	34%	57.1%	

$$N = 121$$
,  $\chi^2 = 9.48$ , df = 2, p = 0.0087.

Patients with high levels of general well-being (low GHQ scores) were less likely to report changes in life-style than those with moderate or low levels of general well-being.

The results concerning the relationship between CLS and the Indep FU variables found in the second follow-up are almost identical to those found in the first follow-up. Comments made regarding interpretations of these relationships in the first follow-up would therefore be applicable in the second follow-up.

### Multivariate analysis - the discriminant function analysis

Table 14.16: The relative contribution of independent variables to the distinction between patients who made none or mild change in their pre-illness life-style and patients who reported to have made moderate or considerable changes

Scaled Eigenvector	Eigenvector	<u>F</u>
0.633	0.014	3.40 N.S.
-0.610	-0.014	2.42 N.S.
-0.499	-0.077	2.45 N.S.
-0.485	-0.027	0.70 N.S.
0.406	0.009	0.66 N.S.
-0.371	-0.059	3.00 N.S.
-0.247	-0.006	0.43 N.S.
-0.123	-0.013	0.17 N.S.
-0.120	-0.002	1.17 N.S.
0.058	0.002	2.42 N.S.
-0.032	-0.006	0.01 N.S.
-0.025	-0.0003	0.08 N.S.
	Eigenvector  0.633 -0.610 -0.499 -0.485 0.406 -0.371 -0.247 -0.123 -0.120 0.058 -0.032	Eigenvector         0.633       0.014         -0.610       -0.014         -0.499       -0.077         -0.485       -0.027         0.406       0.009         -0.371       -0.059         -0.247       -0.006         -0.123       -0.013         -0.120       -0.002         0.058       0.002         -0.032       -0.006

N.S. - Not significant

### Table 14.17: Significance tests on eigenvectors

Wilk's lambda criterion = 0.87

### Rao's F test

F = 1.16,  $df_1 = 12$ ,  $df_2 = 94$ , p = 0.324

Table 14.18: 'Hits and misses' table

Forecast group name	None or n change i life-sty	.n	Moderate or considerable change in life-style		
None or mild change in life-style	59		24		
Moderate or considerable Change in life-style	10	# 250 # #	14		

The significance tests on the eigenvectors (table 14.17) and the 'Hits and misses' table (table 14.18) show that the discriminant function did not make a significant distinction between the two categories of the modified CLS score. This function may therefore not be useful for prediction purposes of CLS.

Table 14.16 is consistent with the results of the univariate analyses in showing that anxiety level shortly after admission to hospital was of a relatively high contribution to the discriminant function. EPI Neuroticism score was also found to have made a relatively high contribution to the function.

# 3.Summary and Conclusions

no change in their pre-illness life-style by the time of first follow-up. 26% reported mild change, 35% reported moderate change and 15% reported to have made a considerable change in their life-styles. In the second follow-up, the respective figures were: 24%, 38%, 29% and 9%.

### Significant associations between CLS and independent variables

At four months, patients who reported greater changes in their life-styles were those of higher socio-economic classes, higher level of anxiety on day 1 in hospital, lower scores on the EPI Lie score, a combination of low Extraversion and High Neuroticism EPI scores, higher degrees of physical disability, those whose GPs, consultants, and wives did not advise them to resume work, those who had not perceived themselves as fit for work (at follow-up) and those who expressed lower degrees of general well-being at follow-up.

At ten months, patients who reported greater changes in their life-styles were those who expressed higher levels of anxiety on day 2 in hospital, those with higher degrees of physical disability (at follow-up), those whose consultants and wives did not advise them to resume work, those who had not perceived themselves as fit for work (at follow-up) and those who expressed lower degrees of general well-being at follow-up.

Since the CLS measure was entirely subjective, references can only be made here to the <u>reported</u> change rather than to the actual change. However, the reported change itself is important since it can probably be taken as an indication of the patient's subjective feeling with regard to the matter. This feeling, in

turn, could well affect the patient's sense of well-being.

The variables found to be of a potential use for early detection of patients likely to report any changes in life-style were chiefly psychological. Anxiety during the first three days in hospital, EPI Lie score and a combination of the Extraversion and Neuroticism scores. Socio-economic status could be of a potential use for this purpose, also.

The <u>indep FU</u> variables found to be related to CLS on both follow-ups were virtually the same. The direction of causality and the meaning of these relationships are not clear since both CLS and these variables were measured at the same time. However, it can be safely concluded that a sense of a full resumption of the pre-illness life-style is associated with higher levels of general well-being. From that point of view, patients should be encouraged to make as full a resumption as possible, of their pre-illness life-style. It may well be that this encouragement could be most effective coming from GPs and consultants. This possibility, however, should be examined in future research.

The discriminant function based on Indep HOS variables made significant distinctions between patients who fully resumed their pre-illness life-style and patients who made moderate or considerable changes in their life-style in the first, but not in the second follow-up. The findings regarding the relative contribution of Variables to the discriminant functions were, in general, consistent with those of the univariate analyses on both follow-ups.

### CHAPTER 15:

### Overview

- A. General summary of findings regarding associations between dependent and independent variables. (tables 15.1 and 15.2)
- B. Inter-relationships amongst the seven rehabilitation criteria (tables 15.3 and 15.4)
- C. Relationship between Rehabilitation (in general) and the independent variables

# A. General summary of findings regarding associations between

# dependent and independent variables

KEY to this table follows overleaf

# Table 15.1: Associations between dependent and independent variables in the first follow-up

		I	Depende	ent va	riable	S	
Independent variables	RTW	RPA	RML	RHR	RSA	RD	CLS
Indep HOS							
MEDICAL variables							
	. 3	N.S.	N S	N.S.	NS	3	N.S.
	N.S.			N.S.			N.S.
Clinical grading		N.S.					N.S.
Severity of the illness					-1,3		3
SOCIAL and OCCUPATIONAL				•	1,5	.,,,,	J
Socio-economic status		N.S.	N.S.	-1,3	N.S.	N.S.	+1
Educational level	N.S.	N.S.		-1	3	N.S.	
Responsibility at work		N.S.		-î	x		x
Physical demand at work			3	N.S.			x
Mental demand at work	N.S.	N.S.			x		<b>x</b> .
Type of job	N.S.	-1,3		3	x	x	x
Type of occupation	N.S.	1		1 .		x	x
Whether or not self-		-					
employed	N.S.	N.S.	N.S.	N.S.	x	x	×
Occupational record	N.S.					x .	x
Availability of the job				N.S.	x	x	
Age	N.S.			N.S.			
Wife's occupation		N.S.		N.S.	x	x	x
Number of dependents				N.S.		x	x
Hobbies and interests	N.S.				×	x	x
PSYCHOLOGICAL variables							-
Anxiety in first three							
days of admission	-1	-2.3	-2	N.S.	-1.3	3	+1
Anxiety on the ward	N.S.		N.S.				
Depression on the ward	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
EPI Extraversion	N.S.	N.S.					N.S.
EPI Neuroticism	N.S.	The state of the s	N.S.	N.S.	N.S.	N.S.	+2,3
EPI Lie		N.S.					
EPI Extraversion &			_,_		1 1 7 1		-,-
Neuroticism	N.S.	N.S.	N.S.	N.S.	1	N.S.	1
Perception of the			3.4	.,,-	i that is not		
illness	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
PCI	N.S.		-1.3			N.S.	
Knowledge of how others			-,-	. •		.,,.,	
had fared	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Indep FU							
MEDICAL	•	N C	M. C	N C		N C	
Physical disability	-1	N.S.	N.S.	N.S.	-1	N.S.	+1
GP's advice regarding							
Work	+1	N.S.	N.S.	+1	N.S.	+1	-1
Consultant's advice	11.4						
regarding work	+1	N.S.	N.S.	N.S.	N.S.	N.S.	-1
SOCIAL and OCCUPATIONAL							
Wife's opinion regardin							
Work	+1	N.S.	N.S.	N.S.	N.S.	+1	-1
PSYCHOLOGICAL variables							
GHQ	-1	N.S.	-2	-1	-1	-1	+1
Perception of fitness							
for work	+1	N.S.	N.S.	+2	+1	+1	-1
PCI	-1	N.S.		-1		N.S.	N.S.
				-	- 14		

#### KEY to tables 15.1 and 15.2

- Results of parametric correlations in which p<0.05 and r>0.29 and Results of non-parametric correlations in which p<0.05</p>
- 2 Results of parametric correlations in which p < 0.05 and r < 0.30
- 3 The independent variable was among the first three on the scaled eigenvector list of the discriminant function analyses.

The direction of the relationships between dependent and independent variables is indicated by assigning '+' or '-' signs to the figures '1' and '2' in the table. A '+' indicates a positive relationship and a '-', a negative one. It is pointed out that in the case of CLS, higher scores reflected poorer rehabilitation (greater change in life-style following the illness) whilst in the other six dependent variables higher scores indicated better rehabilitation. The direction of the relationship is not indicated in the table in the case of nominal independent variables.

- N.S. Not significant
- Relationship was not analysed

Table 15.2: Associations between dependent and independent variables in the second follow-up

		Der	enden	t varia	ables		
Independent variables	RTW	RPA	RML	RHR	RSA	RD	CLS
Indep HOS							
MEDICAL						•	
The consultant	N C	M C	1 2		1 2	1 2	N C
		N.S.				1,3	
Peel Index		-1			N.S.		
Clinical grading		-1			N.S.		
Severity of the illness	N.S.	-1,3	N.S.	N.S.	N.S.	N.S.	N.S.
SOCIAL and OCCUPATIONAL			_				
Socio-economic status		N.S.		•		N.S.	N.S.
Educational level		N.S.				N.S.	3
Responsibility at work		N.S.		1	x	X	x
Physical demand at work	3	-1 .		N.S.	x	x	x
Mental demand at work		N.S.		N.S.	x	x	x
Type of job	3		N.S.	3	x	x	x
Type of occupation Whether or not self-	N.S.	1	N.S.	N.S.	x	x	×
employed	N.S.	N.S.	N.S.	N.S.	x	x	x
Occupational record	N.S.	N.S.		N.S.	x	x	x
Availability of the job	N.S.	N.S.				x	x
Age	N.S.			-1,3		N.S.	N.S.
Wife's occupation	N.S.			N.S.		x	x
Number of dependents	N.S.			+1		x	x
Hobbies and interests	N.S.				x	x	x
PSYCHOLOGICAL variables			.,,,,,	•			•
Anxiety in the first		-					
three days of admission	3	N.S.	N.S.	N.S.	3	-1,3	+1,3
Anxiety on the ward	N.S.		N.S.		N.S.		
Depression on the ward						N.S.	N.S.
EPI Extraversion		+2,3		N.S.		N.S.	N.S.
EPI Neuroticism		N.S.					3
EPI Lie	-1	N.S.			-1,3		
EPI Extraversion &	-1	M.O.	N.S.	14.2.	N.S.	N.S.	N.S.
Neuroticism	N.S.	N C	N C	N C	N C	N C	N C
			N.S.	N.S.	N.S.	N.S.	
Perception of the illnes						-1 N C	
PCI		-2	-2	-2	N.S.	N.S.	N.S.
Knowledge of how others							
had fared Indep FU	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
MEDICAL							
Physical disability	-1	N.S.	N.S.	N.S.	N.S.	N.S.	+1
GP's advice regarding							
Work	+1	N.S.	N.S.	N.S.	N.S.	+1	N.S.
Consultant's advice				**		*	
regarding work	+1	N.S.	N.S.	N.S.	N.S.	N.S.	-1
SOCIAL and OCCUPATIONAL							
Wife's opinion regarding	3	7					
Work	+1	N.S.	N.S.	N.S.	N.S.	N.S.	-1
Financial difficulties	N.S.	N.S.	N.S.	N.S.	x	x	X
PSYCHOLOGICAL variables							
GHO	-1	N.S.	N.S.	N.S.	-1	N.S.	+1
Perception of fitness	_				-		
for work	+1	+2	NC	N C	N.S.	±1	-1
Intention to resume work	-1	N.S.	14.2.	M.D.	X3.	X	X

KEY to this table is on page 352

The proportion of significant results of the total number of analyses in both table 15.1 and 15.2, 54/205 = 26% and 41/213 = 18%, respectively, is clearly higher than what could be expected by chance.

# B. Inter-relationships amongst the seven rehabilitation criteria

Table 15.3: Inter-relationships amongst the dependent variables in the first follow-up

RTW		RML		RHR	RSA 0.31**	RD 0.38***	CLS 0.21*
RPA		-		0.28**			- 2
RML				0.40***			
RHR		_	<b>10</b>	-	0.27*	-	_
RSA	*.:	, <b>-</b>				0.41***	0.27**
RD		-			_	-	-

<sup>\*</sup> p<0.05 \*\* p<0.01 \*\*\* p<0.001 - Not significant

Table 15.4: Inter-relationships amongst the dependent variables in the second follow-up

	RML	RHR	RSA	RD	CLS
RTW	-		-	0.28**	0.34***
RPA	0.37***	0.35***	0.26*	-	-
RML	_	0.28**	-	_	-
RHR	· ·		-	-	-
RSA		-	-	0.30**	0.26*
RD		-	-	_	0.46***

All the analyses in table 15.3 and in table 15.4 were non-parametric, the values in the tables are  $\phi$  or C expressions of the magnitude of significant associations.

Tables 15.3 and 15.4 show that many of the rehabilitation indices were significantly associated with each other.

These findings can be interpreted as indicating that the sample can be divided into two categories of 'good' and 'bad' rehabilitators. People in the first group did well in most areas and people in the second group did badly in most areas. It may be argued that whilst 'good' rehabilitators can be expected to require little help in most areas, the 'bad' rehabilitators would require to be detected early and to receive a considerable amount of guidance and encouragement in order to restore the pre-illness level of activity in various areas.

In view of the fact that apart from RTW, all dependent Variables were based on the patients' reports and were liable to subjective bias, it may not be justified, at this point to draw firm conclusions regarding the interpretation of interrelationships amongst them. More objective evidence is necessary. However, it can be concluded that from the subjective point of view of the patients, different aspects of the rehabilitation are highly associated with each other. It may well be that this subjective impression has as effect on the actual way in which patients behave.

It will be noticed that the inter-relationships amongst the dependent variables were not the same in the two follow-ups.

The differences are summarised in table 15.5 overleaf.

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Table 15.5: Differences in inter-relationships amongst dependent variables between first and second follow-up

Relationship between	Follow-up	
Variables	First	Second
RTW and RSA	Significant	Not significant
RPA and RML	Not significant	Significant
RPA and RSA	Not significant	Significant
RHR and RSA	Significant	Not significant
RD and CLS	Not significant	Significant

Although the relationships between RPA and RML, RPA and RSA and RD and CLS, differed between the two follow-ups, in the sense that they all reached statistical significance in the second and not in the first follow-up, the differences were relatively minor. The directions of the relationships were similar in all three cases. However, the relationships between RTW and RSA and between RHR and RSA, were highly significant in the first follow-up, but considerably remote from significance level in the second follow-up. It may be argued that the difference in the case of RTW and RSA is a result of the low variance in RTW in the second follow-up (almost all patients were back at work). It may also be suggested that the difference in both cases may be explained by the fact that the distribution of patients on RSA was almost identical in both follow-ups (table 12.1), Whilst it deferred considerably in the case of RTW(table 8.1) and RHR (table 11.1) between the two follow-ups. Any explanation, at this stage can only be regarded as speculative and will have to be tested in future research.

More detailed descriptions of those relationships amongst

dependent variables which were found to be significant in the first and second follow-ups are presented in appendix 8 and 9.

### C. Relationships between Rehabilitation (in general) and the

### independent variables

Two general questions were put forward:

- Is rehabilitation (the dependent variables) significantly related to the independent variables?
- 2 In what ways can the two sets of variables be combined to make the correlation between components of the two sets a maximum?

Canonical correlation analysis (Cooley and Lohnes, 1962) seems to be the technique most appropriate for answering these questions.

Since the three aspects of the level of return to work

(RPA, RML and RHR) are closely related to whether or not work

Was resumed (patients who had not resumed work did not have
scores on the three variables), the dependent variables were
divided into two groups: a. RTW, RSA, RD and CLS and b. RPA,

RML and RHR. Two canonical analyses were then applied. One
for group a. and one for group b. The variables included in
the analyses are presented in appendix 10. Independent variables
Which could not be rated (e.g. The consultant) were not
included in the analyses.

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## Canonical analysis for group a.

At four months, two canonical variate sets were found to be significant. In the first set (p < 0.005), the greatest contributions to the significantly related canonical variates were made by RTW and CLS ( of the dependent variables) and by Severity of the illness, General well-being, AAS anxiety on day 2 and Mental load at work ( of the independent variables). In the second set (p < 0.05), the greatest contributions to the significantly related canonical variates were made by RSA and RTW ( of the dependent variables) and by General well-being, AAS Anxiety on day 1, Severity of the illness and Degree of physical disability ( of the independent variables).

At ten months, no canonical variate sets were found to be significant.

## Canonical analysis for group b.

At four months, one canonical variate set was found to be significant (p < 0.05). The greatest contributions to the significantly related canonical variates were made by RHR and RPA (of the dependent variables) and PCI (measured in hospital), Socio-economic status, Age and AAS Anxiety on day 2 (of the independent variables).

At ten months, no canonical variate sets were found to be significant.

It appears therefore, that MEDICAL (Severity of the illness and Physical disability), PSYCHOLOGICAL (Anxiety in hospital

and perception of causes of the illness) and SOCIAL (Age and Socio-economic status) are significantly related to rehabilitation. Some of them (those measured during stay in hospital) may well prove useful in predicting the rehabilitation course. Furthermore, the analyses show that successful rehabilitation is closely and positively related to the feeling of general well-being.

## CHAPTER 16:

## General discussion and conclusions

- A Disadvantages of this study
- B Advantages of this study
- C The extent to which rehabilitation after myocardial infarction need special intervention
- D The role played by psychological factors in cardiac rehabilitation
- E The role of psychologists in cardiac rehabilitation

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In this chapter it is proposed to weigh the evidence and estimate the advantages and disadvantages of the study. This is followed by a discussion of three major general points:
i.e., The extent to which rehabilitation after myocardial infarction needs special intervention, The role of psychological factors in cardiac rehabilitation and The role of psychologists in cardiac rehabilitation.

## A. Disadvantages of the research

## a. Exclusion of Indep FU variables from the multivariate analyses

It is unfortunate that Indep FU variables could not be included in the multivariate analyses. It may well be that there are interactions between these variables and some of the Indep HOS variables. However, it was impossible to take such interactions into account. This point may be further investigated in future research.

## b. Incomplete reliability of measures used in the study

Deficiencies associated with the measurement of some of the Variables have already been discussed in previous chapters. It had been concluded that some of the Indep FU measures e.g. PCI should be taken at an earlier follow-up (about four weeks after leaving hospital) so that they could be regarded as truly independent.

Problems associated with the reliability of other variables are discussed here.

## Independent variables

## MEDICAL variables

Clinical grading

Peel Index

Both variables are commonly used in medical research for prognostic purposes. However, there is no full agreement with regard to their

usefulness and their predictive validity. Since no alternative measures of the severity of the illness of higher validity are known at present, it was decided to employ these two indices in the study. SOCIAL and OCCUPATIONAL variables

Physical demand at work

Mental demand at work

By asking the patients to assess these two variables it was possible to reduce the effects of individual differences in tolerance to physical and mental stresses. However, this procedure did not make possible an objective assessment of the physical and mental demands involved in the job. This can probably be improved by obtaining thorough descriptions of jobs and by using independent judges. The conclusions regarding relationships between these two variables and independent variables should take into account the limitations of these scores.

## PSYCHOLOGICAL variables

Anxiety on the ward
Depression on the ward

These two variables were not found to be significantly associated with any of the dependent variables. This is surprising since they were based on observations over a period of 10 - 14 days and can be expected to be as good as AAS measures in predicting later coping. However, it is possible that this finding was due to an inaccuracy of the measure. It may be argued that a more structured procedure of assessing anxiety and depression by the nursing staff on the ward would have resulted in a more accurate measurement than the general impression of sister and her assistants used in this study. A more accurate measure may be achieved by directing the nurses attention to particular aspects of the patient's behaviour on

a daily basis (rather than asking them to indicate their overall impressions by the end of the period of stay). If this hypothesis regarding the inaccuracy of the measure is correct, it may have important implications with regard to the sensitivity of medical and nursing staff to the psychological state of patients, in general. Since doctors and nurses are expected to respond to signs of anxiety and depression by explanations and reassurance (Hellerstein, 1957) it may be argued that they require special training in detecting emotional distress in their patients.

Knowledge of how others had fared after a similar illness PCI

The major weakness is in the timing of administration of these measures. It may be argued that a period of ten days of the onset of the illness is not sufficient, for the patient, to obtain information regarding these variables. They may well discover more details after they leave hospital and use them for forming stronger views regarding these matters. These views, in turn, are more likely to be the ones that influence rehabilitation and they can only be measured after discharge from hospital.

# Dependent variables

RPA

RML

RHR

All these measures were based on the patients' self-reports.

This method provided a measure of the subjective feelings of

patients regarding the degree to which they had resumed work.

However, it did not allow either an objective assessment of the variables or an examination of the accuracy of the patients' judgements. An improvement could be achieved by obtaining independent assessments from work-mates or supervisors.

#### RSA

No method was available by which the accuracy or reliability of the patients' reports could be assessed. Such assessments may be done in a number of ways. For example:

- a. Interviewing wives it was not possible to carry out such a procedure in the present study.
- b. Obtaining a measure of the pre-illness frequency of sexual intercourse, during stay in hospital, and comparing that with the frequency at the time of the follow-up.

This procedure was examined in the pilot study. It was discovered that the patients were unhappy to discuss such intimate details for research purposes and it was felt that this could affect their general preparedeness to co-operate in the study. This subject, therefore, had to be abandoned. However, it is possible that if these details are obtained by physicians (rather than by a psychologist research worker) in the context of the routine history taking on admission, better co-operation could be achieved.

RD

A possible way of improving the accuracy of this measure

Could be by obtaining during the paitents' stay in hospital

Some quantitative assessment of the amount of pre-illness driving

carried out by them.

CLS

This measure can only be regarded as providing information about the subjective impression of patients of the overall degree of change in their life-styles. This in itself can be considered an important aspect of rehabilitation. Its accuracy may be improved by obtaining quantitative measures of the pre-illness activities in various aspects of life and compairing them with the level at the time of the follow-up. However, due to the variance in life-styles it would be difficult to obtain a fully objective measure of CLS.

## b. Potentially relevant variables that have not been observed

In selecting the independent variables it was attempted to take into account theoretical considerations and findings of previous studies. However, methodological and technical difficulties dictated that some of the variables had to be abandoned. The duration and frequency of interviews with patients had to be determined not only on the basis of the information considered to be relevant but also on the basis of factors related to physical aspects of the illness, hospital routine and the readiness of Patients to co-operate.

The results of this study indicate that future research should involve interviews with GPs and wives. This will enable a more Objective assessment of the relationships between various aspects of the rehabilitation and the attutudes of these two important figures. The way in which data were collected here only allows the formulation of hypotheses regarding these relationships

but they can not be regarded as a basis for firm conclusions.

Ways in which the attitudes of GPs and wives can be influenced so they would be compatible with the rehabilitation objectives (of encouraging restoration of most pre-illness activities) also seem to be important subjects of future research. Communication between consultants and GPs and wives of patients may prove to be a crucial factor in this respect.

Further reading during the course of the study and after the completion of the data collection has lead to further ideas regarding psychological variables of potential importance.

Unfortunately, it was not possible to introduce these variables once the research was in progress. Two variables of particular interest were General active coping ability and Internal - External control. Shanan (1967) developed a test to assess general active coping ability. This or possibly another measure of this variable could be used in future research. This is particularly relevant in view of the perception of myocardial infarction as a stressful condition requiring coping behaviour.

The concept of Internal versus external control is related to the question of whether or not an individual believes that his own behaviour, skills, or internal dispositions determine what reinforcement he receives (Rutter, 1966). The concept has been linked with various other sociological and psychological concepts. Veblen, for instance (1899) argued that the belief in luck was characteristic of an inefficient society.

McClelland (1953) and Crandall (1963) suggested that people who are high on the need for achievement, in all probability, have some belief in their own ability or skill to determine the Outcome of their efforts. On the basis of extensive research work

Internal versus External control as a personality variable. In a recent study it was found that this variable may be related to rehabilitation after cerebrovascular accidents. High Internal Control patients seemed to progress better than patients of low Internal control. (Burnside, personal communication). The degree to which this personality characteristic can distinguish between 'good' and 'bad' rehabilitators at an early stage of the illness may be an interesting subject for future research.

Since all 183 patients who were included in the analyses
Were all diagnosed as having had a first myocardial infarction,
it would not be possible to generalize the research findings to
other CHD groups (the other 87 patients did not form a homogeneous
group and could not be used for purposes of comparison).

In a recent study (Kushnir et al, 1975), 95 first myocardial infarction patients were compared with a group of 32 patients whose myocardial infarction was complicated by primary ventricular fibrilation (they had experienced a cardiac arrest shortly after admission to hospital and were successfully ressucitated). It was found that the second group patients were initially slower but ultimately, they did not differ from the uncomplicated myocardial infarction group in terms of return to work or the resumption of sexual activity and driving. However, it would be important, in future research, to investigate other CHD Patients especially in view of the fact that incomplete and slow rehabilitation often occurs in CHD patients whose illness is less severe than myocardial infarction (Hay, 1970).

## B. Advantages of the study

The major advantages of the present study over previous reports can be expressed in terms of the degree to which it has met principal methodological criteria. Firstly, a clear description of the sample and the selection of patients has been given. Secondly, a distinction was made between dependent and independent variables. Problems associated with this distinction have been discussed and limitations have been pointed out.

Thirdly, a special effort was made to provide a clear description of the method by which the assessment of each variable was made.

Reliability and validity of these measures were discussed.

Fourthly, the study was conducted in a prospective manner.

Fifthly, conclusions regarding factors affecting rehabilitation were made on the basis of statistical analyses of the data. Lastly, the particular approach is, to the best of the author's knowledge unique in the literature.

In addition it is pointed out that all the patients were treated in the same hospital department, by the same medical and nursing staff (apart from a few individual personnel changes that occurred in the course of the study) and were interviewed by the same psychologists. The review of the literature, as well as previous reviews (Croog et al, 1968) showed that most previous studies did not meet the above criteria.

Another aspect of the present study which appears to be almost unique in the field is the full co-operation between medical and nursing, and secretarial staff, on the one hand, and a psychologist on the other. This type of co-operation is essential in a research of this kind and seems to have been lacking in most previous studies (Croog et al, 1968).

# needs special intervention

This point had already been examined (p.16 ) when previous findings regarding the restoration of work and other activities after coronary heart disease were compared with expectations of cardiologists. It was concluded that the discrepancy had been Considerable in the sense that the proportions of patients resuming work and other activities were much lower than would be expected by cardiologists. It was pointed out that although much information was available with regard to resumption of work, other activities had not been systematically studied. The results of the present study showed that considerable proportions of patients do not achieve complete rehabilitation with regard to resuming work, sexual activity, driving and social and leisure activities in general, by four months of leaving hospital. Although most patients returned to work by ten months, many of them did not restore their pre-illness level of activity at work even by ten months of leaving hospital.

This can probably be taken as a reflection of cooperative attitudes on the part of employers who were evidently prepared to re-employ people suffering from a heart disease, in many Cases in a reduced physical and mental capacity and fewer working hours. The degree to which sexual activity, driving and general life-style improved between the two follow-ups was minimal. In Conclusion it may be argued that rehabilitation was not Complete in many patients either by four or by ten months of leaving hospital.

The analyses carried out in previous chapters showed that

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unsuccessful rehabilitation was in many cases not explained by incapacitating effects of the illness or by occupational factors. This study shows that attitudes of GPs, consultants and wives and the patient's own perception of their illness may play crucial roles in determining to what extent pre-illness activities will be restored. Awareness of the importance of such factors may lead to further research into ways by which these can be modified so that they will operate to encourage rehabilitation. Whilst all patients may benefit from encouragement and reassurance, in particular by their GPs, it appears that some of them may need a more specific attention. Psychological tests seem to be of a potential use in early detection of such patients.

In general, the results of this study indicate that intervention to facilitate cardiac rehabilitation is needed since many patients do not achieve successful rehabilitation and since in many cases the explanation for the failure seems to lie in Variables which can be modified. It may well be that if preventive measures are taken at early stages, with correct guidance and encouragement, the need for special facilities for cardiac rehabilitation will not arise.

The decision to intervene with the aim of encouraging a patient to return to work can not be made simply on the grounds that the patient is physically capable of resumingwork. Although most patients seemed to dislike being out of work and often complained of being bored and tense, some individuals were grateful for the opportunity of taking a long rest, in particular in cases in which their employers enabled them to do so without a great loss in earnings. It may be argued that in some cases when there are no obvious undesirable consequences of prolonged

unemployment, intervention would not be justified even when the patient is physically fit. For one patient it was an opportunity to make social contacts with his next-door neighbours for the first time in ten years. For another it was an opportunity to show his grand children that they 'really' had a grandfather. Others simply enjoyed the spare time. However, it is stressed that no attempt to conduct a systematic study of this subject was made here. These comments are based on clinical impressions of the author and are only meant to draw attention to the matter.

# D. The role played by psychological factors in cardiac rehabilitation

The findings presented in previous chapters clearly show the importance of MEDICAL variables, particularly that of incapacitating effects of the illness, in influencing the rehabilitation course. SOCIAL and OCCUPATIONAL variables also seem to play an important role, in particular with regard to determining the level to which work was resumed. It was also found that a number of PSYCHOLOGICAL variables were significantly associated with various aspects of the rehabilitation and that they may be of potential use in facilitating progress towards a more complete and faster restoration of pre-illness activities.

The level of anxiety, expressed by patients during their first three days in hospital, appears to be of potential use in early detection of patients likely to become slow rehabilitators. It was found to be significantly related to all aspects of rehabilitation apart from RHR. An advantage of the AAS is that it is a simple measure taking only a few minutes to administer and to score. However, further research will be needed in order

to determine the way in which it could be used in hospitals (format, norms). A number of additional points should be stressed with regard to AAS measures.

- a. It appears that despite being a 'state' rather than a 'trait' measure (Speilberger, 1972), the level of anxiety measured in the first three days of admission was associated with aspects of the rehabilitation which were measured months later. This may be explained in that the anxiety level reflected a more general reaction to the illness rather than just a temporary state of mind.
- b. It is difficult to determine which of the first three days was particularly relevant for later rehabilitation. The results show that each one of the measures was associated with some of the dependent variables. It is noticeable, however, that the measures of days 1 and 2 in hospital were more frequently associated with rehabilitation than that of day 3. This may be a result of the measurement procedure of assessing anxiety on day 1 in hospital retrospectively. Further research is needed in order to clarify this point.
- C. It appears that the distinction between the two components of the AAS ('Anxiety plus' and 'Anxiety minus') was justified. Although in some cases both components were significantly associated with a dependent variable, in many others, only one scale was found to be associated with the dependent variable. In such cases a combined score of AAS would not have shown this association.

d. The usefulness of AAS receives a further emphasis from the results of the anxiety and depression measures taken by the nursing staff. These measures were not found to be associated with any of the rehabilitation indices and it was hypothesised that their accuracy was poor.

An AAS measure and possibly other structured measures of emotional states may be of value in assisting the medical and nursing staff in detecting patients who need particular reassurance and encouragement.

e. It is possible that the administration of drugs (p.130 ) for the relief of excessive anxiety reactions in the CMU affected the AAS scores. This effect would be expected to be in the form of reducing anxiety and possibly causing a reduction in the level of anxiety expressed (on AAS) by patients who were given tranquilizers. Unfortunately, no record of this procedure was maintained in the study. However, it may be argued that if such an effect of drugs on AAS scores did actually occur it would have made it more difficult to discover significant associations between AAS measures and rehabilitation measures. The association between the effect of anxiety reducing drugs and AAS scores may be a subject of investigation in future research.

EPI measures were not found to be strongly associated with most aspects of the rehabilitation. The only two indices with which Neuroticism and the combined score of Neuroticism and Extraversion were found to be significantly and strongly associated were resumption of sexual activity and change in life-style on both follow-ups. It may be concluded that these dimensions of personality, although not clearly associated with

the resumption of work may well be related to other areas of life. These findings are consistent with theoretical arguments regarding the connection between coping and personality (p. 28 ). However, they also emphasize the need for further research in showing that this connection is more apparent in some areas of life than in others and that the influence of other factors should be considered. The data, in general, would probably agree with the notion that patients with higher neuroticism scores would be more likely to develop 'problems' in some activities than patients with lower neuroticism scores - particularly when high neuroticism is also associated with low extraversion.

PCI was found to be significantly associated with RTW, RPA, RML and RHR, in particular when measured at follow-up. lesser the tendency to attribute the illness to aspects of work, the higher the likelihood of achieving a full rehabilitation in the four areas. A PCI measure can therefore become a useful tool for detecting misconceptions that patients have with regard to the causation of their illness. Knowledge of this kind can then be used by doctors in their attempts to encourage their patients to resume their pre-illness activities. In this study PCI was scored with a specific aim of determining the degree to which the illness was attributed to aspects of the job. In practice it may be sufficient to use a PCI-type measure for Obtaining qualitative rather than quantitative information. It is stressed that PCI may prove to be most useful it it is measured 3 - 4 weeks after discharge from hospital, when the Patients have gathered sufficient information to form their attitudes.

GP's and Consultants' advice regarding return to work were initially included in the category of MEDICAL variables. However, it may well be argued that their effect should be regarded as psychological. The results indicated that there was a very strong association between GP's advice regarding work and most aspects of the rehabilitation. It has been stressed that more research would be needed in order to achieve a better understanding of these relationships. Since GPs become the major representatives of medical authority after discharge from hospital, they may be considered to play a major role in the rehabilitation process. It is sensible to expect their opinion to have a significant influence on the patients' behaviour. The communication between GFs and consultants was not specifically examined in the present study. However, the results seem to indicate that the likelihood of GPs to encourage their patients to return to work and to resume other pre-illness activities, depends to a great extent on their communication with the consultant cardiologists. The influence of instructions given in hospital on later rehabilitation has been studied in a recent study (Kushnir et al, In press). 35 men admitted to hospital with first myocardial infarction were given detailed medical guidance before discharge home with respect to the resumption of work, sexual activity and driving. They were compared with a control group of 63 patients Who were not given any specific guidance. It was concluded that the pre-discharge medical counselling had no effect on how quickly the patients returned to work or resumed their preillness level of sexual activity. An early hospital review and encouragement by the general practitioner seemed to be of greater influence.

general, tend to be overcautious in advising patients after a myocardial infarction. They seem to take the view that there is less risk in advising patients to delay resumption of preillness activities than in encouraging them to restore these activities. They seem to tend to leave decisions of this kind to be made by consultants. Cardiologists, on the other hand, (Hellerstein, 1954) show a tendency to advocate restoration or pre-illness life as fully and as soon after discharge from hospital, as possible. If this view is supported by more direct evidence, it may be concluded that consultants should emphasize their views regarding rehabilitation in their correspondence with GPs. It may also be concluded that GPs should be better informed about the importance of early restoration of pre-illness activities and about existing evidence that shows that restoration of most activities do not have any harmful effects on the Cardiovascular system (p. 11). Furthermore, the strong associations between GHQ and most of the dependent variables may be indicative of a desirable psychological effect of successful rehabilitation, in facilitating a sense of general well-being.

It appears that a very simple method of asking patients about their plans could prove to be a useful device in predicting rehabilitation. In the present study this question was directed to those patients who, at the time of the first follow-up were not back at work. It was found that most patients who expressed clear intentions to resume work did so by the time of the second follow-up (71.4%). By presenting patients with such a question at an earlier stage it may be possible to discover many patients who are likely to become 'slow rehabilitators', and to attempt to change their attitudes when appropriate .

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Finally, it must be emphasized that the findings presented in this study can not be used as such for purposes of decision making regarding individual cases. Recognising the complicated combinations of various MEDICAL, SOCIAL and OCCUPATIONAL, and PSYCHOLOGICAL variables, any decision regarding factors influencing unsuccessful rehabilitation in an individual patients and regarding ways of treatment must be based on a careful consideration of relevant factors operating in that case. The present findings could point towards some important areas to which enquiries should be directed but they do not suggest that a particular variable or a combination of variables are likely to be more relevant than others in any individual case.

# E. The role of psychologists in cardiac rehabilitation

The findings of this study do not show that the emotional disturbance of patients surviving a myocardial infarction is sufficiently serious to require a full-time involvement of a clinical psychologist in a hospital cardiac department. It appears that these disturbances are closely associated with the illness itself, to a great extent realistic, and can probably be dealt with best by medical and nursing staff. It is the doctor who is considered by patients to have the knowledge regarding their likelihood to survive and therefore, it is the doctor who can be expected to be in a position of relieving anxiety at the early stages and in encouraging restoration of normal life later.

However, the need for further research into the role of various psychological variables expressed in previous chapters clearly invites more involvement of psychologists in the field of

cardiac rehabilitation. At present, this involvement is minimal and, as shown in this study, its potential use for both theoretical and practical purposes is considerable. More psychological research can be usefully applied to develop methods of early detection of 'slow rehabilitators' and to advise medical and nursing staff regarding ways of preventing adverse effects of psychological factors.

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## APPENDICES

## Appendix 1

## Peel Coronary Prognostic Index

## 1. Score sheet for coronary prognostic index

•	Score	\ ·					Score	Patient
Sex and age:  Men, 54 or under	0 1 2 3	Women, 6	4 or under 5 or over	::	::	::	2 3	
Previous History: Previous cardiac infarct Other cardiovascular diseases or history Angina only No cardiovascular disease	of exert	ional dyspnœ	a	::	::		.6 3 1 0	
Shock: Absent Mild—transient at onset Moderate—present on admission but su Severe—persisting despite rest and seda	bsiding	with rest and	sedation	::	::	::	0 1 5 7	
Failure: Absent Few basal râles only Any one or more of the following: brudyspnœa; gallop rhythm; liver enlarg	eathlessn	ess; acute pu	lmonary œo	dema; or	rthopno	ea or	0 1 4	
Electrocardiogram.  Normal QRS. Changes confined to R. QR complexes  QS complexes or bundle-branch block (if no electrocardiogram obtained, mark	••	ent or T wave		::	::	•	1 3 4	
Rhythm: Sinus Any one or more of the following: A.F. cardia (110 or more), frequent E.S., r	, flutter,	paroxy, tach	ycardia, per block	rsisting s	imple to	achy-	0	
TOTAL PATIENT SCORE=PROGNOST	TIC INDE	x						

# 2. Prognostic index and survival of patients alive on 29th day after cardiac infarct (in Peel's study)

Index range	End of year	Number traced	Percentage surviving
1 to 8	1 3 5 8 10	191 128 99 44 41	92 79 66 50 41
9 to 12	3 5	113 89 79	80 55 37
13 to 16	1 3	69 55	72 33
17 to 20	1 2	17 17	65 47
21 to 28	2	5	40

# Appendix 2

## MEDICAL INFORMATION FORM

Su	Surname Forename	No
Da	Date	
	Consultant G.P	•
Di	Diagnosis	
	•	The state of the s
<u>Se</u>	Severity of infarct	
1.	1. Maximum rise in serum enzymes	•
2.	2. Arhythmias	•
	3. Cardiac arrests	
4.	4. Other complications	
5.	5. Peel index	numero and a superior
6.	6. Clinical grading:	
	1. Mild.	
	<ol><li>Failure without hypotension.</li></ol>	
	3. Hypotension without failure.	
	4. Hypotension with failure.	
n:	History of coronary artery diseases	
υŢ	history of coronary artery diseases	
_		
0t	Other illnesses involved (which might hinde	r return to work):
Co	Comments:	
_		general and the second

# AFFECT ADJECTIVE SCALE

Surname		Fo:	rename		. N	0
Date of admission	on	•	Date		<b>_•</b>	
EXAMPLE						
FEELING	Very much 5	Much 4	Rather	A Little 2	Very Little 1	Not at all 0
SAD						1-7
STABLE						
	:				*	
FEELING	Very much 5	Much	Rather	A Little 2	Very Little 1	
WORRIED						
UPSET						
TERRIFIED		,				*
STEADY						
SECURE					j v	
PLEASANT				,		
TENSE				1.000		
SHAKY						
JOYFUL						
PANICKY			10 yr	er en Martin		
NERVOUS						
FRIGHTENED					4	
HAPPY						X.
CONTENTED						
CHEERFUL						A Section
FEARFUL	•					
DESPERATE	· W					******
CALM						
AFRAID						

#### EYSENCK PERSONALITY INVENTORY

by H. J. Eysenck and Sybil B. G. Eysenck

#### PERSONALITY QUESTIONNAIRE

#### FORM A

NAME	•••••		AGE	• • • • • • • • • • • • • • • • • • • •
OCCUPATION	• • • • • • • • • • • • • • • • • • • •		SEX	
N=	E=	* * * * * * * * * * * * * * * * * * * *	L=	

#### Instructions

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "YES" or "NO".

Try to decide whether "YES" or "NO" represents your usual way of acting or feeling. Then put a cross in the circle under the column headed "YES" or "NO". Work quickly, and don't spend too much time over any question; we want your first reaction, not a long-drawn out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions.

Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.



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E (	O N O L O T					
	FORM A	YES	NO			
ı.	Do you often long for excitement?	0	0			
2.	Do you often need understanding friends to cheer you up?	0	0			
3.	Are you usually carefree?	$\bigcirc$	$\bigcirc$			
4.	Do you find it very hard to take no for an answer?	Ŏ	Ŏ			
5.	Do you stop and think things over before doing anything?	Ŏ	Ŏ			
6.	If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so?	Ŏ	Ŏ			
7.	Does your mood often go up and down?	$\circ$	0			
8.	Do you generally do and say things quickly without stopping to think?	0	0			
9.	Do you ever feel "just miserable" for no good reason?					
10.	Would you do almost anything for a dare?					
11.	Do you suddenly feel shy when you want to talk to an attractive stranger?	O	0			
12.	Once in a while do you lose your temper and get angry?	0	0			
13.	Do you often do things on the spur of the moment?	$\circ$	0			
14.	Do you often worry about things you should not have done or said?	$\circ$	0			
15.	Generally, do you prefer reading to meeting people?	0	0			
16.	Are your feelings rather easily hurt?	$\circ$	0			
17.	Do you like going out a lot?	$\circ$	0			
18.	Do you occasionally have thoughts and ideas that you would not like other people to know about?	0	0			
19.	Are you sometimes bubbling over with energy and sometimes very sluggish?		0			
20.	Do you prefer to have few but special friends?	$\circ$	0			
21.	Do you daydream a lot?	0	0			
22.	When people shout at you, do you shout back?	$\circ$	0			
23.	Are you often troubled about feelings of guilt?	O	Ō			
24.	Are all your habits good and desirable ones?	$\circ$	0			
25.	Can you usually let yourself go and enjoy yourself a lot at a lively party?	$\circ$	Ó			
26.	Would you call yourself tense or "highly-strung"?	Ō	Ō			
27.	Do other people think of you as being very lively?	$\circ$	0			

		YES	NO
28.	After you have done something important, do you often come away feeling you could have done better?	0	0
29.	Are you mostly quiet when you are with other people?	$\circ$	$\bigcirc$
30.	Do you sometimes gossip?	$\circ$	$\bigcirc$
31.	Do ideas run through your head so that you cannot sleep?	$\circ$	$\bigcirc$
32.	If there is something you want to know about, would you rather look it up in a book than talk to someone about it?	Ö	Ŏ
33.	Do you get palpitations or thumping in your heart?	$\circ$	$\circ$
34.	Do you like the kind of work that you need to pay close attention to?	$\circ$	0
35.	Do you get attacks of shaking or trembling?	$\circ$	$\bigcirc$
36.	Would you always declare everything at the customs, even if you knew that you could never be found out?	Ö	Ö
37.	Do you hate being with a crowd who play jokes on one another?	0	0
38.	Are you an Irritable person?	$\circ$	$\circ$
39.	Do you like doing things in which you have to act quickly?	0	0
<del>4</del> 0.	Do you worry about awful things that might happen?	$\circ$	0
41.	Are you slow and unhurried in the way you move?	$\circ$	O
42.	Have you ever been late for an appointment or work?	$\circ$	O
43.	Do you have many nightmares?	Ŏ	Ŏ
44.	Do you like talking to people so much that you never miss a chance of talking to a stranger?	Ö	Ö
45.	Are you troubled by aches and pains?	$\circ$	$\bigcirc$
46.	Would you be very unhappy if you could not see lots of people most of the time?	Ö	Ŏ
<b>47.</b>	Would you call yourself a nervous person?	0	$\circ$
<del>4</del> 8.	Of all the people you know, are there some whom you definitely do not like?	Ŏ	Ŏ
49.	Would you say that you were fairly self-confident?	Ŏ	Ŏ
50.	Are you easily hurt when people find fault with you or your work?	Ŏ	Ŏ
51.	Do you find it hard to really enjoy yourself at a lively party?	Ŏ	Ŏ
52.	Are you troubled with feelings of inferiority?	$\circ$	Ŏ
53.	Can you easily get some life into a rather dull party?	0	Ŏ
54.	Do you sometimes talk about things you know nothing about?	0	0
55.	Do you worry about your health?	0	0
56.	Do you like playing pranks on others?	$\circ$	0
57.	Do you suffer from sleeplessness?	$\circ$	0
	ACC CLICAL TO SECTIVAT VOLUMENTS AND VEDERAL TURBULES		

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#### The Pilot study

An initial period of about twelve weeks was devoted to the execution of a brief pilot study.

### Method

#### 1. Sample

74 male patients admitted consecutively to the coronary monitoring unit during this initial period.

#### 2. Instruments

These were the ones used in the main study for measurement of Indep HOS variables with the inclusion of those that were later excluded (as a result of the pilot study) and with the exclusion of those which were under construction during the pilot study.

#### 3. Procedure

This was similar to the one described in the main study with regard to the measurement of Indep HOS variables.

# **Objectives**

The objectives of this study were as follows:

 Learning the hospital routine and familiarization of the author with the medical nursing and secretarial staff. This information was essential for the design of the research procedure.

- 2. Practising alternative approaches to patients this was important for the achievement of maximal cooperation on the part of patients.
- 3. Assessing psychological tests in terms of:
  - a. Duration of administration.
  - b. Their effects on patients.

This lead to the following decisions:

- a. To exclude the MMPI it proved to require too much time to administer.
- b. To exclude intelligence testing since it seemed to tire some patients and to upset those who did not do very well. It was suspected that reactions of this kind could have an adverse effect on the patients willingness to cooperate.
- 4. Assessing patients reactions to certain questionnaire items.

  This lead to the exclusion of questions regarding patients'

  pre-illness income and regarding frequency of sexual activity.

  Both subjects were perceived by many patients as a violation of their privacy. Although patients tended to answer these questions, it was decided to exclude them due to their potential adverse effect on the patients' willingness to cooperate.

The major concern regarding patients' cooperation was about their likelihood of attending for follow-up appointments.

5. Construction of psychological measures - data collected in

the pilot study were used in the construction procedures of the AAS and the PCI.

6. Construction of medical measures - on the basis of communications with the senior medical staff, decisions were made regarding the design of the medical measures that required their cooperation.

# Appendix 6 PERCEPTION OF CAUSES OF THE ILLNESS

People who have had heart problems often tend to relate them to different aspects of their lives. Some people associate them with overweight, some with smoking, some with pressures of life, at home or at work and others with other aspects of their lives.

We would like to know the ideas that you have in mind in this connection.

Below you can see a list of phrases which have been suggested as possible factors associated with heart problems by patients and doctors.

Read the phrases thoroughly and mark not more than five of them which you consider to be associated with your heart trouble. You are requested to number them from 1 to 5 in a decreasing order of importance.

Trouble with the wife. Lifted a heavy article.	My job is too heavy, physically.
at home or at work.  A lack of extercise.	Too much general responsibility at work.
Unemployment worries.	Worries about the health of a relative.
AgeThe conditions at work,	I have been too active and have not had enough rest.
(cold, wet, etc).  Heart troubles are in	Too much responsibility for others at work.
Too much tension at work,	Upset because of the death of a family member.
because of other people with whom I work.	Too much smoking.  My bad temper.
A result of another illness which I had in the past.	Trouble in the family which upset me.
Financial worriesToo much tension at workbecause of the nature of it.	Trouble with the children. Cannot see any apparent
Overweight.	reason.
A rapid recent change in my life pattern.	Other possible reasons:

#### APPENDIX 7

#### GENERAL HEALTH QUESTIONNAIRE

#### Please read this carefully:

We should like to know if you have had any medical complaints, and how your health has been in general, over the past few weeks. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

#### HAVE YOU RECENTLY:-

HAVE YOU RECENTLY:-				100	
1 been feeling perfectly well and in good health?	Better than usual	Same as usual	Worse than usual	Much wor	
2 been feeling in need of a good tonic?	Not at all	No more than usual	Rather more than usual	Much mor than usu	
3 been feeling run down and out of sorts?	Not at all	No more than usual	Rather more than usual	Much mor	
4 felt that you are ill?	Not at all	No more than usual	Rather more than usual	Much mor	0.000
49	•				
5 been getting any pains in your head?	Not at all	No more than usual	Rather more than usual	Much mor	
6 been getting a feeling of tightness or pressure in your head?	Not at all	No more than usual	Rather more than usual	Much mor	
7 been able to concentrate on whatever you're doing?	Better than usual	Same as usual	Less than usual	Much les	
8 been afraid that you were going to collapse in a public place?	Not at all	No more than usual	Rather more than usual	Much mor	
9 been having hot or cold spells?	Not at all	No more than usual	Rather more than usual	Much mor	
<pre>10 been perspiring (sweating)     a lot?</pre>	Not at all	No more than usual	Rather more than usual	Much mor	
11 found yourself waking early and unable to get back to sleep?	Not at all	No more than usual	Rather more than usual	Much mor than usu	
12 been getting up feeling your sleep hasn't refreshed you?	Not at all	No more than usual	Rather more than usual	Much mor	A STATE OF THE PARTY.

13 been feeling too tired and exhausted to eat?	Not at all	No more than usual	Rather more than usual	Much more than usual
14 lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
15 been feeling mentally alert and wide awake?	Better than usual	Same as usual	Less alert than usual	Much less
16 been feeling full of energy	Petter than usual	Same as usual	Less energy than usual	Much less energetic
<pre>17 had difficulty in getting     off to sleep?</pre>	Not at all	No more than usual	Rather more than usual	Much more than usual
18 had difficulty in staying asleep once your are off?	Not at all	No more than usual	Rather more than usual	Much more than usual
19 been having frightening or unpleasant dreams?	Not at all	No more than usual	Rather more than usual	Much more than usual
20 been having restless, disturbed nights?	Not at all	No more than usual	Rather more than usual	Much more than usual
21 been managing to keep yours busy and occupied?	self More so than usual	Same as usual	Rather less than usual	Much less than usual
22 been taking longer over the things you do?	Quicker than usual	Same as usual	Longer than usual	Much longer than usual
23 tended to lose interest in your ordinary activities?	Not at all	No more than usual	Rather more than usual	Much more than usual
24 been losing interest in you personal appearance?	ur Not at all	No more than usual	Rather more than usual	Much more than usual
25 been taking less trouble wi your clothes?	ith More trouble than usual	About same as usual	Less trouble than usual	Much less trouble
26 been getting out of the hou as much as usual?	use More than usual	Same as usual .	Less than usual	Much less than usual
27 been managing as well as mo people would in your shoes?	ost Better than most	About the same	Rather less well	Much less well
28 felt on the whole you were doing things well?	Better than usual	About the same	Less well than usual	Much less well
29 been late getting to work, getting started on your housework?	or. Not at all	No later than usual	Rather later than usual	Much later
30 been satisfied with the way you've carried out your tas		About same as usual	Less satis- fied than usual	Much less satisfied

31 been able to feel warmth and affection for those near to you?	Better than usual	About same as usual	Less well than usual	Much less
32 been finding it easy to get on with other people?	Better than usual	About same as usual	Less well than usual	Much less well
<pre>33 spent much time chatting    with people?</pre>	More time than usual	About same as usual	Less than usual	Much less than usual
34 kept feeling afraid to say anything to people in case you made a fool of yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
35 felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
36 felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
37 felt you're just not able to make a start on anything?	Not at all	No more than usual.	Rather more than usual	Much more than usual
38 felt yourself dreading everything that you have to do?	Not at all	Nor more than usual	Rather more than usual	Much more than usual
39 felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
40 felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
41 been finding life a struggle all the time?	Not at all	No more than usual	Rather more than usual	Much more than usual
42 been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
43 been taking things hard?	Not at all	No more than usual	Rather more than usual	Much more than usual
44 been getting edgy and bad- tempered?	Not at all	No more than usual	Rather more than usual	Much more than usual
45 been getting scared or panicky for no good reason?	Not at all	No more than usual	Rather more than usual	Much more than usual
46 been able to face up to your problems?	More so than usual	Same as usual	Less able than usual	Much less
47 found everything getting on top of you?	Not at all	No more than usual	Rather more than usual	Much more than usual
48 had the feeling that people were looking at you?	Not at all	No more than usual	Rather more than usual	Much more than usual

49	been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
50	been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
51	been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
52	felt that life is entirely hopeless?	Not at all	No more than usual	Rather more than usual	Much more than usual
53	been feeling hopeful about your own future?	More so than usual	About same as usual	Less so than usual	Much less hopeful
54	been feeling reasonably happy, all things considered?	More so than usual	About same as usual	Less so than usual	Much less than usual
55	been feeling nervous and strung-up all the time?	Not at all	No more than usual	Rather more than usual	Much more than usual
56	felt that life is not worth living?	Not at all	No more than usual	Rather more than usual	Much more than usual
57	thought of the possibility that you might make away with yourself?	Definitely not	I don't think so	Has crossed my mind	Definitely have
58	found at times you couldn't do anything because your nerves were too bad?	Not at all	No more than usual	Rather more than usual	Much more than usual
59,-	found yourself wishing you were dead and away from it all?	Not at all	No more than usual	Rather more than usual	Much more than usual
60	found that the idea of taking your own life kept coming into your mind?	Definitely not	I don't think so	Has crossed my mind	Definitely has

Detailed description of those relationships amongst dependent variables that were found to be significant in the follow-up

Table AP. 8.1: Relationship between RTW and RSA

RTW	RSA Fully resumed	Partly resumed	Not resumed
Back	50	12	10
	75.8%	66.7%	38.5%
Not back	16	6	16
	24.2%	33.3%	61.5%

$$N = 110, \chi^2 = 11.49, df = 2, p = 0.0032$$

The greater the degree to which the pre-illness level of sexual activity was resumed, the greater the likelihood of resuming work.

Table AP. 8.2: Relationship between RTW and RD

RTW	RD Fully resumed	Partly resumed
Back	56	8
	78.9%	34.8%
Not back	15	15
	21.1%	65.2%

$$N = 94$$
,  $\chi^2 = 13.58$ , df = 1, p = 0.0002

The table shows that patients who fully resumed their preillness driving show a greater likelihood of resuming work than those who only partly resumed driving.

Table AP. 8.3: Relationship between RTW and CLS

RTW	<u>CLS</u> No change	Mild change	Moderate	<u>Considerable</u>
Back	30	28	34	11
	78.9%	66.7%	59.6%	45.8%
Not ba	<u>ck</u> 8	14	23	13
40	21.1%	33.3%	40.4%	54.2%

$$N = 161, x^2 = 7.72, df = 3, p = 0.05$$

The lower the degree of reported change in life-style, the greater the likelihood of resuming work.

Table AP. 8.4: Relationship between RPA and RHR

	RHR		
RPA	Fully resumed	Par	tly resumed
Fully resumed	42		13
*	64.6%		33.3%
Partly resumed	23		26
*	35.4%	8	66.7%

$$N = 104$$
,  $\chi^2 = 8.35$ ,  $df = 1$ ,  $p = 0.004$ 

The likelihood of fully resuming the pre-illness physical activity at work was greater in patients who fully resumed their pre-illness daily number of hours at work than in those who only partly resumed their hours at work.

Table AP. 8.5: Relationship between RML and RHR

RML	RHR Fully resumed	Partly resumed
Fully resume	<u>d</u> 57	19
	87.7%	48.7%
Partly resumed	8	20
	12.3%	51.3%

$$N = 104$$
,  $\chi^2 = 16.89$ , df = 1, p = 0.0000

The likelihood of fully resuming the pre-illness mental load and responsibility at work was greater in patients who fully resumed their pre-illness daily number of hours at work than in those who only partly resumed their hours at work.

Table AP. 8.6: Relationships between RHR and RSA

RHR Ful	ly resumed	Partly or not resumed
Fully resumed	38	9
	73.1%	40.9%
Partly		
resumed	14	13
	26.9%	59.1%

$$N = 74$$
,  $\chi^2 = 5.58$ ,  $df = 1$ ,  $p = 0.0181$ 

The likelihood of fully resuming the pre-illness daily number of hours at work was greater in those patients who fully resumed their pre-illness level of sexual activity than in those who only partly resumed their sexual activity.

Table AP. 8.7: Relationship between RSA and RD

RSA	RD Fully resumed	Partly resumed
Fully resumed	<u>d</u> 51	6
	78.5%	30%
Partly		*
resumed	14	14
	21.5%	70%

$$N = 85, \chi^2 = 14.14, df = 1, p = 0.0002$$

Patients who fully resumed their pre-illness driving were more likely to fully resume their pre-illness level of sexual activity than patients who only partly resumed driving.

Table AP. 8.8: Relationship between RSA and CLS (modified)

RSA	CLS (modified) No or mild change	Moderate or considerable change
Fully resumed	40	25
	71.4%	47.2%
Partly resume	<u>a</u> 9	9
	16.1%	17%
Not resumed	7	19
	12.5%	35.8%

$$N = 109$$
,  $\chi^2 = 8.92$ ,  $df = 2$ ,  $p = 0.0115$ 

The lower the degree of change in life-style reported, the greater the likelihood of fully resuming the pre-illness level of sexual activity.

Detailed description of those relationships amongst dependent

variables that were found to be significant in the second follow-up

Table AP. 9.1: Relationship between RTW and RD

RTW Back	Fully resumed 64	Partly resumed
	90%	61.1%
Not back	7	7
•	10%	38.9%

$$N = 89, \chi^2 = 7.07, df = 1, p = 0.008$$

The likelihood of resuming work was greater in patients who fully resumed their pre-illness driving, than in those who only partly resumed driving.

Table AP. 9.2: Relationship between RTW and CLS

Not back	4	3	6	6
	13.3%	6.4%	17.1%	54.5%
Back	26	44	29	5
	86.7%	93.6%	82.9%	45.5%
RTW	<u>CLS</u> No change	Mild change	Moderate	Considerable

$$N = 123$$
,  $\chi^2 = 16.01$ ,  $df = 3$ ,  $p = 0.001$ 

The lower the degree of reported change in life-style, the greater the likelihood of resuming work.

Table AP. 9.3: Relationship between RPA and RML

RPA	RML Fully resumed	Partly resumed
Fully resumed	53	7
	68.8%	25%
Partly resumed	24	21
	31.2%	75%

$$N = 105, \chi^2 = 14.36, df = 1, p = 0.0002$$

The likelihood of fully resuming the pre-illness level of physical activity at work was higher in patients who fully resumed their pre-illness level of mental load and responsibility at work than in those who only partly resumed mental load.

Table AP. 9.4: Relationship between RPA and RHR

RPA	RHR Fully resumed	Partly resumed
Fully resumed	52	. 8
	68.4%	27.6%
Partly resumed	24	21
	31.6%	72.4%

$$N = 105, \chi^2 = 12.67, df = 1, p = 0.0004$$

The likelihood of fully resuming the pre-illness physical activity at work was greater in patients who fully resumed their pre-illness daily number of hours at work than in those who only partly resumed their hours at work.

Table AP. 9.5: Relationships between RPA and RSA

RPA	RSA Fully resumed	Partly resumed	Not resumed
Fully resumed	35	7	9
	67.3%	35.0%	<b>-56.2%</b>
Partly resumed	17	13	7
	32.7%	65.0%	43.7%

$$N = 88, \chi^2 = 6.21$$
, df = 2, p = 0.045

The likelihood of fully resuming the pre-illness level of physical activity at work was greatest among those patients who fully resumed their pre-illness level of sexual activity. However, this likelihood was greater in patients who did not resume their sexual activity at all, than in those who partly resumed sexual activity.

Table AP. 9.6: Relationship between RML and RHR

RHR Fully resumed	Partly resumed
62	15
81.6%	51.7%
14	14
18.4%	48.3%
	62 81.6%

$$N = 105, \chi^2 = 8.10, df = 1, p = 0.004$$

The likelihood of fully resuming the pre-illness mental load and responsibility at work was greater in patients who fully resumed their pre-illness daily number of hours at work than in those who only partly resumed their hours at work.

Table AP. 9.7: Relationships between RSA and RD

RSA	RD Fully resumed	Partly resumed
Fully resumed	. 45	4
	67 <b>.</b> 2%	26.7%
Partly resumed	13	7
	19.4%	46.7%
Not resumed	9	4
,	13.4%	26.7%

$$N = 82, \chi^2 = 8.45, df = 2, p = 0.014$$

The likelihood of fully resuming the pre-illness level of sexual activity was greater in those patients who fully resumed their pre-illness driving.

Table AP. 9.8: Relationship between RSA and CLS (modified)

	CLS (modified)	
RSA	No or mild change	Moderate or considerable change
Fully resumed	38	19
	62.3%	50%
Partly resumed	17	7
	27.9%	18.4%
Not resumed	6	12
	9.8%	31.6%

$$N = 99, \chi^2 = 7.56$$
, df = 2, p = 0.022

The lower the degree of change in life-style reported, the greater the likelihood of fully resuming the pre-illness level of sexual activity.

Table AP. 9.9: Relationship between RD and CLS

RD	<u>CLS</u> No change	Mild change	Moderate	Considerable
Fully resumed	19	25	26	1
	82.6%	78.1%	96.3%	14.3%
Partly resumed	4	7	1	6
	17.4%	21.9%	3.7%	85.7%

$$N = 89$$
,  $x^2 = 23.34$ ,  $df = 3$ ,  $p = 0.0000$ 

There was relatively no difference in the proportions of patients fully resuming driving amongst the first three categories of CLS. In all of them this proportion was high. However, this proportion was significantly lower amongst patients who reported to have made considerable changes in their lifestyles.

# Variables included in the canonical analyses

## Indep HOS variables

#### MEDICAL variables

Severity of the illness

## SOCIAL and OCCUPATIONAL variables

Socio economic status
Responsibility at work
Physical load at work
Mental load at work
Age
Educational level

#### PSYCHOLOGICAL variables

AAS 'Anxiety minus' day 2

AAS 'Anxiety plus' day 2

AAS 'Anxiety minus' day 1

AAS 'Anxiety plus' day 1

Perception of causes of the illness

**EPI** Extraversion

EPI Neuroticism

EPI Lie score

# Indep FU variables

#### MEDICAL variables

Physical disability

GP's advice regarding work
Consultant's advice regarding work

# SOCIAL and OCCUPATIONAL variables

Wife's opinion regarding work

#### PSYCHOLOGICAL variables

Perception of causes of the illness Perception of fitness for work General Health Questionnaire

# THE INFLUENCE OF PSYCHOLOGICAL FACTORS AND AN EARLY HOSPITAL FOLLOW-UP ON RETURN TO WORK AFTER FIRST MYOCARDIAL INFARCTION

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ABSTRACT. The factors influencing the return to work following first myocardial infarction were studied in 112 male patients, all of whom had previously been fully employed. Delay in return to work within 4 months of discharge from hospital was seen in patients who were not given an early hospital follow-up appointment and in those who attributed their illness to aspects of their work. Encouragement by the General Practitioner to resume employment was found to be essential if an unnecessary delay was to be avoided. Positive advice of this nature was given more frequently by General Practitioners whose patients had been seen at early hospital review. Age, a tendency to neuroticism, personal knowledge of how others had fared following a similar illness, and apparent benefit from sick payments did not appear to influence the rate of return to work.

Most patients who have survived an acute myocardial infarct should be able to resume employment within 3 months of discharge from hospital, provided their jobs are suitable (22). Patients who do not return to work within this period appear to form three groups: (i) those disabled by extensive myocardial damage and/or incapacitating angina, (ii) those whose previous employment is inappropriate to their current illness, and (iii) those in whom no obvious organic reason is apparent. In this last group psychological factors frequently play a dominant role (15, 21, 26). Detailed advice and reassurance from the Specialist and General Practitioner may well allay these anxieties (22, 18, 8). However, to date there is no information availa-

ble which allows us to identify the patients who will develop this psychological disability, nor is it yet agreed how the medical profession can best deal with this problem.

The present study was therefore designed to examine some of the factors which affect the return to work of patients who have survived an acute myocardial infarction.

#### PATIENTS AND METHODS

112 male patients under the age of 65, admitted to the Coronary Care Unit, Kingston General Hospital, Hull, between February 1973 and August 1974 were studied. They were selected on the basis of the following criteria:

- (1) Their current admission was the immediate consequence of their first identified myocardial infarct.
- (2) They had not received previous treatment for coronary heart disease.
- (3) They had all been fully employed for at least 10 years prior to admission.

The routine management of the patients and the criteria used for the diagnosis of acute myocardial infarction have been previously reported (1, 9).

All patients were interviewed by a psychologist (B. K.) between the 10th and 12th day after admission to record (a) the exact nature of the patient's occupation, (b) his level of neuroticism¹ as measured by the Eysenck Personality Inventory (EPI) (7), (c) his subjective perception of the cause of his illness, obtained by asking the patient what he considered to be the most important factors in the cause of his current illness, and (d) whether or not he had personal knowledge of a member of the family, friend, or close acquaintance who had had a similar illness and, if so, how they had progressed.

The patients were divided into Groups A or B (according to the day of the week of their admission. Our previous examination of patients entering our unit has led us to believe that this technique of selection is satisfactory.

<sup>&</sup>lt;sup>1</sup> Definition: The general emotional lability of a patient, his emotional over-responsiveness, and his liability to neurotic breakdown under stress (6).

Table I. Medical and occupational reasons accounting for the failure of 27 patients to return to work 4 months after acute myocardial infarction

Reason	Group A	Group B	Total
Readmission to hospital	-	(with a further myo cardial in- farction) I (with pneumonia	
Early planned retirement	4	4	8
Severe angina and/or dyspnoea (II b)	7	7	14
Unsuitable occupation	l (Fireman) l (Professional Gardener)	(Shipyard worker)	3
Total	13	14	27

Group A (58 patients) were seen for cardiological examination 4 to 6 weeks after their discharge from hospital. They were questioned as to the presence of symptoms, with particular reference to angina of effort and dyspnoea. They were also asked whether they felt fit enough to return to their previous occupations. Clinical examination was carried out to exclude arrhythmias, cardiac failure, mitral incompetence, and left ventricular dysfunction. Chest X-rays (plus left ventricular screening) and electrocardiograms were ordered when appropriate. Patients who were found to have no significant complications and whose symptoms, if present, were unlikely to prevent them from performing their previous occupations were advised to return to work forthwith. No contact was routinely made by ourselves to see the employer. A full report of the review was sent to their General Practitioner in all cases. Group B (54 patients) were not given such an appointment. Both groups were seen 4 months after discharge for cardiological and psychological reassessment. The following information was then obtained by the psychologist:

(1) The date of return to work and the extent to which their job had to be modified.

(2) Financial difficulties resulting from unemployment.

(3) What information had been given to the patient by the General Practitioner regarding resumption of his employment.

(4) The degree of emotional well-being of the patient-assessed by the General Health Questionnaire (GHQ) (10).

#### Statistics

Statistical evaluation of the data was made using the Chi square test for two independent samples, the Fisher test of exact probabilities, and the t-test for independent samples.

#### RESULTS

73 (65%) of the 112 patients studied were back at work by the time of the four-month follow-up. All these patients had resumed employment with their previous employers, although 39 (54%) of them initially had to reduce the level of physical activity demanded by their work (37 were manual workers). The remaining 34 patients (46%) made no adjustment to their jobs, although 15 were manual work-

Effect of six-week follow-up. 15 patients in Group A (26%) and 24 patients in Group B (44%) had not returned to work at 4 months. The difference between the two groups is statistically significant (p < 0.05). 27 of these 39 patients had failed to return to work for various medical or occupational reasons (Table I). When these 27 patients are excluded the number of patients not returning to work in Group A is 2 out of 45 (4%) and in Group B 10 out of 40

Table II. Time of return to work of patients after acute myocardial infarction (months)

Time fall	Group	A		Group B				
Time following discharge (months)	One	Two	Three	Four	One	Two	Three	Four
Number of patients back at work	1	19	33	43	_	14	25	30
Percentage (I) <sup>a</sup> (II) <sup>b</sup>	1.7 2.2	32.7 42.2	56.9 73.3	74.0 95.5	-	25.9 35.0	46.3 62.5	55.5 75.0

<sup>(</sup>I) Of total number of patients in Group A (58 patients) and Group B (54 patients).

(II) Of those patients considered fit to return to suitable occupations in Group A (45 patients) and Group B (40 patients).

Table III. The relationship between the perception of the cause of the illness and the return to work after acute myocardial infarction

	All patien	ts (112 patie	nts)	Patients fit for re-employment with suitable previous occupations (85 patients)				
Four-month follow-up	Group A	Group B	Total	Group A	Group B	Total		
Patients who related their illness to their work Back at work Not back at work	9 2	6 10	15 12	9	6	15 6		
Patients who did not relate their illness to their work Back at work Not back at work	34 13	24 14	58 27	34 2	24 4	58 6		
Total	58	54	112	45	40	85		

(25%). The difference between these two groups is statistically significant (p < 0.05).

The number of patients in Groups A and B back at work at one month intervals following discharge from hospital is shown (Table II). There was no significant difference between the two groups with regard to the rate of return to work during the first 3 months. However, the difference becomes significant at 4 months (p < 0.05).

Effect of neuroticism. There was no significant difference in the level of neuroticism between patients who returned to work and those who did not.

Effect of perception of the causes of the illness (Table III). The difference in the rate of return to work between all those patients who considered their work to be the major cause of their illness and those who did not was not significant. However, when patients who failed to return to work for medical or occupational reasons are excluded this difference becomes significant (p=0.038).

A significantly greater number of patients who considered their work to be the major cause of their illness returned to work in Group A than in Group B (whether or not the patients who had failed to return to work for medical and occupational reasons are taken into consideration) (p=0.028 and 0.017 respectively).

Effect of previous contact with coronary heart disease. The patients' return to work did not appear to be influenced by their knowledge of how other people had fared after a similar illness.

Effect of cardiac arrest (ventricular fibrillation). Seven patients had ventricular fibrillation whilst in hospital, six in Group A and one in Group B. Two patients (one from each group) were back at work by 4 months. Of the remaining five patients two (both in Group A) had no medical or occupational reasons for not returning to work.

Effect of General Practitioners' advice (Table IV). Patients were more likely to have returned to

Table IV. The advice given by the General Practitioner with regard to resumption of work after acute myocardial infarction (as reported by the patients at the four-month follow-up)

	E	All paties	nts (112 pa	tients)	Patients fit for re-employ- ment with suitable previous occupations (85 patients)			
General Practitioners' advice	Four-month follow-up	Group A	Group B	Total	Group A	Group B	Total	
Return to work	Back at work Not back at work	41 7	27 3	68 10	41 1	27	68 1	
Unclear, or should await hospital follow-up report	Back at work Not back at work Total	2 8 58	3 21 54	5 29 112	2 1 45	3 10 40	5 11 85	

work at 4 months when advised to do so by their General Practitioner (p < 0.001).

10 patients (17%) in Group A and 24 (44%) in Group B were either told by their General Practitioner that they should not return to work until seen by the Specialist, or indicated that their General Practitioner's advice was unclear. The difference between the two groups is statistically significant (p < 0.01).

Effect of age. There was no significant difference between the mean age of patients who returned to work (mean=52.28, S.D.=6.38) and those who did not (mean=50.33, S.D.=7.22).

Effect of sick payments. Patients who did not return to work did not benefit from sick payments to a greater extent than those who were reemployed.

Emotional well-being at follow-up. The level of emotional well-being of patients who returned to work (as measured by the General Health Questionnaire) was significantly higher than of those who did not (mean = 5.6, S.D.=7.8, and mean=15.6, S.D.=10.6 respectively) (p < 0.01).

#### DISCUSSION

Social, psychological, and economic pressures dictate that as many patients as possible who have survived an acute myocardial infarction should return to work and resume a normal life-style as soon as medically acceptable. A long delay may produce chronic invalidism (5, 22). Furthermore, the early resumption of normal physical activities may improve cardiac function (3, 23).

Previous studies have shown that between 60% and 70% of patients re-commence work within 4 months (19, 20, 12, 14). Our findings support these observations, although initially a substantial number of our patients had to modify their jobs.

Delay in returning to work may be due to physical disability, physically exacting or stressful occupations, or reluctance on the part of some employers to resettle men who have recently suffered a "heart attack" (22). The results of the current study support only the first two factors, since most employers were co-operative in allowing their employees to take on lighter duties.

Sometimes, the major barrier to rehabilitation is

psychological (11, 25, 17). A constant fear of death or recurrence of ill-health, even in the absence of symptoms, may limit the undertaking of physical exercise (2). This restriction of physical and leisure activities may then induce depression which further impedes a return to a normal productive way of life. The ability to detect those cardiac patients prone to respond in this way to psychological and physical stress would be valuable when planning a programme of preventive treatment. However, this is difficult since during their stay in hospital patients often conceal their emotional reactions and refrain from discussing their fears and anxieties with the medical staff (13). Moreover, the significance of the various factors which influence the development of anxiety and depression in these patients is not known, although their level of neuroticism and their perception of the major causes of their illness may both play a part in determining such a pattern of behaviour.

Since a major characteristic of neuroticism is an inability to cope emotionally with stressful situations (6, 4), one would expect that a delay in returning to work following myocardial infarction would be more common amongst people with high degrees of neuroticism. Our results do not show this. Likewise, the resumption of employment was not influenced by the patient's knowledge of how other people had fared after a similar illness. This is contrary to views previously reported (24). A more useful index appears to be the patient's subjective perception of the cause of his illness. Of the patients who were physically capable of returning to work those who considered their work to be the major cause of their illness delayed their return more frequently than those who did not.

The positive relationship between the General Practitioners' advice regarding resumption of employment and the actual rate of return to work suggests that encouragement by the General Practitioner is essential if an unnecessary delay is to be avoided.

The importance of an early follow-up as an integral component in the rehabilitation of patients following myocardial infarction is emphasised by the significant difference between Groups A and B in the rate of return to work at 4 months. It is noteworthy that the only two patients in Group A who had failed to resume work without adequate reason had experienced ventricular fibrillation whilst in hospital. Neither of them appeared to be

<sup>&</sup>lt;sup>1</sup> A lower score indicates a higher level of emotional well-being.

neurotic, nor considered their work to be the major cause of their illness—perhaps they still harboured a fear of sudden death. Amongst those patients who thought that their work was the major cause of their illness early follow-up was shown to have a significant effect on the rate of return to work. Only half of these patients in Group B, as opposed to all the patients in Group A, had returned to work within 4 months. An early hospital follow-up also seems to affect the General Practitioners' approach to the rehabilitation of these patients, by reassuring them as to their patients' medical progress, and thus encouraging them to send their patients back to work.

Our findings also support previous reports in that there was a significant difference in the degree of emotional well-being between patients who returned to work and those who did not (16). The mean score on the General Health Questionnaire of patients who were not back at work is above that which, according to Goldberg, identifies patients suffering from depression with a lack of self-confidence (10).

The value of an early hospital follow-up has been clearly demonstrated. However, it would be interesting to see if the same benefit could be achieved by giving more detailed advice to patients before they are discharged from hospital.

Finally, it should be emphasised that this study only involved patients with a satisfactory work record and the same findings and comments do not necessarily apply to patients who had not been regularly employed prior to their illness.

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# Primary ventricular fibrillation and resumption of work, sexual activity, and driving after first acute myocardial infarction

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#### Summary

The resumption of work, sexual activity, and driving were studied in 32 patients who had suffered primary ventricular fibrillation after their first myocardial infarction. They were compared with 95 patients whose myocardial infarction was not so complicated. Though initially slowing rehabilitation, primary ventricular fibrillation did not affect ultimately either the return to work or the resumption of normal sexual activity and driving.

#### Introduction

Most patients who experience primary ventricular fibrillation after their first acute myocardial infarction are successfully resuscitated if efficient mobile or hospital coronary care facilities are immediately available. Subsequently their life expectation is similar to that of patients with myocardial infarctions uncomplicated by this arrhythmia. What is not known is whether the outcome of primary ventricular fibrillation affects the speed or the completeness of the social and psychological rehabilitation of these patients, most of whom should be able to gain satisfactory re-employment and assume normal life.

We therefore studied the course of rehabilitation in patients whose first acute myocardial infarction was complicated by primary ventricular fibrillation.

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#### Patients and methods

Two groups of patients were studied.

The ventricular fibrillation (VF) group consisted of 32 patients who were all under the age of 65 and had been discharged from Kingston General Hospital, Hull, between November 1967 and August 1974, having survived primary ventricular fibrillation as a consequence of their first myocardial infarction. Ventricular fibrillation was defined as primary if it occurred without heart failure, hypotension, or shock. They had all been fully employed for at least 10 years before admission to hospital and had no immediate plans for retirement. Those patients whose previous jobs were considered inappropriate after their myocardial infarction—for example, bus or heavy goods vehicle drivers—were excluded from the study.

The control group consisted of 95 patients who had all been discharged from Kingston General Hospital, Hull, between February 1973 and August 1974 having survived their first acute myocardial infarction, which had not been complicated by ventricular fibrillation.

Both groups were well matched in age (mean  $(\pm SD)$ , VF group  $53\pm6.5$  years; control group  $52\pm7.3$  years), previous cardiac and occupational histories, and drug treatment. The routine management of patients admitted to the coronary care unit, the criteria for the diagnosis of acute myocardial infarction, and the management of ventricular fibrillation have been described.<sup>23</sup> Primary ventricular fibrillation was considered to be early if occurring within 72 hours of the infarction (18 patients) and late if occurring after 72 hours (14 patients).

All surviving patients were invited for review between 2 and 6 months and again between 10 months and 2 years after discharge from hospital. In addition to a full cardiovascular examination, the following information was collected: (a) the date of return to work, (b) the extent to which their job had had to be modified in terms of physical load and number of working hours, (c) when and to what extent sexual activity had been resumed, and (d) when and to what extent private driving had been resumed. When patients failed to attend these interviews information about their work after leaving hospital was obtained from their general practitioners. In such circumstances (13 patients in the VF group and 11 in the control group) no attempt was made to record information on sexual activity and driving.

Occupations were assessed independently as manual or sedentary by a unanimous (in 80% of cases) or majority (in 20%) decision of three observers (two industrial psychologists and a works manager). A job was considered to be manual if it entailed at least a moderate amount of physical activity—for example, motor fitter, electric welder, prison officer. A sedentary job was one in which there was little or no physical activity—for example, hospital catering officer, industrial training officer, clerk. The patient's work commitment (in terms of

hours and physical load) and sexual and driving activities were graded as "full" if they exceeded 89 $^{\circ}$ 0 of the premorbid level and "reduced" if below that level.

Statistics—Data were analysed by the  $\chi^2$  test for two independent samples, the Fisher exact probability test, and the t test for two independent samples.

#### Results

Since it is now accepted that most patients should have returned to work and resumed a normal life within 3 or 4 months of acute myocardial infarction<sup>4</sup> we assessed the rehabilitation status of our patients 4 months after they left hospital as well as after a longer period (10 months). There was no significant difference in the 4- or 10-monthly mortality rate between the two groups (P=0.95). Four out of 32 patients (13%) in the VF group and 5 out of 95 patients (5%) in the control group died within four months of discharge. One further patient in the VF group and a further two patients in the control group died within 10 months of discharge.

A significantly greater proportion of patients in the control group had returned to work at four months (P=0.001; table I), and since only 5 patients in the VF group had resumed work at this time we did not compare statistically the work capacity of the groups. At 10 months there was no significant difference between the two groups in either the proportion of patients who had returned to work or their working capacity.

A greater proportion of controls had resumed full sexual activiy and driving within four months (P = 0.040 and P = 0.047 respectively; table II). But at 10 months these differences between the groups had disappeared (table II). Patients who had not driven or had terminated their sex life before their illness were excluded from this analysis.

Within the VF group the rate of return to work and the resumption

of normal sexual activity and driving of the 20 patients admitted before 1973 did not differ significantly from that of the 12 patients admitted after that date (P = 0.05).

The effects of age, occupation (manual or sedentary), time of ventricular fibrillation (early or late), and site of infarct (anterior or posterior) on the return to work at 10 months were examined (table III). Age was the only single factor that clearly distinguished between those patients who returned to work and those who did not in both the VF and the control groups (P=0.006 and P=0.049 respectively). Furthermore, we discovered that the age of 58 years discriminated better than any other age between those patients who returned to work and those who did not.

#### Discussion

Our results support the view that the short- and long-term prognosis with respect to life expectancy of patients surviving primary ventricular fibrillation after acute myocardial infarction does not differ significantly from that of patients whose myocardial infarction has not been so complicated. On the other hand, there seem to be differences between these two groups of patients in the speed with which they return to work and in their personal and, possibly, psychological rehabilitation.

Patients in the VF group returned to work and resumed full sexual and driving activities more slowly than those in the control group. It has been shown that physical disability due to angina or dyspnoea, or both, the attitude to the illness, and the general practitioner's advice influence the rehabilitation of patients who have suffered myocardial infarction. The difference in rehabilitation four months after discharge between the VF

TABLE I—Number (percentage) of patients who returned to work and their working capacity 4 and 10 months after discharge from hospital after acute myocardial infarction

		107	ork status*			Working capacity†										
Group					Physical Load						Hours					
	Back at work		Not back at work		Total		Full		Reduced		Total	Full		Reduced		Total
						-1			4 Months							
VF	5 (18)	1	23 (82)	i	28 (100)	1	4 (80)	1	1 (20)	1	5 (100)	5 (100)	1		i	5 (100) 62 (100)
Control	62 (69)	1	28 (31)	1	90 (100)	1	31 (50)		31 (50)	1	62 (100)	40 (65)	1	22(35)	1	62 (100)
			P<0.001	1					(Num	bers	too small for	statistical cor	nparis	on)		(,
					1	0 M	onths							,		
VF	19 (70)	1	8 (30)		27 (100)	1	11 (58)	1	8 (42)	1	19 (100)	17 (90)	1	2 (10)		19 (100)
Control	19 (70) 76 (86)		8 (30) 12 (14)	1	88 (100)		42 (55)		8 (42) 34 (45)	1	76 (100)	56 (74)	1	2 (10) 20 (26)	1	76 (100
<b>C</b> 0.1	10 (00)	NS	()	1	00 (200)	1	(33)	NS	3. ()	1	()	30 (14)	NS	20 (20)	1	.0 (200
	1			1		1		110		1	1		110			

<sup>\*</sup>Figures include only living patients.

TABLE 11—Number (percentage) of patients who resumed sexual activity and driving within 4 and 10 months of discharge from hospital after acute myocardial infarction

Group				Sexua	l activ	ity						Driving				
Group		Full		Reduced	Total Inapplicable*		•	Full		Reduced		Total		Inapplicable		
VF Control		2 (20) 45 (65) P=0	0:04	8 (80) 25 (35)		10 (100) 70 (100)	1	Months 5 9		5 (46) 47 (77)	P=0:04	6 (54) 14 (23)	1	11 (100) 61 (100)	1	4 18
VF Control	!	5 (50) 42 (61)	NS	5 (50) 27 (39)		10 (100) 69 (100)	10	Months 4 8		6 (60) 52 (85)	   NS	4 (40) 9 (15)		10 (100) 61 (100)		4 16

<sup>\*</sup>Patients who had terminated their sexual activity or had not driven before their illness were not included in the calculation of the percentages or the statistical analysis.

TABLE III—Effect of age, occupation, time of onset of ventricular fibrillation, and site of infarction on return to work 10 months after discharge from hospital. Results are numbers (percentages) of patients and include only patients who were alive 10 months after discharge from hospital

10 1	Age (years)				Occupation			Time of VF				Site of infarction*			
10-months status	≥58		<58	7	Manual		Sedentary		Early		Late		Posterior		Anterior
Back at work Not back at work	3 (33) 6 (67)	P = 0.006	16 (89) 2 (11)	1	12 (63) 7 (37)	NS	7 (88) 1 (12)	١	12 (80) 3 (20)	NS	7 (58) 5 (42)	i	10 (77) 3 (23)	NS	9 (64) 5 (36)
Back at work Not back at work	22 (76) 7 (24)	P=0.05	54 (92) 5 (8)	5	8 (13)	NS	24 (86) 4 (14)	.					53 (87) 8 (13)	NS	23 (85) 4 (15)

True posterior infarction was not seen.

<sup>†</sup>Figures include only patients who were back at work.

NS = Not significant.

group and the controls could be explained in terms of a higher incidence of physical disability due to angina and dyspnoea in the VF group, the patients' attitudes to their disease, or overcautiousness on the part of their general practitioners. These explanations must be speculative since we could not obtain evidence to support or refute them in view of the retrospective manner in which some of the information was collected about the patients in the VF group. Within 10 months of leaving hospital, however, these differences between the two groups had disappeared.

Recognising that unsuccessful rehabilitation after myocardial infarction could be due as much to psychological as to physical factors,4 it might be expected that patients whose heart attacks were complicated by ventricular fibrillation would be most adversely affected psychologically by their illness. They commonly believe, quite inaccurately, that their "Heart attack had been very severe" and often comment, "I had actually died and was brought back to life."7 As a result they may harbour fear of sudden death or recurring ill health-fears that should have been allayed by sympathetic and informed medical counselling before and after they were discharged from hospital. Our 10-month follow-up figures do not suggest that anxiety alone explains the failure to return to work in either group of patients. Age seemed to be the most influential factor. The only two patients in the VF group who were below the age of 58 and had not returned to work by 10 months (table III) had experienced a further acute myocardial infarction and were incapacitated by severe angina and dyspnoea.

Since age was the most useful factor in distinguishing between patients who returned to work within 10 months of their discharge from hospital and those who did not, it may be advisable to consider early retirement after acute myocardial infarction in patients who are in or around their early 60s, especially if they wish to leave manual occupations and have understanding employers. A similar opinion has been expressed by Biorck.

Though the controls were not ideal in that they were consecutive admissions after 1973, this selection was unlikely to have prejudiced the results of our study since VF patients admitted before 1973 behaved in the same way as those admitted after this date.

In conclusion, primary ventricular fibrillation after a myocardial infarction, though initially slowing rehabilitation, does not itself ultimately adversely affect the resumption of work and normal living.

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### THE EFFECT OF A PRE-DISCHARGE CONSULTATION ON THE RESUMPTION OF WORK, SEXUAL ACTIVITY, AND DRIVING FOLLOWING ACUTE MYGCARDIAL INFARCTION

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ABSTRACT. Thirty-five men admitted to hospital with their first acute myocardial infarction were given detailed medical guidance before discharge home with respect to the resumption of work, sexual activity, and driving. When compared with a control group of 63 patients who were not given any specific guidance, it was observed that a similar proportion of patients in both groups had resumed these activities within four months of leaving hospital. It is concluded that, although the pre-discharge medical counselling may have reduced ambiguity and uncertainty and may also have encouraged the resumption of driving, it had no effect on how quickly the patients returned to work or resumed 'normal' sexual activity. An early hospital review and encouragement by the general practitioner seems to be of greater importance.

The value of an early hospital follow-up in preventing unnecessary invalidism and encouraging patients who have recently suffered an acute myocardial infarction to resume work has been previously demonstrated (7). The present study was designed to investigate whether the same benefit could be achieved by giving detailed advice to patients before their discharge from hospital following acute myocardial infarction.

#### PATIENTS AND METHODS

The routine management of patients admitted to the Coronary Care Unit and the criteria for the diagnosis of acute myocardial infarction have been previously described (1). All patients studied were under the care of the same consultant (C.P.A.), junior medical and nursing staff. They formed two groups.

#### Consultation group (35 male patients)

All patients were under the age of 65 years and had been admitted to Kingston General Hospital, Hull, between October 1974 and February 1975, having suffered their first myocardial infarction. They had all been fully em-

ployed for at least 10 years prior to admission to hospital and had had no immediate plans for retirement. One patient was excluded from the study since resumption of his previous job of a bus driver was considered inappropriate. All patients in this group were interviewed by the medical registrar (K.F.) within 48 hours prior to discharge from hospital. This consultation took the following format:

- (1) The reason for the consultation was explained—to advise regarding "do's and don'ts" in the convalescence period and to provide an opportunity for the patients to ask questions with respect to their recent illness.
- (2) The nature of the illness was explained in simple terms. The patients were told that as a result of a block of one of the coronary blood vessels a part of the heart wall had been damaged. An analogy was made with a cut in the skin which, in time, like the heart would heal up leaving only a scar.
- (3) They were reassured with regard to the prognosis. It was emphasised that chances of survival were good and that most people resume a virtually normal life following the illness. They were told that they may experience angina or dyspnoea after discharge from hospital and if either of these symptoms became severe and/or frequent they should contact their general practitioner.
- (4) Explicit instructions were given regarding: (a) Activity—they were advised to remain virtually housebound for two weeks following discharge from hospital and then to gradually increase their physical activities, aiming to return to a normal life style within about three months of the onset of their illness. An active walking programme was encouraged. (b) Driving-should be resumed twothree weeks after discharge from hospital. (c) Sexual activity-could be commenced within four to five weeks of leaving hospital. (d) Return to work—the nature of their work and the likelihood of their employer co-operating with any modifications that might be considered necessary were assessed and discussed. Each patient was then told when, in the absence of the development of incapacitating symptoms, he should be able to return to work (within two-three months of discharge from hospital).

During the interview a special effort was made to avoid ambiguous statements such as: "take things easy". Advice was given in a positive manner, for example: patients were



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Table I. Resumption of work, sexual activity, and driving four months after discharge from hospital following acute myocardial infarction

	_		Resumption	on of sex acti	vity	Resumption of driving			
	Resumption	on of work	***************************************		Inapplic-			Inapplic-	
	Yes	No	Full	Reduced	able	Full	Reduced	able <sup>a</sup>	
Consul-									
tation group	16 (50 <i>%</i> )	16 (50%)	21 (70%)	9 (30%)	2	23 (92 %)	2 (8 <i>%</i> )	7	
Control group Signifi-	31 (52.5%)	28 (47.5%)	37 (68.5%)	17 (31.5%)	5	38 (73 %)	14 (27%)	7	
cance level	p>0.99 N	.S.	p>0.99 N	.S.		p>0.10 N	1.S.		

<sup>&</sup>lt;sup>a</sup> Patients who terminated their sexual activity or had not driven, prior to the illness were not included in either the computation of the percentages or the statistical analyses.

told they can drive after three weeks rather than "do not drive for at least three weeks".

The patient's level of anxiety was measured the day before and immediately after the consultation by means of a modified form of the Zuckerman (14) AACL. The range of scores is between 0 (low anxiety) and 55 (high anxiety).

#### Control group (63 male patients)

The patients were admitted to Kingston General Hospital, Hull, between January 1974 and September 1974, having suffered their first myocardial infarction, but none had been specifically interviewed by the medical registrar whilst in hospital.

Occupations of all patients were assessed independently as manual or sedentary by a unanimous (80%) or majority (20%) decision of three observers (two industrial psychologists and a works manager). A job was considered to be manual if it involved at least a moderate amount of physical activity (for example: motor fitter, electric welder, prison officer). A sedentary job was one in which there was little or no physical activity (for example: hospital catering officer, industrial training officer, clerk). There was no significant difference between the two groups in regard to the proportion of patients with manual occupations (p>0.05).

Both groups were well matched with respect to age (consultation group: mean=53.68, standard deviation 6.74; control group: mean=52.76, standard deviation 7.38) and previous cardiac and occupational histories.

#### Follow up

All patients were invited for their first review four months after discharge from hospital. A full cardiovascular examination was carried out (by I.W.T.). Symptoms were considered as absent or minimal when none or only occasional episodes of mild angina and/or dyspnoea on exertion were reported. Symptoms were considered as moderate or severe when angina and/or dyspnoea interfered with activities that demand only mild or moderate physical effort (for example: walking a short distance at a slow pace).

The following information was also collected (by B.K.):
(a) The date of return to work. (b) To what extent sexual activity and (c) private driving had been resumed. The patient's sexual and driving activities were graded as "full" if they exceeded 89% of the pre-morbid level and "reduced" if their performance was below that level. (d) Whether or not the patient recalled being given advice before leaving hospital regarding when and to what extent he should resume work, sexual activity and driving. (e) What information had been given to the patient after leaving hospital by the general practitioner regarding the resumption of his employment.

Neither the cardiologist nor the psychologist who interviewed the patients at follow-up knew to which group they belonged.

#### Statistics

Analyses of the data were carried out by means of the chisquare test for two independent samples, the Fisher exact probability test, and t-test.

#### **RESULTS**

#### Mortality rate

There was no significant difference in the fourmonth mortality rate between the two groups. Two patients in the consultation group and four in the control group died.

# Resumption of work, driving, and sexual activity

A similar proportion of patients in both groups had resumed work and sexual activity by four months. The proportion of patients fully resuming driving was greater in the consultation group than in the control group. However, this difference was not statistically significant (Table I).

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Table II. Recall of advice received from medical staff prior to discharge home following acute myocardial infarction (at four months)

	Work		Sex		Driving		
	Good recall	No recall	Good recall	No recall	Good recall	No recall	
Consultation group Control group	29 (90.6%) 5 (8.5%)	3 (9.4%) 54 (91.5%)	30 (93.7%) 5 (8.5%)	2 (6.3%) 54 (91.5%)	29 (90.6%) 29 (49%)	3 (9.4%) 30 (51%)	
Significance level	p<0.001	to ■ contractors difficient	p<0.001		p<0.001	,,	

#### Recall of advice given in hospital

Over 90% of patients were able to remember with accuracy the information they were given during their pre-discharge consultation with the medical registrar with regard to work, driving, and sexual activity (Table II). On the other hand, in the control group less than 10% were able to recall being given any advice (whilst in hospital) about work or sexual activity. By contrast, 50% in this group remembered discussing driving with a member of the hospital staff (Table II).

#### Effect of symptoms

Patients who were experiencing moderate or severe symptoms at the time of the follow up were less likely to have resumed work and sex. The resumption of driving, however, was not affected (Table III). The proportion of patients experiencing symptoms at this time was the same in the conultation and the control groups (19%).

#### Effect of general practitioner's advice

Patients in both groups were more likely to have returned to work at four months when advised to do so by their general practitioner (Table IV) even when their symptoms were mild or absent (Table V).

There was no significant difference in the level of anxiety measured before (mean=5.45, standard deviation=6.38) and after (mean=4.85, standard deviation=5.5) the pre-discharge consultation.

#### DISCUSSION

It has been suggested that the best way to deal with psychological reactions of fear of death or recurrence of ill-health, and the development of dependent tendencies after acute myocardial infarction, is for physicians to adopt a sympathetic and understanding approach (2, 5, 8). This should involve explanation of the nature of the illness, and adequate guidance with regard to how quickly and to what extent 'normal' activities can be resumed.

Croog and his associates (3), on the basis of an extensive survey of the literature, pointed out the shortage in empirical studies of the effects of the pattern of therapeutic advice or the quality of the

Table III. The effect of residual symptoms on work, sexual activity and driving, by four months of discharge from hospital following acute myocardial infarction

Symptoms			Sex activity			Driving	Driving		
	Resumption Yes	on of work No	Full	Reduced	Inapplic- able <sup>a</sup>	Full	Reduced	Inapplic- able <sup>a</sup>	
Mild or absent	44 (60.3%)	30 (39.7%)	53 (73.6%)	19 (26.4%)	2	51 (78.4%)	14 (21.6%)	9	
Moderate or severe	3 (17.6%)	14 (82.4%)	5 (41.6%)	7 (58.4%)	5	10 (83.3%)	2 (16.7%)	5	
	p = 0.002		p = 0.03			p = 0.52  N	.S.		

<sup>&</sup>lt;sup>a</sup> Patients who terminated their sexual activity or had not driven prior to the illness were not included in either the computation of the percentages or the statistical analyses.

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Table IV. The effect of the general practitioner's advice on the return to work after acute myocardial infarction

	GP's advice to consultation group		GP's advice to control group		
Work status at follow-up	Return to work	Do not return to work, or unclear	Return to work	Do not return to work, or unclear	
Working	11 (68.7%)	5 (31.3%)	29 (93.5%)	2 (6.5%)	
Not working	3 (18.7%)	13 (81.3%)	5	23	
`	p < 0.025	(81.3%)	(17.8%) $p < 0.001$	(82.2%)	

doctor-patient relationship on the level of rehabilitation in cardiac patients. They also claim that workers examining these problems often tend to report their subjective impressions, using clinical judgments instead of experimental and control groups. These criticisms were taken into account in the design of the present study.

It is commonly expected that most patients surviving a myocardial infarction can and should complete their rehabilitation within about three months (12, 13, 9). Various studies have shown that about 50% of the patients resume work within four months of the illness (10, 11) and up to 90% within one year (6, 4). The rate of return to work, at four months, in our sample, is consistent with that found in previous reports. Few authors, however, have reported findings regarding the resumption of sexual activity and driving.

In spite of more than 90% of the consultation group being able to recall details of their interview, no significant difference was found between the two groups in the proportion of patients resuming work, sexual activity, or driving by four months. How-

ever, the consultation may have encouraged the resumption of driving to a greater extent than the usual hospital routine. Although not statistically significant the proportion of patients fully resuming driving in the consultation group (92%) was greater than the control group (73%). This difference might have been even greater had 49% of the patients in the control group not received information regarding driving from other sources (e.g. house officers, nurses).

The routine rehabilitation given to the patients in the control group entailed no formal advice regarding the three rehabilitation aspects under investigation (i.e. work, sexual activity, driving) although it was possible for these patients to obtain this information in an informal manner from members of the medical or nursing staff during their stay on the ward. However, since only a small proportion of patients in the control group were able to recall any advice (with the exception of driving) given to them while they were in hospital they cannot be considered to have been treated in an exceptionally good rehabilitation climate, which might have

Table V. The effect of the general practitioner's advice on the return to work in relation to residual symptoms following acute myocardial infarction

,	Moderate or severe symptoms GP's advice		Mild or abser GP's advice			
Work status at follow-up	Return to work	Do not return to work, or unclear	Return to work	Do not return to work, or unclear	m .	
Working	2	1	37 (84 %)	7 (16%)	<i>(</i> *	
Not working	3	11	6 (20%)	24 (80%)	₩	
	N.S.		p<0.001			

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diminished the need for a formal pre-discharge consultation. It is noteworthy that those patients in the control group who remembered being offered any advice while in hospital usually reported that it had been given in a somewhat negative way, i.e. "Do not drive for at least three weeks" or "Do not resume work for at least three months". The relatively high proportion of patients in the control group (49%) who received any guidance with regard to driving probably reflects a determined effort on their part to obtain information on this subject.

It is also unlikely that the lack of difference between the two groups was a result of a poorer medical progress in the consultation group, since the incidence of moderate or severe symptoms at follow up was the same in both groups.

In accord with our previous findings (7), it appears that following discharge from hospital the general practitioners' role in encouraging the restoration of a normal life style is of considerable importance. However, their reluctance to assume this responsibility and to send patients back to work, even in the absence of symptoms (Table V), is a further indication of the necessity for early hospital review and for close communication between the cardiologist and the general practitioner in order to prevent both undue invalidism and over-cautious medical guidance. Information concerning the gene-

ral practitioner's advice with regard to the resumption of work was obtained from the patients. Therefore, it could be argued that this information is a reflection of patients' tendency to forget, misunderstand, or obscure their doctors' opinions, rather than being the true advice given to them. This, however, is unlikely to be the case, since many of the patients who reported being advised to delay their return to work also indicated that they had been specifically told to wait for the hospital follow-up examination.

In conclusion, therefore, it would appear that the detailed medical counselling prior to discharge from hospital following acute myocardial infarction, although perhaps reduced ambiguity and uncertainty, and possibly encouraged the resumption of driving, had no effect on how quickly the patients returned to work or resumed 'normal' sexual activity. An early hospital review and encouragement by the

general practitioner seem to be of a much greater importance (7).

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