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THE RELATIONSHIP BETWEEN STRESS AND ILLNESS:
A HISTORICAL AND THEORETICAL REVIEW OF SOME CONCEPTUAL
AND METHODOLOGICAL PROBLEMS IN RESEARCH

By

Robert Briner

Thesis submitted for the degree of Master of Science at the
University of Durham, Department of Psychology.

December, 1986.



19 JUN 1987

I declare that the work contained in this thesis has not been previously submitted for any other degree.

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ABSTRACT

Research into stress and illness is fraught with methodological and conceptual problems. These problems have slowed progress in research. Life stress variables are still conceptualized at a crude, simplistic and naive level. Research findings in life stress, either in terms of increasing the predictive power of life stress variables, or enhancing our understanding of the stress-disorder relationship, have advanced little in the last ten to twenty years.

A possible approach to this problem is adopted in this thesis. By looking at how the ways in which the term stress has been used and developed in different areas of research, the diverse uses of this concept can be distinguished. The background to stress and illness research can now be approached with a clear conception of these different uses.

Although there is general evidence for the link between stress and illness, knowledge about the processes and mechanisms involved is sparse. Many of the insights made by early researchers in psychosomatic medicine, that disease causation is multicausal, appear to have been forgotten by many researchers who use only a few variables in their research designs.

The idea of 'mediators' of stress presupposes a certain model of stress, loosely based on an engineering analogy, where stress is pictured as an external force, which the individual will resist, and moderating factors will reduce the impact of the force. This analogy is influential in life stress research, but little evidence exists to suggest it may be correct.

Recent moves towards assessing daily stress and coping have been criticised as such variables are contaminated by others. An unresolvable difference exists between those who see stress variables as objectively measurable, and those who view stress and health as part of a much larger ongoing interaction between the person and their environment, and coping and social support variables as part of a more general effort to adapt.

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CHAPTER ONE
INTRODUCTION



1.1 Background.

My initial interest in stress came about through a much larger and basic concern with the ways in which the psychological environment can influence health. Different research frameworks share this common concern. These include medical psychology, health psychology, epidemiology and behavioural medicine.

From all the various factors involved in the relationship between psychology and health, I chose to look at stress. My third year undergraduate dissertation was about Hans Selye and his conception of stress. During the reading for this dissertation, I quickly realised that the whole area of stress was full of theoretical and conceptual problems that I found very interesting. There are a number of other reasons for this choice. First, the concept of stress is fundamental to all these frameworks, and related to my basic concerns in such a way as to allow for a broad and general approach to the issues involved. Second, the concept of stress attempts to explain how psychological experiences can affect physiological states, which may then have consequences for health. Third, the concept of stress is very problematic. These problems exist both on the theoretical and practical levels and provide an added interest and challenge. Lastly, the theoretical and

conceptual problems encountered in stress research have an importance which goes beyond stress research itself. For example, the efforts made to demonstrate that measures of stress are causally associated with changes in health have implications for all medical research, and our concepts of health and disease.

When one looks at 'stress research' or those areas of research which use the term and idea of stress there are several striking aspects of these areas: there are a huge number of publications and books about stress; the definition and concept of stress varies enormously even within one particular focus of stress research; increasing attention is being paid to methodological and conceptual problems, although researchers have been aware of such problems ever since the word stress was first used in a scientific sense in this context; and despite a great deal of research, progress in this area is slow. An overview of stress research leaves the impression that the area is confused, messy, without clear direction, and unable to tell us much of real importance about the mechanisms involved in stress, illness and health.

Although such criticisms can probably be made about other research areas, one consequence of stress research which

may not apply to other areas, is that it has, or should have, significant practical implications for medicine and health care. Hence, there is extra need to speed up progress, especially as stress-related chronic illnesses (such as heart disease) are now the major single cause of death in many Western countries.

There have been a number of responses to this slow progress. Researchers have attempted to improve stress-disorder relationships by refining the measures of stress (usually life events) adopted in studies. Although such efforts have been going on for nearly twenty years the power of life events to explain variance in illness rates has not significantly increased. Other responses to speed up progress have been less concerned with proving or demonstrating that a relationship between stress and disorder exists. Instead, the focus for these researchers is to better understand the mechanisms involved in stress disorder relationships. Our knowledge of the causal links between stress and disorder is at a very low level. The research designed to improve our understanding of such mechanisms is more qualitative, and rejects the simple independent-dependent variable approach. These two experimental approaches to stress research represent two extremes. There are some researchers who try to find

positive relationships between stress and disorder, but at the same time pay attention to the causal mechanisms involved.

On a theoretical level the response to the slow progress in stress research is less noticeable. This is perhaps due to a general bias against theory. However, in stress research in particular, the practical implications of findings means that there is extra urgency in the search for 'hard' facts which can be applied. Research on theory, although seen as vitally important by nearly all researchers, is sometimes hard to justify in a positivist climate, and may seem inappropriate to individual researchers who are more concerned with making advances in very specialized research areas, than general gains in theory.

This thesis is an attempt to look at some of the theoretical issues in stress research. I have taken a theoretical approach for two reasons. The first, as outlined above, is because I feel that a serious consideration of theoretical issues would speed up progress far better than any number of empirical studies, as such studies are developed from poor theory. Second, on a personal level, the problems involved in stress research are, for me, almost overwhelming. My desire to do some

empirical work in the general area of stress, health and illness has lessened as I realised that I would not feel confident, or justified in undertaking empirical work, if I could not approach the work with some understanding of the considerable theoretical and methodological problems in the area as a whole. Whilst this thesis is by no means a comprehensive review of the theoretical problems in the stress area, it has given me more confidence, and made appreciate even more the lack of good theory in this area, and the importance of approaching empirical work from a sound, theoretical basis.

I have tried to indicate the background to this thesis in this section. However, I hope that the rationale will become clearer as each chapter develops.

1.2 Theoretical orientation.

There are two issues I would like to discuss here. The first is my approach to the thesis, and the second is my theoretical approach to stress research. The two are closely related as I have tried, through my approach to the thesis, to give support to a particular contemporary perspective in stress research. This thesis is intended to provide a broad, general overview of some of the theoretical and methodological problems in stress research.

It is aimed to give the reader a feel for the area, rather than lists of facts and research findings. Because of this, I have not spent much time in arguing my own particular point of view, at least not explicitly. I felt that it was very important to give as broad a view as possible to the diverse strands of stress research. Such a view allows one to clearly place any piece of stress research in a theoretical and historical context. Such a broad review does not exist in the literature. But in this thesis I have attempted to pull together these diverse strands, showing how they can be integrated, and more fully understood in comparative, historical and conceptual terms.

The theoretical orientation used in the thesis leads to two different types of analysis. The first involves a review of the idea of stress, as it has been used in research, and where such ideas originated. The use of the term 'stress' has caused a great deal of confusion in stress research. Although it has only been used in a technical sense to refer to psychophysiological phenomena for about fifty years, it has quickly assumed different, sometimes contradictory meanings. This is a problem as it makes the integration of research findings difficult, as different operational definitions are used. On the other hand, the use of the same term, 'stress' often seems to make

researchers believe that the research they undertake must automatically have something to do with other research which uses the term 'stress'. One of the results of this is that although little attempt is made formally to integrate research findings, it is somehow thought that all research into 'stress' is somehow compatible, and contributes generally to our understanding of the 'stress phenomenon'.

The second analysis made in this thesis is conceptual and historical. As the central theme is the relationship between stress, health, and illness, I have looked at the historical origins of psychophysiological approaches in medicine, and how these have developed into stress research. The historical approach is particularly valuable in the analysis of an area which is large and diverse. Understanding the conceptualizations of stress is also valuable as such conceptualizations will determine the kinds of measures developed, although this relationship may also be the other way around. If measures of stress are adopted for their practical use, then the measures of stress themselves may well determine the conceptualization of stress.

My theoretical approach to stress research could be considered to be rather naive and impractical. My

overwhelming impression of the relationship between stress, health, and illness is that it is very complicated. The level of complexity is not reflected in research methods. I am pessimistic about the ability of traditional research to answer any but the most simplistic questions about the relationship between stress, health, and illness. In general the ideas of stimulus and response, independent and dependent variables, although applicable to experiments in the laboratory, have little place in research efforts aimed at understanding the relationships and mechanisms involved in stress, health, and illness in peoples' lives. A useful way of looking at the processes involved is in terms of adaptation. Individuals are constantly adapting to events (past, present and anticipated) in the social, psychological and intrapsychic environments. Adaptive efforts take many forms, including traditional concepts of coping. Adaptive outcomes also take many forms, including health and/or illness. One problem of traditional stress research is that stressful events, adaptive efforts, and adaptive outcomes have been conceptualised in a very narrow way. Stressful events are usually seen as major life events; adaptive efforts, when considered at all are often restricted to cognitive coping responses; and adaptive outcomes are seen only in terms of ill-health and are often assessed by simple general measures.

Although my approach does not easily lead to any particular ways of doing research or any studies, it does at least provide a critical background. Some recent research, discussed in chapter six, tries to take account of the complexity of the phenomena under study. This approach is transactional, in that it views stress as arising from a transaction between the person and the environment, and not simply as a passive, automatic response to external events/stimuli. Such studies accept that the factors they choose to measure are interwoven with many other factors and in this sense 'clean' measures of variables can not be obtained. The relationship between stress, health and illness is a consequence, or a result of the way in which people live, or adapt to their environments. Environment is used here in a wide sense, to include the cultural, psychological, social and political environments.

The research methods needed to examine the processes and mechanisms involved are only beginning to be developed. There is no doubt however, that traditional research methods, many of which have been borrowed from laboratory situations, are inappropriate for the study of stress, health, and illness.

As a whole, the theoretical orientation taken in this thesis is intended to clarify and integrate the diversity of approaches to stress research. This has been attempted on a smaller scale elsewhere (e.g. Fleming et al, 1984). From the basic assumption that the phenomena under study are very complex and interwoven, we can see why stress research is so diverse, as researchers have each looked at a small part of these complex adaptive processes and outcomes, and called what they found stress. By approaching this body of research with some idea of the complexity involved, and the historical background to the concept of stress, we can begin to understand how these different strands of research may, or may not, fit together in a historical and conceptual way.

1.3 Overview of the thesis.

Given this background and theoretical orientation, I will now give an account of the thesis. This is not a summary, but will hopefully make clear to the reader the reasons for my selection of topics, and the order in which they occur.

As said above, the focus for this thesis is the relationship between stress, health, and illness, and the theoretical and conceptual problems involved in studying this relationship. One of the major problems, which is

mentioned in virtually any book about stress, is the diversity of definitions of the word stress. Of course, there are reasons for this diversity, one of the main ones being that different definitions of stress are referring to truly different phenomena. However, a great deal of confusion has arisen out of these different definitions and uses of stress. Chapter two is a fairly comprehensive review of the origins and uses of the term and concept of stress. This covers some uses of the term which are not related directly to health and illness. However, it is important to look at the whole range of uses, as very often these do become confused, and without the entire range of usages, distinguishing between them becomes difficult. Chapter two also provides the reader with a framework on which to place the definitions and concepts of stress encountered later in the thesis.

Chapter three looks at the background to stress and illness. This historical background is important as it shows that the idea of stress is not a new one, although it is often treated as though it is a new discovery. The origins of stress in recent history arose from the medical field where simple explanations of disease were rejected by some in favour of a more complex or holistic approach to health and illness. This complexity has often been

overlooked by researchers, who are more keen to demonstrate that the relationship between stress and illness exists, than understand the mechanisms at work. The result of this tendency is that the mechanisms by which psychological information produces psychophysiological responses which in turn may lead to illness, are little known or understood. This chapter is intended to give an overview of the history of stress and illness, and a little about what is actually known.

Chapters four and five are concerned with recent research aimed at the assessment of life stress, and possible mediating variables. In these chapters I emphasise the simplistic way in which life stress, and other variables such as social support and coping, have been measured and conceptualised. The new approaches which adopt a more transactional view of stress and illness tend to make more frequent assessment of the variables involved, and use more complex and comprehensive measures of variables.

In conclusion I have tried to offer support to my theoretical orientation by drawing on examples from the development of stress research. There are many problems associated with new transactional approaches. One of the

main ones is that although the theory it is based on may be acceptable, there are no practical ways of demonstrating this approach. In a sense, the transactional approach is almost anti-empirical or anti-experimental as it does not accept that dependent and independent 'clean' variables exist. In this way, the transactional approach may not be useful. However, research methods will be developed that are suitable for the phenomena under study. Once again I would emphasise that the concept of adaptation is a useful basis from which to integrate perspectives in stress research. I think it is important to integrate these perspectives as well as see the distinctions between them.

I find the theoretical and conceptual problems in stress research of great interest and importance in themselves. Such problems have extra importance if they are slowing down progress towards a better understanding of stress, health, and illness. From my point of view, undertaking empirical research in the area of stress and illness without a sound theoretical and historical knowledge is very unwise. If, that is, the problems that have hampered stress research for some twenty years are to be avoided. Far too often, research has been approached from a narrow, almost atheoretical perspective, which can only be avoided with such background knowledge.

This thesis is intended to give a broad overview of some of the methodological and conceptual problems in this area, their historical background, and some possible alternatives to traditional approaches. There are certainly points I would have liked to emphasise more strongly, and issues I would have liked to include. Despite these omissions, I feel that the framework presented here represents a useful integration of stress research and a sound basis for empirical work.

CHAPTER TWO

THE ORIGINS AND USES OF THE TERM AND CONCEPT OF STRESS

2.1 Introduction.

Stress can mean a stimulus, a response and the interaction between the two. It can happen internally, externally and somewhere in between. It may be physiological, psychological, sociological and cultural. It can be noise, anger, heat, work, threat, conflict, lack of work, and crowding. It can operate over milliseconds, seconds, minutes, hours, days, months and years. It may produce hypertension, psychological strain, increase in heart rate, inefficiency, 'burnout', fatigue, shifts in attention, hysterical reactions, depression, slower reaction times and relapse in schizophrenics.

This list could be extended, but limited though it is, it still shows the huge number of ways in which the concept and word 'stress' have been used. It is no mistake, or accident that the idea of stress has captured the imagination of both researchers (from a large number of disciplines) and the general public. The word 'stress' sounds scientific, and indeed it's more recent history can be traced back to engineering and physics, where the word stress is used to describe the load placed on an object, and strain, the resultant deformation within the material. Also, the word 'stress' has the quality of sounding like a

complete explanation for many different phenomena. For example, headaches can be caused by stress, crimes can be committed because someone was under stress. On a more scientific level, stress can contribute towards the development of certain illnesses, or stress can cause changes in selective attention.

This thesis is primarily concerned with the idea of stress in relation to illness. However it is important to see this particular use of the stress concept as only one of many possible uses. In order to place stress and illness in the context (both historically and conceptually) of other 'sorts' of stress, this chapter will attempt to trace back the various uses of the term 'stress'. Hopefully, a broad overview will help to clarify some of the problems now being encountered in this particular area.

After a consideration of Hans Selye's concept of stress, and the background to it, the chapter will then go on to look at other concepts of stress by looking at the way in which researchers have used the term 'stress' and how such uses have developed and changed.

2.2 Problems of definition.

"If the word "stress" is to enter the language of biological science, responsibilities

concerning its meaning are entailed." (Wolff, 1953. p. v)

"There exists a widespread inconsistency in defining stress, together with an inadequate concern for meaning." (Howard, 1960, p. 185)

"Perhaps the single most remarkable historical fact concerning the term "stress" is its persistent, widespread usage in biology and medicine in spite of almost chaotic disagreement over its definition." (Mason, 1975, p. 6)

"There are so many uses of "stress" that it may be more confusing than anything else." (Fleming et al, 1984, p. 939)

The quotes above show that same concerns for definitional and conceptual consistency in the use of the term 'stress' have existed for decades. Indeed, the definition of stress has itself been broadened to include the idea that the term can mean many different things to different researchers in the field (e.g. Corsini, 1984; Reber, 1985). Many people have proposed possible solutions to the problem of defining stress, as it has been felt that the lack of similarity in the working definitions different researchers use will only serve to hamper any real progress in stress research (Cofer & Appley, 1964; Fisher, 1984; Lazarus & Folkman, 1984; Levine & Scotch, 1970; McLean, 1972; Neufeld, 1982; Payne, 1978; Ursin & Murison, 1984).

Possible solutions have included making a distinction between different types of stress (Appley & Trumbull, 1967) and between different types of stressor (Howard &

Scott, 1963), concentrating on the "subjective meaning" of stress (Haward, 1960), and even abandoning the concept altogether (Hinkle, 1973; McLean, 1972).

However, the term 'stress' is so popular, and used so widely that it is unlikely that researchers in the field will be prepared to give it up easily, or make a clear distinction between different types of stress (as there is no commonly agreed definition with which to start classifying types). There are many explanations as to why the term "stress" became so widely used.

"It is as though, when the word stress came into vogue, each investigator, who had been working with a concept he felt was closely related, substituted the word stress for it, and continued in his same line of investigation". (Cofer & Appley, 1964)

Others have suggested that the word has acquired "attribution power in popular language" (Ursin & Murison, 1984) such that it can 'explain' diseases and also perhaps objectify and so neutralize certain emotions. (e.g. "I'm just under a lot of stress at the moment.")

Another explanation for the confusion and popularity surrounding the word 'stress' is that despite all the disparity a common element does exist, and it is this common element which can account for the popularity of the term as it encompasses a fundamental process which can

operate on many levels.

If progress is to be made in our understanding of stress, then it is vital that definitional and conceptual problems are cleared up. As shown above, many possible solutions involve the creation of different types of stress and stressor which would not be possible, as no common definitions of stress exist with which to begin classifying. Perhaps a better way of clarifying a very confused and muddled area of research would be to explore what the various uses and conceptions of stress have in common either historically or theoretically. In other words, attempt to integrate and search for unifying threads within the literature. (Fleming et al, 1984)

2.3 Origins of the term 'stress'.

It is generally acknowledged that Hans Selye was the originator of the modern biological or biochemical (Levine & Scotch, 1970) model of stress. It is interesting to note that Selye experienced such "violently adverse public opinion" (Selye, 1956, p. 30) to his use of the term 'stress' around the time of his first publication in the field (Selye, 1936) that he stopped using it for several years. The objections raised were that it would be too

easily confused with popular words, such as 'nervous strain'. Similar objections continue to be voiced some fifty years later.

Despite its biological nature, Selye's conception of stress has influenced research in many areas not directly connected with biochemical research. Frank Engel describes Selye's concept of stress in the following way.

"It has permeated medical thinking and influenced medical research in every land, probably more rapidly and more intensely than any other theory of disease ever proposed." (quoted in Mason, 1975, p. 10)

So although Selye's conception of stress could be viewed as rather limited, as it does not take account of any psychological factors, its influence on Health Psychology, Psychosomatic Medicine, Human Performance, Clinical Psychology, Occupational Psychology and many other areas, is all pervasive. It is important to note that many researchers implicitly suggest that their research is somehow connected to Selye's concept of stress, but completely fail to substantiate these claims. Selye appears in many articles and books in the areas mentioned above, not only in reference sections, but often being asked to write introductory chapters. For example in Psychological Stress and Psychopathology (Neufeld, 1982); Stress research: Issues for the Eighties (Cooper, 1983); Handbook on Stress

and Anxiety (Kutash et al, 1980); Handbook of Stress: Theoretical and Clinical Aspects (Goldberger & Breznitz, 1982); Human Stress and Cognition, (Hamilton & Warburton, 1979); Stress and Psychiatric disorder (Tanner, 1960).

"Researchers in the field had no accepted definition of their stress variables and were, in fact, often assuming that the concept of stress advocated by Hans Selye, which was based on a physiological response pattern, was related to the psychological assessments they were making." (Call to the Conference, 1979, p.5)

A broad way of describing his notion of stress is with the following definition. "Stress is the common denominator of all adaptive reactions in the body" (Selye, 1956). A detailed account of Selye's formulations concerning the nature and meaning of stress will follow later. For the moment however, his concept will be considered historically by looking at earlier research into 'adaptive reactions', which are the antecedents to his ideas. What Selye means by adaptive reactions are those which occur in the General Adaptation Syndrome, outlined in "A syndrome produced by diverse noxious agents" published in 1936.

2.4 Background to Selye's discoveries.

It is recognised by Selye himself (1956, 1973, 1975, 1976 etc) and by many others (Cox, 1978; Fleming et al, 1984; Frankenhaeuser, 1980; Gatchel & Baum, 1983; Kessler et al,

1985; Lazarus & Folkman, 1984; Mason, 1975) that the pioneering work of Claude Bernard and Walter Cannon laid the foundations upon which Selye built his theory of stress: Bernard developing the idea of the internal environment, and its tendency to remain constant, Cannon giving a name to this steady state, homeostasis, and outlining some of the mechanisms by which it is maintained. These findings are crucial as, in a sense, Selye's theory of stress outlines the maladaptive 'side-effects' of homeostatic mechanisms, the "diseases of adaptation" (Selye, 1956).

2.5 A wholistic approach to the organism.

"All the vital mechanisms, varied as they are, have only one object, that of preserving constant the conditions of life in the internal environment." (Claude Bernard, as quoted in J.M.D. Olmsted (1939) p. 290-291)

Claude Bernard (1813-1878) could be thought of as an 'animal chemist' (Holmes, 1974) in that he made important discoveries in digestion and carried out many experiments on the production of sugar in animals. However, the contribution he made to physiology extends beyond the findings, though important, produced directly by experimentation. Physiological research during the 19th century was heavily influenced by mechanistic ideas and by

a scientific method borrowed from the physical sciences. This involved the breaking down of the complex living organism into its parts, studying these in isolation, and then 'restructuring' the whole (Mason, 1972). Such a method was compatible with a mechanistic conception of the organisation of living things, and techniques for studying the integrative processes were not yet available. Despite this, Bernard developed a view of the organism as an integrated whole.

"In spite of the fact that (vital) phenomena are connected with physio-chemical manifestations, the question in its essence is not thereby clarified; for it is not a fortuitous encounter of physio-chemical phenomena which fashions each living being according to a plan and after a design fixed and foreseen in advance, and gives rise to the admirable subordination and harmonious concert of the acts of life. There is in the living body an arrangement, a sort of disposition which cannot be slurred over, because it is really the most striking character of living beings. That the idea of this arrangement is poorly expressed by the word force we agree: but here the word makes little difference, it is enough that the reality is indisputable." (Claude Bernard, as quoted in J.M.D. Olmsted (1939), p. 287-288)

Here Bernard is clearly saying that although living things can be considered to be a series, or collection of chemical and physiological reactions, the 'essence' of what living things are can not be explained in this way.

2.5.1 The stability of the 'milieu interieur'.

Also Bernard considers that the essence, the most striking

feature of living things, is their harmonious arrangement. The idea of harmony and integration within organisms, combined with another feature of Bernard's theory give rise to his notion of the internal environment or the 'milieu interieur'.

"That an exterior environment was necessary to the life of the organism has always been recognised. But I have not observed that anyone before myself has distinguished an exterior and an interior environment. I think that I have been one of the first to propose and develop this idea of the considered as an interior environment of the organic elements." (Claude Bernard, as quoted in J.M.D. Olmsted (1939), p. 290)

So, this other feature of Bernard's theory represents a clear distinction between the internal and the external environment. Given his ideas about harmony and integration within the organism, a third feature emerges. If the organism is to function in a harmonious way, then the cells within organisms must be shielded and protected from the fluctuations in the external environment. Bernard was aware that higher organisms are, to a degree, independent of their external environment when he wrote that "the perpetual changes of the cosmic environment do not reach it (the higher organism); it is not chained to them; it is free and independent." (Quoted by J.M.D. Olmsted (1939), p. 291) This important step in understanding the ability of organisms (higher organisms in particular) to regulate their internal environment produced a number of vital

changes. First, it created an area of research which later became an important influence on modern Physiological Psychology (Blundell, 1975). And second, it was to lead directly to the idea of homeostasis developed by Walter Cannon (Blundell, 1975; Carlson, 1981; Cox, 1978). Without Cannon's work, and the development of the concept of homeostasis, the modern notion of stress and the "diseases of adaptation", as developed by Hans Selye, would not exist (Selye 1956).

2.6 Homeostasis and Cannon.

The link between Bernard and Cannon was clearly seen during the 1930's when Cannon was a prominent physiologist having published his book "The Wisdom of the Body" in 1932. J.M.D. Olmsted's biography of Bernard, written in 1939, states that "Cannon has shown how his many years of experimentation have all been directed to the demonstration of the validity of Bernard's conception of the internal environment." (p. 293)

Cannon's concept of homeostasis was to have a profound effect on many areas of psychology and physiology. A direct effect on some personality theorists (e.g. Stagner, 1951; Mace, 1953; Hartman, 1958; Menninger, 1954a), an indirect

effect on theories of emotion (Cannon-Bard) and, as stated above, a major influence on the modern conception of stress devised by Hans Selye.

2.6.1 Homeostasis as a state.

"The coordinated physiological processes which maintain most of the steady states in the organism are so complex and so peculiar to living beings..... that I have suggested a special designation for these states, homeostasis. The word does not imply something set and immobile, a stagnation. It means a condition, a condition which may vary, but which is relatively constant." (Cannon, 1939, p. 22)

It is clear from this quote that Cannon intended the term 'homeostasis' to refer to the steady state. Other references describing homeostasis as a state do exist. For example, "I have suggested that the stable state of the fluid matrix be given the name homeostasis." (Cannon, 1935, p. 2) Despite this, many think that the term homeostasis, as coined by Cannon, refers to the process by which a steady state is maintained rather than the steady state itself. For example, Cox (1975) says about the steady state that "it's maintenance was referred to by Cannon as homeostasis." (p.54). However, there are some who interpret Cannon correctly. "Cannon proposed the (former) meaning in which homeostasis is synonymous with the dynamic steady-state of the physiological system." (Blundell, 1975, p. 62) Probably the most important misinterpretation of

Cannon's idea was made by Hans Selye, who views homeostasis not as a state, but as the "power to maintain constancy". (1956, p. 12)

2.6.2 Homeostatic mechanisms.

An important distinction can be made when considering the operation of homeostatic mechanisms. Some readjustments which are made to restore homeostasis take place internally and on a physiological and biochemical, 'under-the-skin' level, whilst others require some change in behaviour, or some adaptive response on the part of the organism. Cannon however, saw both types of response as important in maintaining homeostasis.

"If water is needed, the mechanism of thirst warns us before any change in the blood has occurred, and we respond by drinking. If the blood pressure falls and the necessary oxygen supply is jeopardised, delicate nerve endings in the carotid sinus send messages to the vasomotor center and the pressure is raised. If by vigorous muscular movements blood is returned to the heart in great volume.....delicate nerve endings are affected and a call goes from the right auricle, that results in speeding up the heart rate and thereby hastening the blood flow." (Cannon, 1939, p. 288)

According to Cannon, homeostasis is maintained by both internal mechanisms (autonomic nervous system) and actions by which "we move from place to place and strive to alter the world about us as we wish." (Cannon, 1935, p.

2) So while homeostasis itself exists only internally as the stable state of the fluid matrix, those mechanisms which maintain homeostasis operate both internally and externally.

2.6.3 Interpretation of homeostasis.

If homeostasis is misinterpreted as meaning homeostatic mechanisms, then inevitably homeostatic mechanisms will come to be regarded primarily as those which operate internally, to maintain the internal steady state. Although Cannon recognised that a wide variety of mechanisms would operate to maintain homeostasis, those who confused the state of homeostasis with the mechanisms of homeostasis tended to emphasise the biochemical and physiological and internal homeostatic mechanisms. While, as noted above, Cannon gave examples of external homeostatic mechanisms, those which maintained homeostasis by in some way operating on the environment, he was particularly interested in the action of the sympathetic nervous system. Indeed he made an extensive study of the emergency or "fight or flight" reaction.

These two factors, the interpretation of the term 'homeostasis' as homeostatic mechanisms, and Cannon's own interest in the role of the sympathetic nervous system as

one particular type of homeostatic regulator, combined to give an impression of homeostatic mechanisms as being essentially internal and autonomic. This impression was picked up by Hans Selye who defines stress as "the common denominator of all adaptive reactions in the body." (Selye, 1956, p. 54) Cannon's influence is clear. Selye concentrates his attention on adaptive reactions in the body and the key adaptive, or homeostasis-maintaining mechanism he identified was the General Adaptation Syndrome (1936), the first stage of which (called the alarm reaction) is basically Cannon's fight-or-flight response.

So in this way, the concept of stress became firmly fixed as an internal physiological response, the "common denominator of all adaptive reactions in the body." (Selye, 1956, p. 54) Adaptation to stress, became autonomic and located internally.

2.7 A formal definition of stress.

Selye gives an account of how he 'discovered' the concept of stress in his book "The Stress of Life" (1956). He found, by accident that the injection of any toxic agent produced a triad of changes in rats he was testing. These changes were the enlargement of the adrenal cortex; intense shrinking of the thymus, lymph nodes and spleen; and

bleeding, deep ulcers in the lining of the stomach. At first, and to his initial "great disappointment", Selye did not think that such changes produced by any toxic substance could be important, as most medical research was concerned with the particular, specific biological response to a particular harmful agent, such as a virus, so that particular treatments could be found. However, Selye remembered his days as a medical student and how he observed the "syndrome of just being sick". He noticed that although all illnesses produced reactions particular to that illness, there were a number of reactions which seem to be produced by all illnesses. Such as general aches, loss of appetite and intestinal disturbances. In other words, there were specific, and non-specific reactions.

This step was probably the most important in Selye's reasoning. "All the actually observed biologic effects of any agent must represent the sum of its specific actions and of this non-specific response to damage that is superimposed upon it." (Selye, 1956, p. 26) In other words, any harmful agent (an illness, a toxic substance, etc) has both specific and non-specific biological effects. The triad of morphological changes observed were nonspecific to any particular toxic agent. Selye then proceeded to show that he could produce these changes by exposing rats to a

great variety of substances or situations, from purified hormones to x-rays, forced exercise and heat. Selye stated "I could find no noxious agent that did not produce the syndrome." (Selye, 1956, p. 30)

2.7.1 Selye's definition of stress.

Selye then considered how this response would unfold over time and called this process the General Adaptation Syndrome (G.A.S.). (Selye, 1936) This syndrome passes through three stages. The alarm stage, the stage of resistance, and the stage of exhaustion. "The G.A.S. had been recognised and named, but we still had no precise idea of what produced it." (Selye, 1956, p. 37) Selye has previously called the agents which produced it noxious, but he felt that this word was not adequate to describe the varied conditions and substances which produced the G.A.S. "In search of one, I stumbled upon the term 'stress'." So Selye's definition of stress is produced.

"Stress is the state manifested by a specific syndrome which consists of all the non-specifically induced changes in a biologic system. Thus stress has its own characteristic form and composition but no particular cause." (Selye, 1956, p.54)

2.7.2 Problems with Selye's model.

A contradiction can be observed in Selye's use of the word stress. In the first quote, he claims to be using stress to mean the conditions which produce the G.A.S. response, and

in the second, to mean the state (G.A.S.) produced by these conditions. Mason (1975) suggests that Selye was "inclined towards defining "stress" variously in terms of either stimulus, response, or interaction between stimulus and response." (p. 9) It is not only Selye who uses the word in different ways. Pickering (1961) writing about the word stress as an example of "jargonese" states "I find it difficult to express my surprise and horror that contemporary science should tolerate this confusion of stimulus and response." (p. 116) More recently, this problem has expressed itself in a debate about antecedent and outcome variables used in stress research (see Dohrenwend et al, 1984; Dohrenwend & ShROUT, 1985; Lazarus, 1984; Lazarus et al, 1985).

Generally though, Selye's model of stress can be considered to be a response-based model, as Selye, more recently wishes to make clear (e.g. Selye, 1975a, 1980, 1983). There are a number of criticisms that can be made of this model. Probably the most important group of criticisms are those which point out that the model Selye proposes is unworkable for testing relationships between stress and physical illnesses, and the factors which mediate between the two. These problems will be discussed in later chapters. For a general critique of Selye's model, see Mason (1975),

Seyffarth (1960), Hinkle (1973) and in particular the concept of non-specificity see Mason (1971, 1975a), Mason et al (1976).

The crucial points to bear in mind about Selye's concept are that it is a response-based idea, adaptive mechanisms are a response to 'stressors' and operate internally on a physiological level, and that stress is the "common denominator of all adaptive reactions in the body." (Selye, 1956, p. 54)

Whilst Selye was one of the first to use the idea of stress, and probably did more to popularise the term than anyone else, many other areas also make use of the idea of stress. Selye's ideas have received so much attention partly because of the forceful and bold way he has presented his notion of 'stress'. Although many others use the term, they tend not to use it in a precisely defined way, as Selye did. However, by looking at the way that the term 'stress' has been used, we can perhaps begin to understand why the idea of stress is popular, and what apparently incompatible perspectives have in common.

2.8 Psychoanalytic ideas and stress.

Although Freud probably never used the word 'stress', the "dynamic conception of mental life" (Freud, 1943, p. 53) he proposed meant that it was almost inevitable that Freudians, or those influenced by psychoanalytic ideas, would use the term.

Freud does refer to tension, forces and energy that exist between the component parts of the personality, or, "the anatomy of the personality". (Freud, 1946, p.78)

"In this way, goaded on by the id, hemmed in by the super-ego, and rebuffed by reality, the ego struggles to cope with its economic task of reducing the forces and influences which work in it and upon it to some kind of harmony." (Freud, 1946, p. 104)

So Freud speaks of the relations between the id, ego and super-ego in a dynamic, physical sense. Also he views an imbalance or lack of harmony between these components as the cause of illness. "Men fall ill owing to the conflict between the demands of their instincts and the internal resistance which is set up against them." (Freud, 1946, p. 78)

The similarities between this and the concept of homeostatic mechanisms are clear. Although the level on which the mechanisms are operating are very different. In the case of Cannon and Selye these mechanisms operate to restore the 'harmony' of the internal environment. But

Freud envisages harmony and a sort of homeostasis between the id and the super-ego, being maintained by the ego.

However, Freud does accept that the internal physiological state can be a sign of either internal conflicts or an external danger. In describing one of the types of anxiety he identifies (objective anxiety), he mentions the 'flight or fight' reaction (Freud, 1943, p. 330) as outlined by Cannon (1929). Such signals of tension would then alert the individual and allow them to respond in adaptive ways to threatening situations. (Hjelle & Ziegler, 1981)

Freud paid little attention to the ego, compared with the study he gave to the id and the super-ego. (Pervin, (1970); Wollheim, 1971) "Pathological research has directed our interest too exclusively to the repressed. We should like to learn more about the ego." (Freud, as quoted in Wollheim (1971) p. 175) This was written in 'The Ego and the Id' published relatively late in Freud's career.

As Janis (1958) points out, objective anxiety was seen as intelligible by Freud and his followers, compared to neurotic anxiety which originated in the unconscious mind. So Freud was not greatly concerned with 'everyday' objective anxiety, nor was he particularly interested in

the ego, and its attempts to deal with external reality and organise adaptive responses to objective anxiety on a fairly conscious level. Indeed Freud writes of the ego that it "seemed to need so little explanation" (1946, p. 79).

So although Freud didn't use the term 'stress' nor did he really study those phenomena which would lead to 'stress' (in most of the current definitions of that term), he did however provide a framework for later researchers, who did use the term and idea of 'stress'. These researchers also placed more emphasis on the ego (Brown, 1951).

2.8.1 Ego-psychology and stress.

As many of the first ego-psychologists were German, and wrote in German (e.g. Hartman, 1958 (written around 1938)), they did not use the word 'stress'. Selye points out that he began to use expressions such as 'le stress' in France, 'el stress' in Spain, and 'der stress' in Germany, so it would appear that there was no equivalent in these languages (1956, p. 42). But they looked at a strongly related concept, that of adaptation. Heinz Hartman in his monograph "Ego psychology and the problem of adaptation" (1958) identifies and names for the first time the "conflict-free ego sphere for that ensemble of functions which at any given time exert their effects outside the

region of mental conflicts." (Hartman, 1958, p. 8) The attention given to the conflict-free ego sphere reflected a desire amongst psychoanalytic psychologists to understand the total personality, rather than the abnormal personality (Hartman, 1958, p. 3) or just the unconscious parts of the personality. Also, these psychologists were interested in how people coped with or adapted to 'real' tensions (or perhaps stresses) that were outside the intrapsychic conflicts between the id, ego and superego. Any theory of personality would be incomplete if it could not explain and include the adaptive responses made to external 'rational' dangers (Janis, 1958) as well as threats and dangers posed by, for example, the fear of castration during the phallic phase (Freud, 1946, p. 116).

So during the fifties and sixties, papers appeared with titles such as "Regulatory devices of the ego under major stress" (Menninger, 1954) and "Experimental reduction of stress based on ego-defense theory" (Speisman et al, 1964) and books which used the term stress in a psychoanalytic context, for example "Psychological stress: Psychoanalytic and behavioural studies of surgical patients" (Janis, 1958).

These researchers used different definitions of stress,

Janis (1958) using the term to mean both the situation (stimulus) and the response (reaction) and Menninger (1954) mainly referring to stress as a stimulus. Also the situations they referred to as stressful were rather different. Janis (1958) was mainly concerned with "severe stresses, the effects of which last for weeks, months, or even years" (p. 13). Menninger (1954) considers the whole range of 'stressors' from those which produce an "increase of alertness, irritability" (p. 160) to those which produce complete disorganisation of the personality. Speisman et al (1964) on the other hand, use a controlled short-term stressor generated from watching a motion picture film.

The link in these studies is that they all considered the psychological response of the individual to be an important indication of the stressful nature of the situation or stimulus. Previous definitions, and definitions which were physiologically based, took the physical or biochemical response of the individual or organism as the best judge of the 'stress' an organism was experiencing. If no physiological response was present, no stressors could be present. For example "a stressor is naturally that which produces stress".(Selye, 1956, p. 64)

This did a number of important things. First it helped to

re-define stress as a psychological as well as a physiological concept. Second, it created a general notion of 'coping'. That is, the individual attempting to adapt to changes occurring in their environment. The environment in this sense means both physical and psychological, internal and external phenomena. Third, the notion of coping helped to introduce the idea of "mediating processes" (Janis, 1958). That is, processes that mediate between stressful events, and the reactions to those events. Although coping processes in themselves could be considered to be reactions to stressful events, the mediating role of coping, as indicated by Janis (1958) is between the stressful events, and the long-term outcome, or consequence of a stressful event in terms of, for example, illness or changes in the level of neurotic symptoms. (Brill & Beebe, 1955)

Coping is a crucial part of the idea of stress. In order to study coping, some kind of repertoire or taxonomy of various coping strategies or behaviours is required. This was provided by ego-psychologists such as Anna Freud who wrote "The ego and the mechanisms of defence" (1937). Although Freud did establish the idea of 'mechanisms of defence' it was only later that a clear description and categorisation of these defences emerged (Mowrer, 1940).

A psychoanalytic taxonomy of defence mechanisms (or coping mechanisms) was used by Janis (1958) to describe the reactions of patients as they prepared for a surgical operation. Also a psychoanalytic approach was used to describe soldiers' reactions to war in "Men under stress" (Grinker & Spiegel, 1945) and "War Neuroses" (Grinker & Spiegel, 1945a).

2.8.2 Stress in the laboratory.

A psychoanalytic taxonomy of coping strategies was used in some of the first laboratory studies into 'stress' (Lazarus et al, 1962; Speisman et al, 1964). Those laboratory studies of stress which did not look at coping responses still had a psychoanalytic, ego-psychology 'flavour' about them. Berkun et al (1962) as part of a project called "Task FIGHTER" set up to "study the causes of behavioural degradation under psychological stress" (p. 1) used the terms denial, projection and suppression as descriptions of some of the "categories of defensive functioning" (p. 16). Beier (1951) defines stress as "the perception of threat, with resulting anxiety" (p. 1) in a study which examined the effects of perceived threat on the flexibility of intellectual functioning. Eriksen et al (1952) related performance under stress to various personality measures such as the Rorschach test. Many other studies concerned

with the effects of stress on performance were not at all psychoanalytic and took as their starting point a basic interest in human efficiency under stress and the implications of this for the selection and training of personnel. These studies will be discussed later in this chapter.

2.8.3 Ego psychology and adaptation.

More recent ego psychologists have used classifications of ego processes (or coping mechanisms) to look at a broad array of naturally occurring psychological stressors and the way in which people adapt to these using ego mechanisms. Vaillant, in "Adaptation to Life" (1977) looked at the development of a group of men over some thirty years. These subjects were part of the Grant Study set up in 1937 to examine the lives of healthy individuals rather than those who had in some way become ill. This represented a view that the study of disease had focused too narrowly on those who already suffered from disease or ill-health and did not include a study of those apparently healthy people who did not show signs of illness. It also reflected a view that health and illness should be considered as existing on a continuum, rather than as mutually exclusive states. This study became an inquiry into how people adapted to life. Vaillant states that "most of

what is called illness in textbooks.....are merely outward evidence of inward struggles to adapt to life." (Vaillant, 1977, p.369) Ego mechanisms are employed to keep affect in bearable limits during life crises, to restore emotional balance by controlling biological drives, to obtain a 'time-out' to master changes in self-image, to handle unresolvable conflicts with people, and to survive conflicts of conscience. These categories of events and situations can be considered as stressful, in that they result in the deployment of ego mechanisms.

Another ego-psychologist who has studied ego mechanisms in relation to stress is Norma Haan. In "Coping and defending: Processes of self-environment organization" (1977) she outlines the function of the ego in coping with stress, and adapts her coping or ego repertoire much more to a full range of stress situations. Whereas Vaillant (1977) concentrates on long-term, fairly intrapsychic stressors, which require long-term adaptation, in contrast, Haan attempts "to describe a psychology of how people process stress, irrespective of content, and to do so in sufficiently general terms to encompass the stress effects of deprivation, overload, intensity, and complexity, and to make the description applicable to acute, chronic, and developmental stress phenomena." (Haan, 1977, p. 167) Also

she states that "stress can be defined only in a circular fashion" (Haan, 1982, p. 257). From these two statements, it can be seen that Haan takes a broad and general view of stress processes and so her view of ego processes is rather more sophisticated. A major division in her classification of ego processes is between coping and defence. Coping is classified as an attempt to overcome difficulties on equal terms, as contrasted with defence which is a way of protecting the ego and preventing any straightforward 'tackling' of the problem.

These researchers, along with Hartman (1958) are primarily concerned with long-term adaptations. Because of this, the term 'stress' is not always used, as it almost implies a special class or group of situations or events. Such ego psychologists are however concerned with, as Vaillant (1977) describes it, adaptation to life, and so adaptation to all kinds of situations and events, not just those which must necessarily be described as stressful. Also they are concerned with the adaptation of the 'whole' personality (or person) while others limit their observations to the adaptation of particular systems within the individual (e.g. biological systems) or particular environments the individual experiences (e.g. social, work).

So, on the whole, those psychologists who use the idea of ego-mechanisms, adaptation, and stress use circular or interactive definitions of stress. However, it could be said that they tend to use a response-based definition of stress as there is an emphasis on a classification of ego mechanisms as 'responses' to stresses placed on the individual, originating either from external, objective sources or from internal, intrapsychic conflicts. More will be said in later chapters on coping in relation to ego mechanisms.

2.9 Man as machine.

Another major area where the term 'stress' is used frequently is in relation to human performance. This area looks at an individual in terms of their various abilities and functions as operators or workers in very particular tasks or situations. Stress is used as a variable which usually decreases the subjects ability to perform the task efficiently. So stress is nearly always considered to be an external stimulus which interferes or distracts the subject, preventing them from performing as well. This perspective on stress and human performance has arisen mainly from military and industrial needs.

2.9.1 The war-machine and the work-machine.

Bartlett (1927) in "Psychology and the soldier" identifies three groups of problems related to the army which the psychologist can attempt to solve. Two of these three are related to what we might describe as 'stress'.

The first relates to the prediction of "mental collapse or disorder if he is subjected to the strain of trench warfare under normal modern conditions." (Bartlett, 1927, p. 11) In other words, how far the soldier can be pushed before they "crack and break under certain conditions". (p. 10) This very clearly uses the 'engineering analogy' of stress, mentioned above and elsewhere (e.g. Cox, 1978; McLean, 1972). Stress is viewed as an external force which produces strain in the individual, such strains then produce 'cracks' and 'breaks'. However, these breakdowns usually result in long-term "conversion hysteria and anxiety neurosis" (Bartlett, 1927, p. 189) and this use of the idea of stress will be discussed in the next section on stress and illness.

A second type of problem is that of "choosing and training the recruit" (Bartlett, 1927, p. 11). This means testing recruits for intelligence and particular abilities, but also looking at how those abilities and skills will be

affected by various conditions met in the field. Freeman (1945) describing the applications for the "standardized 'stress' test" (p. 3) says that the test "now requires validation in connection with combat flight success." (p. 11) The test requires the subject to perform two simultaneous sensory-motor tasks which are difficult to perform together. In the stress condition, subjects were required to perform these tasks whilst being distracted by sounds. In this study, stress was seen as the distracting sounds produced in the stress condition. Berkun et al (1962) also observed the effects of stress on performance. The stress situations were generated by deceiving new army recruits. They were told that they had accidentally injured someone by wiring a detonator wrongly or that they were in the middle of an nuclear fallout shower, due to an accident or any one of a number of other situations. The performance measures taken were, for example, the time taken to follow an emergency procedure involving the rewiring, or operation of a complex piece of machinery. Other studies which used a stress-performance model were not motivated solely by an interest in the military and industrial applications of research.

"Not only does this general problem (performance under stress) have important applied implications..... but it

is of considerable theoretical importance." (Lazarus & Eriksen, 1952, p. 100, my brackets) Stopol (1954) in a study which looked at subjects' ability to tolerate stress, used distraction stress (loud bell and flashing light) and failure stress (critical or encouraging remarks before each trial) while subjects performed a digit-symbol test. Lazarus & Eriksen (1952) also used a digit symbol test whilst subjects experienced 'failure stress', imposed by giving subjects impossibly difficult trials. The subjects' failure is followed by the experimenter telling them that they should have finished that trial. Pronko & Leith (1956) present the first review of stress to appear in the psychological literature. They state that:

"the recent profusion of experiments on "stress" have a striking novelty about them. They almost suggest that a new behaviour has been discovered in the psychological laboratory. Indeed one searches in vain for "stress" in issues of Psychological Abstracts of 20 years ago or so." (Pronko & Leith, 1956, p. 205)

They go on to identify three main sources of the work on stress. These are experiments on stress and perception; stress and performance; and stress and personality variables. They also point out definitional problems that existed even then. Showing that "stress" was used variously to refer to behaviour in an individual (to induce stress), the stimulus, or the situation (behaviour under stress). Within stress and performance research, 'stress' is nearly

always used to refer to some aspect of the experimental situation which somehow interferes with, or disrupts the task or activity the subject is performing.

This traditional model of stress and performance is still going strong today (e.g. see Hamilton & Warburton, 1979; Hockey, 1983) but with a greater degree of sophistication in both the tasks used and models and explanations produced (e.g. Sanders, 1983; Thayer, 1978). Also, many areas of ergonomics have developed out of early work on stress and performance, and examine many environments and situations as 'stressors' (e.g. Welford, 1974). It should also be noted here, in the context of stress and performance, that very often the concepts of activation and arousal are used in a very similar way. So, for example, Broadbent (1971) in "Decision and Stress" talks about the arousal theory of stress, in other words, stress producing an increase in arousal. This can be combined with the Yerkes-Dodson law, or the inverted-U shaped relationship between arousal and performance. For any task, there will be an optimum level of arousal which produces the best performance. Any increase or decrease in the level of arousal will result in a degradation of performance level. This is, not surprisingly, an oversimplification of the relationship between performance and arousal, as has been pointed out by

a number of theorists (Hockey & Hamilton, 1983; Eysenck, 1984). Despite the inadequacies of the Yerkes-Dodson law, it is an important part of the idea of stress as it is used by researchers in this area, as other uses of the idea of stress often assume that any level of stress is 'bad' and places demands on the individual. In this area, stress is used more along with ideas such as activation (Thayer, 1978) and arousal which are assumed to be necessary for normal functioning. However it should be emphasised that notions such as stress and arousal are by no means synonymous as recent research indicates (Cox & Mackay, 1985; Mackay et al, 1978).

The important aspects of the way in which researchers from this area use the concept of stress can be extracted from the early experimental models this work is based on. These view the individual as a skilled performer, in a particular environment. Stress operates to interfere with or disrupt the performance of the task. However, as said above, when stress is linked with the more physiological concepts of arousal and activation, stress only becomes a disrupter of the task when there is too much (overstimulation) or too little (understimulation, boredom).

2.10 Disease and health.

The idea that psychological and emotional factors can contribute to physical illness is not a new one (Lipowski, 1984). However, the use of the term 'stress' to describe the processes, states, and conditions which may cause illnesses in this way is relatively new. It is this use of the term stress I shall be most concerned with in the thesis, but I also hope to show the relationship between many different uses of the term.

Hinkle (1973) quotes Sir William Osler speaking in 1910 about "Angina Pectoris" and its causes, saying that "stress and strain seems to be a basic factor in so many cases." (p. 33) Although this source might seem relatively old, it was not really until the 1950s that the word was used again in the same way. The rise in psychosomatic medicine, marked by the emergence of the journal "Psychosomatic Medicine" in 1939, one of the aims of which was to look in detail at the relationships between emotional life and bodily processes (Lipowski, 1984), indicates that more interest was being paid to psychological factors in illness. Also, a more multicausal model of health and illness was being adopted around this time (Weiner, 1982; Lazarus & Folkman, 1984). A series of papers published by Harold Wolff and others (e.g. Wolff et al, 1948; Wolff, 1950) used the term 'stress' to

indicate extreme situations and the physiological reactions they produced. These preceded the publication of the book "Stress and Disease" (Wolff, 1953) which had a large effect on psychosomatic research (Lipowski, 1977, 1977a). Psychosomatic concepts before this had been influenced largely by the work of Freud and other psychoanalytic theorists who used the idea of conversion to explain many of the relationships between mental phenomena and physical symptoms (Wittkower, 1977). Wolff presented a more psychophysiological approach which emphasised the interaction of the individual with their cultural or social environments, as opposed to their intrapsychic environments (Macleod et al, 1954).

Wolff (1953) defines stress as "the internal or resisting force brought into action by external forces or loads" (p. v). Although this definition appears at first to be a response-based type, Wolff goes on to say that "the stress becomes the interaction between external environment and organism" (p. v). This apparent confusion was cleared up some years later when Wolff wrote: "I have used the word stress in biology to indicate that state within a living creature which results from the interaction of the organism with noxious stimuli or circumstances, i.e. it is a dynamic state within the organism; it is not a stimulus,

assault, load, symbol, burden, or any aspect of the environment, internal, external, social or otherwise." (Wolff, (personal communication), quoted in Hinkle, 1973) It is clear then, that Wolff intended the term 'stress' to mean an internal state, but a dynamic one, and one which was a result of an interaction between the organism and the environment.

The use of the term 'stress' in relation to both physical and psychiatric illness is still widespread today. Although researchers within this field use the term in different ways, they still tend to use terms such as 'life stress' (e.g. Gunderson & Rahe, 1974; Susser, 1981; Menaghan, 1983) and 'life experiences' (e.g. Kasl, 1983; Sarason et al, 1985). These terms emphasize an important aspect of Wolff's original concept in which stress is a dynamic state brought about by an interaction between the organism and the environment, an environment which includes cultural factors, family influences, work factors etc (Wolff, 1953). By talking about 'life stress' and 'life experiences', the broad sense in which Wolff referred to the environment, (an environment which includes many varied experiences), is preserved.

"The stress accruing from a situation is based in large part on the way the affected subject perceives it; perception depends upon a multiplicity of factors including the genetic

equipment, basic individual needs and longings, earlier conditioning influences, and a host of life experiences and cultural pressures." (Wolff, 1953, p. 10)

Although stress as a state is a psychophysiological concept, the causes of stress are social and cultural as well as individually psychological, as the above quote shows.

The term 'stress' as it is used in research on health and disease is essentially a broad concept, moving from the physiological to the psychological to the social and cultural. This broad sense of the term 'stress' has not come about because of inaccuracy or imprecision on the part of researchers in the area. It is merely a result of the idea that illness and indeed health come about through a complex interaction or transaction between the organism and all environments (e.g. social, physical etc) that organism deals with.

2.11 Summary and conclusions.

There are many definitions of stress. Indeed so many that some feel that the wide range and diversity of definitions inhibits any real advancement in areas of stress research. Solutions advanced by various theorists include clearly segregating the different meanings and abandoning the use of the term altogether. However, a different solution to

this problem, and one which also helps to put research into a context, is to examine the historical and conceptual roots of the various uses and definitions of the term 'stress'.

In this chapter, four main origins of the idea of stress were discussed:-

1. Biological or biochemical ideas of homeostasis and homeostatic mechanisms in the work of Bernard, Cannon and Selye. Bernard conceived the idea of the 'milieu interieur' to explain the internal stability of the organism despite varied environmental conditions. Cannon introduced the notion of homeostasis as the dynamic steady state of the organism and homeostatic mechanisms as any process by which the organism attempts to maintain this dynamic equilibrium. In Selye's work, stress is a non-specific physiological adaptive response to demands placed on the organism by any 'noxious' stimuli. In other words, stress is the common denominator of all adaptive reactions in the body.

2. Psychoanalytic ideas from Freud led other researchers such as Hartman and Menninger to consider the role of the ego as a homeostatic regulator. Maintaining some sort of dynamic 'harmony' between the id, super-ego and external

reality. The dynamic conception of mental life proposed by Freud made it almost inevitable that the idea of stress and strain would enter the vocabulary of those who followed psychoanalytic ideas. Also, ego-psychologists concerned as they were with the adaptive role of the ego, developed the first ideas of ego or coping mechanisms. These mechanisms were examined experimentally in the laboratory as well as through long-term studies looking at the adaptive role of the ego over the life-span. Stress is defined variously, but is closely linked with the idea of ego mechanisms, in that they are used in response to stress, and operate in situations of stress.

3. A third use of the idea of stress comes from a tradition in applied psychological research. The impetus for this research came from military and industrial sources where information about the abilities of soldiers and workers to 'perform' certain activities was required. This involved not only the question of 'how much' an individual could take in terms of extreme demands being placed upon them, but also in what ways task demands could be altered and tailored to facilitate the most efficient performance possible. Stress is usually viewed in an experimental context as a stimulus which somehow interferes with or disrupts an ongoing activity and which will have an effect

(usually detrimental) on measures of performance such as reaction times, and number of correct responses.

4. One of the major uses of the idea of stress is in connection with illness. Although it has been recognised for a very long time that social and emotional life can have an effect on peoples' health, it is a relatively recent development to use stress to explain this relationship. It is used by many researchers in areas such as occupational psychology, psychosomatic medicine, health psychology and epidemiologists as a construct to relate an individual's experiences to their health. In this context then, stress has a fairly broad usage and refers to lifestyles, occupations, particular events, the condition of the individual and so on.

These four uses of the term 'stress' represent the historical and conceptual origins of the term as it is used today. In some areas, this concept still remains popular, whilst in others its use has declined. Mason (1975) states that "the popularity of stress concepts has gradually dwindled away in the physiological field during the past 15 years, while the use of stress terminology and concepts has continued to flourish in the psychological and social sciences." (p. 11) One psychological area where the term

has not flourished so well is in psychoanalytic thinking. This is because the concept was adopted in the context of functioning ego or defence mechanisms. Stress was assumed to precipitate the use of ego mechanisms, and hence the function of the ego was to regulate or maintain homeostasis in the face of stress. The central concern of ego psychologists was in the function and mechanisms of the ego. The acceptance that stress was a sufficient cause to set such mechanisms in motion is relatively unproblematic.

Those research areas which still use the idea of stress, (mainly the performance and psychosomatic areas), tend to view the definitional and conceptual problems mentioned at the beginning of this chapter in very different ways. The stress and performance area does not really face conceptual problems in interpreting stress as it uses laboratory based 'stressors' to affect performance on a clearly defined task which can be neatly scored and rated. Changes observed between stress and non-stress conditions then can give information about presumed cognitive processes and how they may be affected or not by this 'interference'. For these researchers, stress becomes an experimental tool or manipulation, it is generally a condition of the environment set up by the experimenter to find out about performances on tasks which may use motor skills,

information processing skills, cognitive skills or any combination of these. Hence, the idea of stress in this context is not one which requires careful consideration by most researchers in this field.

The stress and illness research area, on the other hand, faces serious difficulties in conceptualizing stress and obtaining measures of stress to correlate with various illnesses. For this group of researchers, stress takes on a very different meaning. They are not using it only as a peripheral construct, as just a stimulus or a sufficient cause to precipitate the phenomena of real interest (performance skills and ego processes), they use it in a substantive sense. Although stress can be thought of as precipitating illness, and therefore used in a similar sense to the other areas indicated above, there is not considerable interest in illness itself, but the link between the two. The interest lies in the relationship between stress and adaptational outcomes such as psychological symptoms and illness. Concerns for understanding the nature of stress (as it affects health) are expressed through issues of measurement. Such concerns can be seen in the number of papers which propose different ways of assessing or measuring stress as it relates to health outcomes (e.g. DeLongis et al, 1982; Dohrenwend et

al, 1984; Eckenrode, 1984; Monroe, 1983). Such issues will be discussed further in the following chapters. It is this use of the idea of stress in the context of stress and health, that will be discussed in this thesis. This particular use of the idea of stress has been chosen mainly because it is the only area in which the nature of stress is seriously considered, mainly because of the reasons stated above.

Despite the differences in the various conceptualizations of the idea of stress indicated above, there is a way in which the different meanings can be understood within one broad framework. This framework will be discussed at length in the concluding chapter, but a brief description of it here may help to integrate the confusing and disparate range of areas which use the term and idea of stress. Although this thesis will deal mainly with only one or two areas which use the idea of stress, it is nonetheless important to have a broad perception of where such ideas originated, and to be able to place those ideas historically and conceptually.

All researchers who use the term stress, even though they may be referring to a stimulus, response or interaction, are examining a crucial common process, that of adaptation.

All research into 'stress' can essentially be seen as research into how organisms adapt.

This could mean adaptation to a huge range of situations, stimuli and events, and could take place over any kind of time frame, and could be psychological adaptation, physiological adaptation or even perhaps social adaptation. It is not surprising that so many researchers use the term 'stress'. Adaptation is generally defined here as any attempts made, on any level in response to characteristics of the environment, to restore a previous level or move to a new level of functioning. Such adaptive responses can be automatic readjustments, or conscious thoughts and actions, and can operate on many levels, from the molecular to the social. Researchers usually look at a small part of the general process of adaptation, and usually only look at adaptation on one very particular level. This theme will be greatly expanded in later chapters. But what 'stress' means for all researchers is some part of the adaptive process.

In this chapter I have attempted to show the origins of some of the various research traditions which use the idea of stress. Although such traditions have many differences, they have important similarities which can help us to understand why the term and concept of stress is popular

despite the many problems the use of this concept can entail. These similarities can also help us to disentangle some of the problems experienced within a particular tradition of stress research, that of relating illness to stress.

CHAPTER THREE
STRESS AND ILLNESS

3.1 Introduction.

This chapter is concerned with the way in which the idea of stress has been conceptualized, developed, and applied in a very broad range of research which has explored the relationship between psychological factors such as personality and the psychosocial environment, and illness.

Whether stress is implicated or not as a factor in any particular illness will depend to a large extent on the particular theory of illness proposed, and if specific or multicausal models of disease are adopted. In relation to this a brief discussion of some theories of disease causation will be included in the first section of this chapter.

It is important to note at this point that throughout this chapter the terms disease, illness and symptoms will be used to refer to both physical and psychological symptoms as much of the work in this area uses rather general measures of health which include both 'types' of symptoms. Such general measures of illness or disorder have been criticized because many researchers claim that stress-illness relationships vary across particular disorders and so must be studied within specific disorders

(e.g. Deupe & Monroe, 1986; Hinkle, 1977).

After a brief discussion of some theories of disease and the origins of psychosomatic medicine, the chapter will then continue to explore the background to stress-illness research and examine the efforts that have been made over the years to measure and assess life stress.

In contrast to the previous chapter which looked at the wide range and diversity of stress concepts, this chapter will be concerned with the stress concept within a particular range of research, where debates about the meaning and measurement of stress take on a degree of importance not found in other areas. It is vital that a causal link can be established between stress and illness rather than just correlations between measures of stress and measures of illness. To do this requires theoretical advances in research as well as the refinement of measuring instruments (Brown, 1974). There has been increasing interest in theoretical issues in this area. Two books on stress and illness (Dohrenwend & Dohrenwend, 1974; Dohrenwend & Dohrenwend, 1981) which represent current research interests in the area, showed a marked increase in theoretical interest, with the second book devoting almost all its chapters to theoretical and methodological issues

(Kasl, 1983).

3.2 Theories of disease causation.

As mentioned above, the particular theory of disease adopted will depend, to an extent, on the particular condition being examined. However, there is also a sense in which explanations for disease are independent of the particular illness under consideration.

Dubos (1970) uses the example of the common cold. Theories to explain the cold are varied. The cold weather, exposure to a virus and the state of receptivity have all been put forward as explanations of why people 'catch' colds. However, tests have shown that none of these is sufficient to produce cold symptoms. This is not because any one of these explanations is wrong as such, it is the assumption that there must only be one causal agent which is incorrect. Exposure to a particular virus is only a necessary condition and not a sufficient one. In order for a cold to develop, a large number of factors, including the weather and receptivity must be present. This example shows that many factors must be taken into account when explaining the cause of any particular illness. "Multifactoral etiology is the rule rather than the exception" (Dubos, 1970, p. 105). So the first point to be

made in relation to theories of disease is that they should be multifactoral, or multicausal.

3.2.1 Historical background.

This multicausal approach to disease has not always been, and still is not accepted fully by many medical practitioners. A brief look at texts on the history of medicine (e.g. Guthrie, 1945; Major, 1954) shows that a great variety of explanations have been put forward for disease causation. Many of these have tended to be rather specific in nature. This well recognized (Dubos, 1959; Lazarus & Folkman, 1984; Selye, 1956; Zegans, 1982) feature of medical research and practice is relatively new, originating with the discoveries of Virchow and Pasteur.

Virchow (1821-1902) undertook many investigations of pathology in cells. He located disease on the cellular level, but before this, it had been thought of as occurring on the level of particular organs or tissues (Major, 1954). This change in emphasis led the way for Pasteur.

Pasteur (1822-1895) made a major breakthrough when he implicated bacteria and microbes in the causation of disease on the cellular level. This idea came to be known as the germ theory of disease. The notion of selectivity in

chemical and biological reactions was always central in Pasteur's research (Dubos, 1961), and the germ theory of disease encouraged the search for single specific causes for every disease (Lipowski, 1984). The great success of vaccines and antibiotics in preventing disease and infection in humans, animals, and plants did two things. First it established the idea of specificity in disease causation, that for each disease there is one cause. Second, as the single cause Pasteur, Virchow, Koch and others identified was bacteria or microbes, the focus for thinking about disease became external to the organism.

Many factors which affect the organism's resistance to disease were ignored as attention was paid to the characteristics of the infective micro-organisms themselves (Dubos, 1961). Although Pasteur was criticised for paying too little attention to factors within the organism itself, he was aware of the organism's ability to resist disease and the conditions which might lower resistance (Selye, 1956). These environmental conditions were referred to by Pasteur as the "terrain" (Dubos, 1961). He also suggested that the mental state of the patient may affect the course of an illness (Dubos, 1961). So although Pasteur's discoveries encouraged a single cause theory of disease, he was personally aware of the great number of factors that come

together to produce illness and disease.

It is interesting to note that in many other cultures and societies a multicausal approach to disease causation is adopted. The causes cited include not only supernatural forces but also theories of stress in terms of strain and overexertion (Murdock, 1980).

From the earliest records of medical practice it can be observed that medical practitioners looked for many causes of disease and were not limited by single-cause conceptions of disease. For example, Hippocrates (460-355 B.C.) considered such factors as the water supply, the soil, the habits of the people and the climate to be important (Guthrie, 1945). Obviously a large number of factors can and should be taken into account when considering the cause of a disease. One of these factors is the psychological characteristics of the individual or their environment. The idea that psychological factors can contribute to disease (the psyche affecting the soma) is the assumption made in all stress-illness research. The idea of 'stress' is a shorthand way of assessing and describing some of the psychological factors involved.

3.3 Psychosomatic influences in medicine.

A definition put forward by Lipowski (1977) of psychosomatic medicine contains three parts. First, it is the scientific study of the relation among psychological, social and biological factors in determining disease. Second, it takes a holistic approach to the practice of medicine. And third, it practices consultation-liason psychiatry. Whilst only the first element of this definition will be considered, it is important to see that psychosomatic medicine is part of a broader movement which also includes health psychology (e.g. Gatchel & Baum), clinical health psychology (e.g. Millon et al, 1982; Karoly, 1985), and behavioural medicine (e.g. Davidson & Davidson, 1980) which attempt to relate psychology to medicine, health and illness both in theory, research, and in medical practices.

Historical surveys of psychosomatic medicine reveal that there have been many developments in the ideas and concerns of workers in this field (Lipowski, 1984; Wittcower, 1977). Therefore a brief history of the role of psychosomatic ideas in medical thinking will clarify the position of psychosomatic medicine today, and more importantly the place and origins of ideas of stress in medicine.

Although much of the research into the relationship between stress and illness is not 'psychosomatic' in that it is not part of the modern psychosomatic movement, (stress research can be seen as a movement in itself), the goals it pursues are very similar to those in psychosomatic medicine, and it shares many of the assumptions developed by those who shaped and created psychosomatic medicine. As I will try to indicate, some knowledge of the history of psychosomatic medicine is essential if we wish to understand the nature of stress-illness research today, and the problems it faces.

3.3.1 A brief history of psychosomatic medicine.

One of the basic premises of psychosomatics, that psychological factors will influence health, is a very old idea. For example, Socrates (496-399 B.C.) and Galen (131-201 B.C.) made reference to this premise (Wittkower, 1977). This premise arises from a consideration of the way in which the mind and body interact (Lipowski, 1984; Margetts, 1954; Millon, 1982).

"Writers on psychosomatics have traditionally, if not always logically and consistently, affirmed their antidualistic stance and tended to opt for some sort of monism, arguing that mind and body are one, or are merely separate aspects of a person, or of the organism as a whole."
(Lipowski, 1984, p. 154)

As said above, the idea that the mind and the body can not

be separated when considering the cause and cure of disease is a very old one, but its role in medical thinking gradually dwindled, only to surface again in relatively recent history. The reasons for this are varied and complex, but some developments in philosophical thinking can be identified as having a large effect on medical thinking. Descartes (1596-1650) introduced two related ideas that helped to reduce the importance given to psychological factors in medicine.

The first of these was mind-body dualism. Descartes considered that the only two types of substance that exist are thought (self-conscious) and material things. These two substances were so different in nature that he could not see how one could affect the other (Speake, 1979). From a dualistic point of view it is very difficult to imagine how thoughts (as abstract, non-material entities) could have an effect on physical things such as the body. Although this relationship may seem unproblematic, (it is 'obvious' that the mind can affect the body), it still exists today, but in a much more sophisticated sense. (For example, see Biro & Shahan (1982) and Dennett (1979) where debate on mind-body problems are discussed in terms of the interrelations between mind, brain, internal representations and behaviour.)

The second idea introduced by Descartes was mechanism applied to the human body. Descartes in his 'Discourse on Method' describes the human body as "a machine made by the hand of god." This view of the human body had a great influence on medicine (Guthrie, 1945) and encouraged the view that for every disease there is a single specific cause (Lipowski, 1984).

These two ideas combine together to give a picture of the human body as a complex machine where the mind or soul is distinct from the physical machine-parts of the body. Given this, the concern of medicine was to understand the mechanisms of the body by looking at individual parts and their relations. Within this framework, there is little room for the mind, which after all was not 'physical', and so did not contribute to the workings of the body.

"If I consider man's body as being a machine, so built and composed of bones, nerves, muscles, veins, blood and skin, that although it had no mind in it, it would still move in the same ways that it does at present." (Descartes, Sixth Meditation.)

For Descartes, the body would continue to function normally without the mind. The influence of this idea on medicine means that disease and illness can be looked upon as almost mechanical faults which are distinct from and not influenced by mental events.

Such philosophical ideas are only part of the reason for the rejection by medical thinkers of psychosomatic ideas. As mentioned in the previous section discoveries made by cellular pathologists such as Pasteur had a large effect on medical thinking. R.J. Rather, writing on the mind and body in medicine, states that the advent of cellular pathology resulted in:

"wiping out recollection of the attention accorded to mind-body relationships. Hence, psychosomatic medicine in our time has appeared to many as a new and almost unprecedented movement in medical thought." (R.J. Rather, as quoted in Z.J. Lipowski (1984), p. 160)

Two factors have now been identified as the reasons for the decline in psychological thinking in medicine. First, medical discoveries made by cellular pathologists drew attention away from both a multicausal and psychosomatic approach to disease. Second, the philosophical positions of dualism and mechanism, outlined by Descartes.

As the above quote by Rather suggests, the recent resurgence of psychosomatic ideas has been viewed as a new area of thought, whereas in fact such ideas are very old, and examples of medical writings where psychological factors are implicated in the etiology of disease are common. For example Osler (1898) recognises that the emotions can play a part in causing disease. In a book

first published in 1807 called "Dr Buchan's domestic medicine; or a treatise on the prevention and cure of diseases" there is a section titled "of the passions". In this Buchan writes:

"The passions have great influence on both the cause and cure of diseases. How the mind acts on the body will in all probability ever remain a secret. It is sufficient for us to know, that there is established a reciprocal influence between the mental and corporal parts, and that whatever hurts the one disorders the other."
(p. 135-136)

Although many individual medical practitioners were well aware of psychological factors in disease and illness such knowledge did not, (and perhaps still has not), become part of scientific medicine. It is difficult to 'prove' in a scientific sense that psychological factors influence disease, so although psychosomatic thinking may implicitly be accepted by medical practitioners it does not have the legitimacy of other sorts of medical knowledge. It remains, as Lipowski (1977a) describes it, part of "medical folklore". Another important factor in this respect is that for the most part medical practitioners are required to cure and treat illness. Psychosomatic medicine is more about prevention than cure, searching for the causes of chronic disease rather than removing the symptoms of acute illness.

It was not until psychosomatic medicine could appeal to 'harder' facts about the relationship between psychological states and physiological reactions that it began to take off as a discipline in its own right.

3.3.2 Recent developments in psychosomatic medicine.

The last section was concerned with the general background to psychosomatic ideas. This section deals with discoveries made by particular individuals which helped to establish psychosomatic medicine. The 1920s and 1930s have been identified as the beginnings of modern psychosomatic medicine (Macleod et al, 1954; Lipowski, 1984).

According to Lipowski (1977a) from the 1920s onwards the psychosomatic field followed two major directions. The psychodynamic or psychoanalytic, and the psychophysiological. These two strands of research will be discussed in turn.

3.3.3 Psychoanalytic approaches.

Psychosomatic ideas followed from Freud who postulated that hysterical symptoms would appear if prolonged inhibition of libidinal and sexual energy occurs (Macleod et al, 1954). This was explained in terms of 'conversion' whereby repressed psychic excitations are converted into somatic

symptoms (Nemiah, 1977). The type and location of symptoms so produced are, according to Freud, highly symbolic as they can indicate the nature of the subconscious conflict. However, Freud did not extend these ideas to organic disease (Lipowski, 1984).

Dunbar (1938) extended Freud's ideas to include somatic illness by subjecting a large number of patients who had organic diseases to psychodynamically oriented examination. From this examination she then attempted to relate certain personality characteristics to particular organic diseases. She related the two by describing the ulcer personality, the coronary personality, the arthritic personality along with many others (Wittkower, 1977).

Another important figure in this area who followed psychoanalytic ideas was Alexander (1950). He suggested that unconscious conflicts played a role in the development of organic diseases such as bronchial asthma and peptic ulcer. According to Lipowski (1977a), most of Alexander's hypotheses proved difficult to validate.

"Yet this (Alexander's) approach had weaknesses. It causally linked variables on very different levels of abstraction, e.g., conflict and peptic ulcer, without due regard to the intervening psychophysiological mechanisms."
(Lipowski, 1977a, p. 235, my brackets)

The problems with other psychoanalytic approaches to

psychosomatic medicine were the same as those faced by Alexander. There was little psychophysiological input into these approaches and so they tried to relate abstract ideas of unconscious processes to concrete somatic symptoms in a way that proved to be unconvincing. According to Lipowski (1977a) the psychoanalytic approach suffered a large drop in popularity around 1955. This was perhaps because of the increasing success of the psychophysiological approach, which in contrast to the psychoanalytic approach, used the experimental method, quantified variables and focused on the effect of conscious processes on somatic functioning.

"Just a description of personality traits and conflict situations is not enough to draw conclusions about the existence and nature of psychosomatic relationships in various diseases. The formulation of such a relationship must be supplemented by experimental, reproducible evidence before it can graduate from an indication to a proof." (Groen, 1950, p. xvii)

This comment appeared in the foreword of a book of the proceedings of a conference with the title "life stress and bodily disease" which reflected the interest around that time in moving away from purely symbolic or psychoanalytic explanations in psychosomatic medicine.

In addition, psychosomatic medicine as a whole was starting to increase in popularity. Many new books appeared (e.g. Alexander, 1950; Grinker, 1953; Weiss & English, 1949; Wittkower & Cleghorn, 1954) on the subject of

psychosomatic medicine. So the decline in psychoanalytic ideas in psychosomatic medicine was not due solely to the increase in popularity of psychophysiological approaches, but also due to the general expansion of the field, with alternative ideas and approaches pushing the once dominant psychoanalytic approach into the background.

The psychoanalytic approach in psychosomatic medicine still exists today (e.g. Musaph, 1977). However, unconscious tensions and motives are viewed as only one of a huge range of factors which play a part in the causation of disease. If we compare two 'state of the art' books about psychsomatic medicine (Wittkower & Cleghorn, 1954; Lipowski et al, 1977) we find that in the earlier book by Wittkower & Cleghorn (1954) the number of times Freud is indexed is six times greater than in the later book. Also while psychoanalysis appears in the index of the earlier book, it does not appear at all in the later one.

As well as this distinction, the two books are very different in that the earlier one puts much less emphasis on environmental, ecological and social factors in disease causation (Lipowski, 1977a). It is much more individualistic and clinically oriented. Two early books about psychology and health (Banister, 1935) and

medical psychology (Zilboorg & Henry, 1941) concentrate almost entirely on mental illness, which suggests that the only relationship then considered between psychology and medicine came from abnormal psychology and psychiatry.

Indeed, this tendency for early psychosomatic medicine to concentrate on individual, clinical and in some cases psychopathological causes of disease must have discouraged both the medical profession and the public at large from accepting many of the ideas of psychosomatic medicine. A psychosomatic illness is not a 'real' one to many people. This is undoubtedly due to the perception of psychosomatics as a psychoanalytically oriented discipline. The general scepticism many people have towards psychoanalytic ideas also extends to psychosomatic illness. A psychosomatic illness is somehow 'not serious', it is 'only' psychosomatic after all. Having a psychosomatic illness implies that the ill person is somehow feigning, or is a malingerer.

These perceptions of psychosomatic illness are very important as they shaped the changes that were to come in the field, and had, and still have a profound effect on the kind of research carried out into stress and illness. The psychophysiological approaches became important as they

provided the 'missing link' between psychological and physiological events.

3.3.4 Psychophysiological approaches.

Claude Bernard's ideas (see chapter 1) played an important part in psychophysiological approaches to psychosomatic medicine. His notions of the 'milieu interieur' and his holistic approach to the functioning organism were an ideal basis from which to study psychophysiological interactions. It has even been suggested that "Bernard was the first prominent physician to emphasize the contributions of psychological factors to physical illness." (Gatchel & Baum, 1983, p. 3)

Walter Cannon who introduced the idea of homeostasis (the dynamic steady state of the 'milieu interieur') wrote two books which marked the beginning of modern psychophysiology as it applies to psychosomatic medicine. These were "Bodily changes in pain, hunger, fear and rage" (1929) and "The wisdom of the body" (1939). Cannon identified for the first time physiological reactions to psychological states such as fear and rage. Also he outlined the 'fight or flight' response of the body to the perception of danger. This is the basis of what later came to be known as the alarm stage of the general adaptation syndrome (Selye, 1956) which is a

stress response. Cannon also extended the idea of homeostasis to psychological and social domains as well as the physiological.

Harold Wolff took as his starting point the physiological reaction to threat outlined by Cannon. He extended this idea to explain psychosomatic illness in terms of the adaptive response of the body to symbolic threats (Wolff, 1953). In other words, a 'fight or flight' response to symbolic threat.

"It is suggested that man, confronted by threats, especially as they involve values and goals, initiates responses inappropriate in kind as well as magnitude. Such reactions, integrated for one protective purpose, and thus inappropriately used for another, can damage or destroy him."
(Wolff, 1953, p. vii)

It is at this point, in the history of psychosomatic medicine, that the idea of stress became implicated as a factor in disease causation. Although in the past, as stated previously in this chapter, general notions of 'emotion' or 'passions' were used in relation to disease causation (e.g. Stratton, 1926), no psychophysiological mechanism had been discovered which linked psychological and physiological states. 'Stress' provided this link.

It is also at this point that stress and illness research started to take off on its own. Although still linked to

psychosomatic medicine, it became an area of study in its own right. Also, as outlined above, psychosomatic medicine started to diversify to include many other areas that fall within a more general framework of the interrelations between psychology, medicine, health, and illness. Such a diversity meant that stress became only one of many factors which contributed to health and disease.

The beginnings of stress and illness research will be considered in the next section. Psychophysiological approaches in psychosomatic medicine did not stop with Wolff and the idea of stress. They also considered other aspects of the psychosocial environment which contributed to disease.

Halliday (1948) took a cultural, anthropological and epidemiological approach to disease causation. He considered that sociocultural changes could have an effect on the prevalence and incidence of certain chronic diseases such as peptic ulcer, rheumatism, and angina pectoris.

His interest was in psychosocial medicine which he defines as "the application of the concepts of psychosomatic medicine to the illnesses of communities and social groups". (Quoted in Galdston, 1954, p. 455)

Wide ranging social and economic changes have their effect on disease by changing important details of personal and family life. For example, the mother-child relationship may be altered because of economic conditions. Such a change, if widespread, will result in children born around that time developing personalities generally different from their parents. As a basic psychosomatic assumption is that particular personality profiles are associated with particular illnesses (e.g. Dunbar, 1938), it follows that changing personalities within a society or community will result in a changing patterns of disease. However, Halliday did not view the relationship between personality and disease in a psychoanalytic or symbolic sense, but drew on psychophysiological mechanisms in his explanation.

Other important figures in the early history of psychophysiological approaches to psychosomatic medicine studied the relationship between particular diseases and the life histories of people with those diseases. Lawrence Hinkle (e.g. Hinkle & Wolf, 1950; Hinkle et al, 1951) looked at subjects who had diabetes mellitus. He postulated that life experiences which were interpreted either consciously or unconsciously as threats to security may cause the diabetic's condition to become unstable. He also

suggested that early conditioning and constitutional predisposition may also contribute to the development of diabetes mellitus (Hinkle & Wolf, 1950). Hinkle's approach was similar to that of other workers around this time in that the psychological and social background of subjects with particular illnesses was examined, but in a more experimental way than earlier psychoanalytic approaches. Many factors were taken into account, stress being only one of them.

This section on psychosomatic medicine is an attempt to show where the current interest in stress and illness originated, both conceptually and historically. It is important to remember these origins, as much of the criticism now directed at stress and illness research is a response to what critics see as the oversimplification of complex phenomena (e.g. Kessler et al, 1985; Monroe, 1982). Such criticism is ironic given that stress and illness research started in an area which has always been at pains to point out the complexity of the interrelationships between psychosocial factors and illness (e.g. Wolf, 1954), and encourage a holistic approach in medicine (Lipowski, 1984).

As stated above, the idea that emotions or adverse life

situations can cause and prolong disease has been around for a very long time. This should be remembered as it often appears that the idea that stress can cause illness is a 'new' discovery. It is not. What is (or was) new is the attempt made by researchers to quantify and qualify the relationship between some of the emotions experienced and the short and long term bodily effects of such emotions. As the idea of stress (reflecting both the physiological/bodily state and psychological/emotional life) became adopted, efforts were made to quantify the measures of stress adopted so that a clear picture could be built up of the nature of the relationship between stress and illness. The following section of this chapter examines these efforts.

3.4 The mechanisms of stress and illness.

Wolff (1953) was probably the first well known researcher in the psychosomatic field to use the term 'stress' in a technical sense to explain the incidence of disease. In 1950 the proceedings of a conference entitled "Life stress and bodily disease" were published (Wolff et al, 1950). These publications probably represent the first widespread use of the term stress in connection with disease.

There are however some other examples of the term stress used in the context of disease before Wolff. These exceptions do not come directly from psychosomatic research and are important in as much as they show that other workers slightly outside the psychosomatic field were coming to similar conclusions regarding the role of stress in disease.

Earlier uses of the term stress in relation to illness give a clue as to why the term became popular in many different disciplines. The popularity of the term has caused a great deal of confusion (see chapter 1), which a short historical exploration might help to clarify.

3.4.1 Earlier uses of stress to explain illness.

Cannon (1935) in "the stresses and strains of homeostasis" suggests that:

"We should have to learn how steady are the steady states and where the critical stress is found, not only in normal individuals, but also in individuals at various developmental epochs and during various disorders. Childhood, adolescence and old age, the exacting periods of puberty and the climacteric, prolonged labor, fatigue, the demands of school, the values of different sorts of training - all these and many other conditions (besides infection and insomnia, worry and dissipation, already mentioned) could be made to tell their influence on the agencies which maintain uniformity in the fluid matrix. Indeed, the whole gamut of human diseases might

be studied from this point of view." (p. 14)

Here, Cannon is clearly using the term stress in connection with illness. He also sees the possibility of research into stress and illness when he says that "the whole gamut of human diseases might be studied from this point of view." (Cannon, 1935, p. 14)

Selye (1950, 1956) used the term stress to refer to the conditions which would elicit the general adaptation syndrome (Selye, 1936). Which in turn produce diseases of adaptation.

"We feel that the main results of this work were to show that:

1. Any systemic stress elicits an essentially similar syndrome with general manifestations.
2. This syndrome helps adaptation.
3. Adaptation can cause disease."

(Selye, 1950, p. 5)

So indirectly, Selye too used the term stress in relation to disease although most of the experimentation he carried out was concerned with particular biochemical changes during the general adaptation syndrome mainly in animals. Even though Selye was not interested in stress from a psychosomatic or epidemiological standpoint, he realised the value of his findings for medicine. "The significance of this kind of research is not limited to fighting this or that disease. It has bearing upon all diseases and indeed upon all human activities." (Selye, 1956, p.305)

Both Selye and Cannon used the term stress in relation to illness because their ideas formed the basis of stress and illness research. Selye took Cannon's ideas of homeostasis and the 'fight or flight' response (emergency reaction) to form his more technical notions of the general adaptation syndrome and the diseases of adaptation. These ideas form the core of stress and illness research and are still extensively referred to in introductions to stress and illness research (e.g. Cox, 1978; Dohrenwend & Dohrenwend, 1974a; Levine & Scotch, 1970; Totman, 1979).

3.4.2 Physiological responses to psychological stimuli.

As stated elsewhere, one of the basic assumptions of stress and illness research is that emotional arousal can produce physiological changes which may lead to disease. One problem with this assumption is to explain why it should be the case that physiological changes accompany emotional appraisals of events and situations.

(There are many problems involved with defining emotions. (See Mandler, 1975.) No particular definition of emotion is put forward here and the statement above that

"physiological changes accompany emotional appraisals" is not intended to indicate any theory of emotion. Rather, emotion is seen as a general construct which emerges from observed relationships between biological and social antecedent conditions and consequent biochemical, physiological and behavioural events (Brady, 1975).)

Many of these physiological changes serve to prepare the body for threatening situations which involve fear, rage or pain. Hormones such as epinephrine (adrenaline) and norepinephrine are released which increase the heart rate, dilate the bronchi in the lungs, stimulate conversion of glycogen to bile by the liver, and generally prepare the body for physical action. While this physiological response 'makes sense' as far as physical responses to threats are concerned, it does not seem to be a suitable response to psychological threats where no course of physical action will remove such threats.

Cannon (1939) saw the 'fight or flight' response as having its origins in "the experience of multitudes of generations in the fierce struggle for existence". (p. 227) Many of the threats and problems faced were of a physical nature, threatening physical life itself, and so required a physical response in terms of escaping from the danger

(flight) or attacking the source of threat (fight). The 'fight or flight' response prepares the organism for physical danger.

Such responses are inappropriate given the non-physical nature of most of the threats faced by people in modern western societies. Many of the physical threats to life have been removed and survival is seen as social and psychological. There are some problems with this analysis of the origins of the fight or flight response. Assumptions are made about life in ancient societies which are difficult to validate. The analysis implies that our ancestors spent a great deal of time fighting off animals or human enemies or running away from them. From Cannon (1939) to Cox (1978) the same analysis is made.

"Great fear, with its attendant internal preparations for struggle, may be serviceable in wild life when the need for physical effort is imminent, but in the circumstances of civilized existence it may be the occasion for baneful disturbance of vitally important functions."
(Cannon, 1939, p. 241)

"The question for industrial man is that of adaptiveness of behaviours like fight or flight in the context of civilized environment."
(Cox, 1978, p. 77)

The fight or flight response is considered to be an evolutionary throwback from a time when most threats were to our physical life. Although in modern western societies we are not faced with the same physical threats, we respond

to them as though they are threats which require physical action of some sort.

"In the long history of the race bacteria have not been the only living foes of man, and in wild life, perhaps, they have not been the most important. There have been savage creatures, human and subhuman, watching with stealth and ready to attack without a moments warning....In that harsh school fear and anger have served as preparation for action. Fear has become associated with the instinct to run, to escape; and anger or aggressive feeling, with the instinct to attack." (Cannon, 1939, p. 227)

This view, of the origins of the fight or flight response, or more generally the origin of physiological responses to threat, is widely held. It is important to see this evolutionary perspective as part of the reason for treating 'stress' as though it is an inappropriate or incorrect response to the environment. Of course stress is mainly viewed as inappropriate because it can cause disease, but the evolutionary perspective gives additional support to the notion that the stress is biologically inappropriate in 'modern' society.

"Researchers have been concerned with the "stupidity" of these responses, which are supposed to be inappropriate to the human condition in civilization. This rests on a possibly erroneous assumption that primitive man was mainly concerned with active and overt behaviour like fight or flight." (Ursin & Murison, 1984, p. 126)

Whilst a response such as fight or flight undoubtedly has great survival/adaptive value in many species, the idea that such genetic characteristics evolved or were

more appropriate in relatively recent (pre-industrial) history are almost certainly incorrect. Fight or flight is such a basic physiological mechanism, found in many species, that it is likely that such a physiological mechanism started long ago in evolutionary history and long before anything recognizable as human or ape-like emerged. any process of natural selection would select for an adaptive response such as fight or flight as soon as it appeared.

The view that fight or flight was appropriate when our ancestors were 'savages', forever fighting and running away from each other and/or animals, and is inappropriate in modern society, leads to another doubtful notion.

"The physiological response to stress according to, say, Cannon, prepares for fight or flight, which are suppressed in man. There results a failure to utilize, in an appropriate manner, the energy mobilization caused by the physiological changes, and this may increase the rate of wear and tear on the body, giving rise to the pathology of stress. Self-control may take a toll in the long run. This is the cost of 'civilized' behaviour." (Cox, 1978, p. 76)

'Self-control' does not really enter into the problem of why stress makes people ill. Many stress-provoking situations may well be in social and emotional encounters where responding by fighting or taking flight may do nothing to resolve the situation. Hinkle (1977) suggests that "the maintainance of social relationships has a

biological importance for men that overrides the importance of maintaining their own physical health." (p. 43) There is no 'cost' involved in behaving in a 'civilized' way, but there may well be real costs in terms of health if social relationships are not maintained (e.g. Thoits, 1985).

This view of why stress leads to illness in 'modern society' implies that it comes about because we have 'self-control' and do not hit out at those things that anger us, or run away from those things which frighten us. Whilst many researchers agree that the fight or flight response if prolonged or repeated too often causes serious tissue and organ damage (e.g. Frankenhaeuser, 1975; Lazarus, 1977; Selye; 1975) it does not follow from this that if we respond physically (as the fight or flight response prepares us to do) the damage done to our bodies will be lessened.

There are a number of problems with these ideas. First, it is not fully known how stress in the form of physiological responses such as fight or flight causes disease. Zegens (1982) lists seven hypotheses that have been put forward to explain how the stress response may cause illness in the long term. Most of these are consistent with Selye (1956) who suggests that stress

causes illness and disease as it increases the general rate of wear and tear on the body. An analogy can be made with a machine that may break down or become damaged due to wear and tear. Stress is equivalent to over-working the machine.

So it is not so much how we respond physically during fight or flight reactions which is important, but, how often, how prolonged and with what intensity such reactions occur. These latter factors are much more likely to be determined by the use of cognitive appraisal and coping and/or defence mechanisms (Burchfield, 1979) rather than a simple class of behavioural responses such as fight or flight. In addition, the level of activation an emergency response may produce in the body is much more complicated than a straightforward fight or flight description suggests. An extreme or intense fight or flight response may well prepare the body for physical action but lower levels of activation may not. Such physiological states are not simply on or off but exist on continuums and so may have very different physiological effects depending on their intensity and duration. They should therefore be considered as complex and variable states (e.g. Ursin & Muriison, 1984; Jenkins, 1979) which at their most intense (fear or rage) may prepare the body for flight or flight, but at other levels may best facilitate other adaptive functions, such as

cognitive abilities (Frankenhaeuser, 1980).

Second, looking at the response to stress in this way means that the point at which we start looking at the whole phenomena of stress begins with the organism's physiological response or mobilization. This means that "factors which lead some individuals but not others to respond to a noxious stimulus with mobilization and some individuals but not others to remain mobilized for prolonged periods are largely ignored." (Coyne & Holroyd, 1982, p. 107) In other words if we take as our focus the physiological reaction, then individual differences in the perception of 'stimuli' as threatening, and those factors which may modify the physiological response (e.g. social support, coping strategies) are not given much attention. This approach to stress has probably held back the conceptualization of stress as a whole process, which should be studied as a whole, more than any other approach.

In this way, the fight or flight response is simply viewed as an inappropriate automatic reaction, out of place in a 'modern society', the long-term effects of which (illness) can only be avoided if we do as our physiology prepares us

for, and fight or take flight. Another problem which is ignored in this framework is how social stimuli become interpreted as harmful or threatening. Whilst we may assume that some responses to some stimuli are innate (such as a frightening and sudden loud noise) others are obviously more social, learned responses (e.g. divorce, bereavement).

This issue raises the question of the 'first mediator' (Selye, 1956). If we consider the fight or flight mechanism to be a very basic physiological response, the question arises as to how such a response is initiated when so many apparently different stimuli produce more or less the same response? What could a loud noise and an insult have in common that would enable them to influence the same physiological mechanism? This will be discussed in the next section.

The fight or flight mechanism or the alarm reaction are important physiological mechanisms if we want to understand the way in which stress might cause illness. For the purposes of this thesis however, it is not necessary to understand fully how these mechanisms work on a physiological level. It is important to understand how these ideas became absorbed into the areas of psychosomatic medicine and epidemiology. Stress provides a useful way of

linking psychological phenomena and physiological/medical phenomena. There is some disagreement on the nature and meaning of such alarm reactions (see next section) with some viewing the response as an 'automatic' response to any demands of adaptation while others view the response as almost entirely dependent on the interpretation or appraisal of the situation as threatening. The origins of research into the fight or flight (stress) reaction in response to emotional stimuli comes from the work of Cannon who demonstrated that many bodily responses are highly sensitive to emotional stimuli. (e.g. Cannon & de la Paz, 1911; Cannon, 1914, 1929) Selye (1956) showed how the fight or flight reaction develops over time in the General Adaptation Syndrome (see chapter 1). This has three parts to it, the fight or flight reaction corresponding to the first stage of this General Adaptation Syndrome (G.A.S.) which is called the alarm reaction (Selye, 1950).

The origins of the fight or flight reaction suggest that it can be thought of as a fundamental biological process, such as homeostasis. Indeed homeostatic mechanisms play an important role in fight or flight/emergency reactions by maintaining the constancy of the internal environment (Selye, 1956). While the fact of some sort of physiological reaction to 'threat' (fight or flight, alarm reaction,

emergency reaction) is not much in dispute, the meaning of such a response in a social context is a crucial issue in stress research and will be discussed in the next section.

3.4.3 The function of the fight or flight response.

One of the main problems in assessing the meaning of stress reactions is the supposedly non-specific nature of these reactions. A wide variety of apparently different stimuli seem to produce the same response. For example Selye (1937) says that "drugs, surgical injuries, spinal shock, excessive exercise, all elicit the same reaction." (p. 187) Later, Selye (1950) includes another 'class' of stimuli as stressor agents (those agents which elicit the alarm reaction). Most of these agents have a 'physical' nature, that is they are actual physical assaults or traumas on a living organism. What can such physical stressors have in common with psychological (emotional) stressors?

"Even mere emotional stress, for instance, that caused by immobilizing an animal on a board (taking great care to avoid any physical injury), proved to be a suitable routine for the production of a severe alarm reaction."
(Selye, 1950, p. 34-35)

The only quality these apparently different agents have in common is their ability to produce a physiological stress response.

"By what reasoning is plunging a subjects arm

into icy water in the same category of stress as being insulted or watching a disturbing movie? The empirical link between the two kinds of stimulus conditions is the response." (Lazarus, 1966, p. 333)

Selye defines stress as the non-specific response of the body to any demand, and most of the demands or stressors Selye identified experimentally are 'physical' stressors. The result of this is that "there has been a widespread assumption that psychological stress merely represents one component of a larger unitary category of biological stress phenomena which involve common integrative mechanisms and which are organised according to common principles." (Mason, 1975, p. 22) Psychological stressors are seen as a subset to the larger group of physical stressors.

This presents a problem (also see above) as responses to psychological stimuli are viewed in the same way as responses to 'physical' stimuli. If we are exposed to a physical stressor, such as low temperatures, then our bodies respond in an 'automatic' way in an attempt to restore homeostasis. The implications of this view of stress are that if, for example, we are insulted then our bodies respond in the same automatic way. Psychological stressors become 'like' physical stressors in their ability to elicit physiological responses. Obviously the

physiological reaction to an insult and low temperatures will be different, but as Selye defines stress as the non-specific response of the body to any demand, or the common denominator of all adaptive reactions in the body (Selye, 1956), then there are non-specific or common elements to both these physiological responses.

Selye, in his historic letter "a syndrome produced by diverse noxious agents" published in Nature (1936) clearly shows that he is basically more interested in the G.A.S. and stress responses than in the stimuli that can produce it. "I could find no noxious agent that did not produce the syndrome." (Selye, 1956, p. 35) He simply describes all stimuli that produce a stress response as noxious, and hence the responses to them as adaptive. Such responses will be made in an attempt to adapt to the noxious agent and restore homeostasis. Noxious agents are the extreme end of the scale of stressors, any adaptive responses may produce some degree of stress. This marks a departure from the strict alarm, or fight or flight reaction that is often considered to be the stress response.

The stress response can vary greatly in intensity and duration. At one extreme the phenomena of voodoo death (Cannon, 1942), sudden death (Binik, 1977, 1985; Engel,

1971) or psychic death can represent the sudden and unexpected death of an organism because of very extreme stressors. At the other end, there is the persistent and continuous stress caused simply by being alive (e.g. Selye, 1956) because biological mechanisms are constantly active, working towards the maintenance of the dynamic steady state (homeostasis). Selye (1974) suggests that stress is always with us and is not necessarily good or bad, but depends on how we 'live our lives'.

According to Mason (1975) it was the idea that emotional/psychological factors could produce stress responses that interested many behavioural scientists in stress. Selye's idea of non-specificity states that "non-specific changes are those which can be elicited by many agents." (Selye, 1950, p.7) Psychological stressors are therefore seen as just another noxious agent, capable of producing a stress response. This is a problem because, as stated above, the nature of the psychological stimulus is not taken into account, nor are the intervening processes which may appraise such stimuli as threatening or benign, and nor are those coping processes which may determine the effect of the stress response over time.

Another major problem associated with viewing emotional



stressors along with 'physical' stressors is the problem of the first mediator (see above). What is it that these very different stimuli have in common that can produce a supposedly similar reaction? Two aspects of Selye's formulations are crucial here. The first is non-specificity and the second is the primary mediator. These will be discussed in the next section.

The meaning of the fight or flight, or emergency response is crucial to the area of stress and illness. The main research in this area comes from the work of Hans Selye, who first attempted to precisely define the physiological response to stress, and how it develops over time. There are many criticisms that can be leveled at Selye's work.

"As one now looks back over the past twenty years, it is a curious fact that, while there were both strong opponents and proponents of Selye's concepts, the main body of 'stress' theory still stands largely in the position of having been neither conclusively confirmed and generally accepted nor conclusively refuted or rejected on the basis of definitive experimental evaluation." (Mason, 1971, p. 323)

Selye's ideas are very influential in the area of psychological stress with "a tendency of many workers to assume, in a rather vague way, that there is necessarily some major link between this area of psychological stress research and the work of Selye, which dealt largely with physiological responses to physical and humoral stimuli."

(Mason, 1975, p. 11) The link that some workers assume exists between their research and Selye's concept of stress is that the psychosocial stimuli they observe to cause stress represent one class of stimuli that are all 'noxious' in Selye's sense. Such stimuli are responded to with various degrees of the fight or flight response as they impose change to which the body adapts.

3.5 Diseases and conditions associated with stress.

Stress has been implicated in a factor in a great number of diseases, illnesses and conditions. As extreme stress responses have such a large and widespread effect on the physiological systems within the body, it is not surprising that some links can be found between nearly all diseases and stress. Very often in studies, illness or disorder is measured using very non-specific indices of disorder. Also, very general assessments of 'stress' are made using life-events inventories which measure the number (and sometimes the severity) of major life changes that individuals have experienced. Such scores are then compared with the incidence of symptoms and disorders. Correlation coefficients suggest that life events (a measure of stress) "may account at best for 9 percent of the variance in illness." (Rabkin & Struening, 1976) Physical and

psychological changes which result from stress will be briefly discussed in turn.

3.5.1 Physical symptoms and disorders.

Illness which results partly from stress must be due to the effects of the fight or flight, emergency response (or some degree of these reactions), "although evidence is less clear and less fully spelled out than is generally realised." (Lazarus & Folkman, 1984, p. 205) This is especially true for evidence about the link between stress and illness in the human species. Experiments which expose animals to extreme forms of stress are common (see Turkkan et al, 1982). Often the animal is in an uncontrollable situation and can not escape from the source of the stress, so it is not surprising that illness can fairly easily be shown to result from stress in an extreme laboratory situation (e.g. Richter, 1957; Seligman & Meyer, 1970; Selye, 1936; Brady, 1958).

Ethical considerations apart, it is much more difficult to show how physiological stress reactions can cause illness in people.

"...the uniquely human capacity for language and symbolic representation demands a whole new approach to defining what is 'stressful' to man, and to a particular individual, and necessitates a style of analysis which gets right away from comparisons with lower animals." (Totman, 1979.

p. 91)

There are other factors which make it difficult to 'prove' the link between stress and illness in humans. The social environment is complex and changing and people manipulate and respond to their environments making it difficult to assess the stress an individual is experiencing. A laboratory stress can be 'measured' and the environment controlled. Indeed the problem of 'measuring' stress so that it can be related to illness is a major problem in stress research. Many conditions that may be caused by stress tend to be long term, chronic diseases which take a long time to develop, and those stresses which may play a causal role can only be assessed by long-term, prospective methods.

Some diseases and conditions such as stomach ulcers and coronary heart disease are more directly linked to stress as both systems are involved in the basic fight or flight, emergency response. Stomach ulceration was one of the triad of morphological changes Selye (1936) noticed as a result of the General Adaptation Syndrome. Heart rate increases when epinephrine (adrenalin) is released into the blood stream from the adrenal medulla. This too is part of the physiological stress response and repeated stress responses put excessive demands on the heart. Obviously a host of

other risk factors are involved in the development of coronary heart disease, such as smoking and diet (Krantz et al, 1980) but, compared to some other diseases and conditions the causal link between heart disease and the physiological stress response is more direct.

In contrast to heart disease and stomach ulceration it is thought that stress can increase the possibility of contracting infectious diseases (Ader, 1981; Ader & Cohen, 1984). By affecting the immune system, susceptibility to many infectious diseases may be increased during stress responses. This means that stress may affect the development of a great many diseases, so making the causal link between stress and illness even less clear than in the case of diseases such as heart disease and stomach ulcers.

So there are some diseases which can be said to result more 'directly' from the stress response than others, where the mechanisms and intervening processes which produce bodily illness are better understood. It has been pointed out (e.g. Deupe & Monroe) that many of the checklists that measure a large number of very 'general' symptoms assume a non-specific model of stress-disorder interactions. In other words 'stress' will just generally

increase all kinds of symptoms, irrespective of the nature of the stressors, or the nature of the symptoms. This issue will be discussed later.

Another class of disorders, those involving psychological symptoms, have also been associated with stress.

3.5.2 Psychological symptoms and disorders.

In this class of disorders we find depression (e.g. Brown & Harris, 1978), neurotic disorders (e.g. Barrett, 1979), schizophrenia (e.g. Rabkin, 1980), reactive stress related syndromes, brief reactive psychosis and post-traumatic stress disorder (Rabkin, 1982), as well as a large number of non-specific symptoms/indicators of disorder measured by symptom checklists which identify emotional disturbance or general psychological distress and anxiety.

The mechanisms by which a physiological response to stress can lead to psychiatric disorders is not made explicit by researchers in the area. Many of the studies use measures of life events to predict psychiatric/psychological symptoms and do not explain the intervening mechanisms. The causal role of life events in precipitating or forming psychiatric disorders is not known, but it appears that

"quite different types of life events tend to be involved in provoking these (different) conditions, but the kind of causal role that the events play in onset is also radically different." (Brown, 1974a, p. 165, my brackets)

For example, Wing & Bebbington (1982) in a review of the epidemiology of depressive disorders in the community, state that "what is required is a set of testable theories explaining how and under what circumstances the mechanisms (homeostatic mood-regulating) 'go out of control' and, therefore how the normal cycle might be reinstated and maintained." (p. 339-340) Many different models are used to explain the link between stress and psychological disorders. Spring & Coons (1982) identify five models that are used to explain the causal link between stress, as a precursor, and schizophrenic episodes. As Neufeld (1982) points out, studies tend to either concentrate on the biological or the psychological/behavioural variables associated with stress and so theories as to why and how stress can affect psychological functioning are many and varied.

Some of these causal links are more directly related to fight or flight type physiological reactions, whilst others are not. Weiss et al (1979) carried out a number of studies

into the role of brain catecholamines in behavioural depression. This was out of an interest in "how psychological factors affected physiological responses that led to pathology." (p. 126) In other words, how physiological/biochemical changes resulting from stress will affect psychopathology. Deupe (1979) & Weiner (1977) make an attempt to more carefully explore the psychobiologic pathways involved in disease.

Contrast this approach with the many studies of stress and psychological symptoms/disorder which make little attempt to relate (other than by correlation) causal links between stress as a psychophysiological phenomena and such symptoms/disorders. Brown (1981) describes two parts to the causal model which he uses to link life events with affective disorders. First, it is those life events which involve threat or loss which are most likely to lead to affective disorders. Second, the feeling of threat or loss produced by such events must take on a "secondary meaning" whereby the individual places the event in the context of their whole life. As Brown (1981) says, "the existence of this 'mechanism' is largely speculative." (p. 467) Finlay-Jones & Brown (1981) report data which is used to argue that "severe loss was a causal agent in the onset of depressive disorder." (p. 803) The aetiology of depressive

conditions is discussed almost entirely in terms of 'factors' which statistically increase the probability of an individual experiencing psychiatric disorder. Brown & Prudo (1981) in explaining the risk of depression in Hebridean women suggest that the two important factors make the difference. These are church-going, and inhabiting the least integrated type of dwelling. Obviously such factors are of great interest and importance, but they do not add up to anything like a causal explanation for the relationship between the effects of life events and depression.

As is the case with physical symptoms, some particular conditions are more directly related to psychophysiological stress responses (e.g. hypertension) than others. In the case of psychological symptoms/conditions this is also true. But in addition, many researchers work exclusively with life event measures of stress, so the relationship between psychophysiological stress and psychological symptoms/conditions may not be assessed. As stated above, Mason (1975) has suggested that many researchers assume that there must be some kind of link between Selye's physiological or biochemical model of stress, and the model of stress they are working with. Selye (1982) in a foreword to a book about 'psychological stress and psychopathology'

suggests a number of ways in which his biochemical model of stress may relate to psychopathology. Such links appear to be limited, and "show how little we know and how much must still be learned." (p. vii)

Stress has been associated with both somatic and psychological symptoms. While such associations are not strong, they do appear to exist. Much attention has been paid in the literature to overcoming theoretical and methodological problems. Some of these problems involve the actual assessment of stress, using life events measures (which will be dealt with in the next chapter), other problems involve the assessment of disorder and symptoms. More fundamental to these problems however is the large number of factors that must be taken into account, so many in fact that many researchers ignore parts of the stress-illness interactions.

"The great majority of studies of life stress and illness have been concerned primarily with one or another of the three types of constructs.... :stressful life events, personal dispositions, or social conditions. The task now is to integrate these constructs into hypotheses about the life-stress process". (Dohrenwend & Dohrenwend, 1981a, p. 19)

Stress-illness research does not take account of enough factors when looking for relationships between life events and symptom rates. Rahe (1974) identifies six transformations that occur in the pathway between stress

and illness. These six transformations are carried out by the following six factors: Past experience; psychological defences; physiological reaction; coping; illness behaviour; illness outcome.

"There are many intervening variables to be considered between a subject's recent exposure to life change and his perception of body symptoms as well as his possible near-future illness reports.....it is impressive that something as simple as a brief questionnaire recording of subjects' recent life changes shows any significant correlation with a criterion as distant and unspectacular as subjects' minor illness reports up to a year later." (Rahe, 1974, p.84)

These comments reveal part of what has been described as the "optimistic bias" (Breznitz & Goldberger, 1982) in stress research. This optimism has two main features. The first, as indicated above, is a belief that in fact, stress is related to illness much more strongly than we can actually demonstrate, due to the conceptual and methodological flaws that exist in the area. The second feature of the optimistic bias is the interest shown in coping as a positive way of encouraging health, not health defined by the lack of illness, but health as positive well-being.

Despite this optimistic bias there still are very few causal explanations which can link stress as a psychophysiological phenomena and psychological and somatic

phenomena. Since recent research into life stress and illness started, marked by the publication of "Life stress and bodily disease" in 1950 (Wolff, Wolf & Hare), it has been known that stress can affect diseases of the eye, airways, stomach, colon, cardiovascular system, skin etc. However, in nearly all the studies reported in the above book, short-term bodily changes associated with the condition were observed in subjects who already had the particular disease under study. 'Stress' was induced by asking subjects questions about conscious and unconscious conflicts or simply 'measured' by observing naturally occurring stressors.

For example, in the case of a study reported by Wolf & Glass (1950), the subject's secretion of gastric juice and changes in the form of the stomach lining were observed while they asked the subject questions about a "topic of suspected conflict." (p. 666) In this way, many conditions were found to be aggravated by short-term stress. Now however, the focus is much more on the long-term effect of social stressors on long-term health outcomes. For short term physiological responses to stressors, the causal mechanisms by which such responses operate are much more easy to identify. On the other hand, the process by which a great many factors come together to produce a particular

health outcome is probably beyond a causal explanation, though the search still continues.

Another complicating factor concerns the hypotheses we make about the causal mechanisms involved in stress-illness developments. Many measures of symptoms used are very general and non-specific. This perhaps reflects Selye's idea that stress is a non-specific response of the body to any demand (1956). If it is non-specific, then many different symptoms may be produced by it. If it is the response to any demand, then it is not the quality of a stressor (life event) that is important, but the degree to which it requires adaptation. The last point will be discussed in the next chapter. Non-specific hypotheses about the relationship between stress and illness will be discussed in the next section.

3.5.3 Non-specific indicies of disorder.

There are two issues that arise out of the way in which disorder is measured in stress illness research. These will be dealt with in turn.

The first refers back to something mentioned above. Stress-disorder associations have been generally quite low. One reason for this may well be the nature of the input

variable which is assessed by general measures of symptoms which may pick up any sort of disorder at all. As Depue & Monroe (1986) point out, about 25 per cent of community samples are characterized by a chronic pattern of disorder over many years, just the kind of disorders general measures of symptoms will pick up. So although there may be genuine variance in symptom rates because of stress, the sheer number of high-scoring chronic symptom subjects will tend to cancel out those individuals who may be responsive to stress. Also, the concern for these non-specific measures of stress goes beyond a simple wish to increase correlations between stress and illness. If a non-specific model of disorders resulting from stress is wrong, then by continuing to use non-specific measures of symptoms we will not be able to learn more about exactly how stress may cause illness, the causal links.

The second point follows on from this idea. Some researchers believe that "the principles underlying stress-disorder interactions vary across disorders, and, hence can only be fully understood by analyzing specific disorders." (Depue & Monroe, 1986, p. 36) Rose et al (1979) show that in the case of air traffic controllers, they did display cardiovascular and endocrine stress responses, but these stress responses were not predictive of psychological

problems but were predictive of somatic conditions such as hypertension. Hinkle (1977) also follows the same lines.

"The data from whatever source suggest that one cannot simply equate "hardships," "straits," and "difficulties" with a state of health. It appears rather, that the patterns of illness and the frequency of certain kinds of illness change with changing circumstances." (p. 46)

As I have tried to indicate above, very few causal explanations exist to explain how stress might cause disease. The tendency for life stress researchers to concentrate only on their measures of stress in terms of life events, has meant that one important part of the assessment of the stress-illness relationship has not been given equal consideration. (Depue & Monroe, 1986) This may well explain the lack of causal explanations. Whilst it can be shown, for example, that depression is more likely if recent life events have been associated with some kind of loss, the psychophysiological mechanisms to explain such phenomena are lacking.

This general non-specific approach can also be seen in the assessment of life stress where very often it is the event itself that is important, as it causes change per se. (Depue et al, 1979) This will be discussed more in the next chapter.

Much of the research into the relationship between stress

and illness is characterized by a general approach to both the assessment of stress as any change in the environment, and illness or disorder as any change in reported symptoms. As Depue & Monroe (1986) point out, in a historical context it is ironic that so many researchers use such general measures and ignore many factors such as individual differences (coping, personality, social support) when the origins of research into stress and illness, as I discussed at the beginning of this chapter, came from a rejection of general and unitary explanations for disease. (For example, the idea that all disease must be infectious.) To conclude this chapter I would like to reinforce the importance of looking at stress-illness research in a historical context. When this is done, it seems clear, that despite the efforts of many researchers, there is still a tendency to simplify, ignore individual differences, and generalize about the nature of stress-illness relationships, which after all, were only suggested in the first place because of the dissatisfaction of many people with models of disease which did not take enough factors into account, and simplified a complex process.

"Life stress research is at a highly primitive level of analysis: although the conceptualization and measurement of environmental and psychosocial variables is becoming more sophisticated, most of the studies still generally ask the simplest of questions (is stress correlated with disorder?) in the context of poorly conceptualized and measured human

disorder, and with a design that measures the input variables so infrequently that little can be concluded about causation. Questions concerning the more precise nature of the process involved in the interaction between an environmental event and psychobiologic functioning are seldom entertained and more rarely investigated." (Depue & Monroe, 1985, p. 316)

3.6 Summary.

The citing of stress as a causal agent in disease is not new. Recent developments arose out of a dissatisfaction with unicausal models of disease and the increasing popularity of psychosomatic ideas.

Early efforts to look at the effects of stress on bodily disease include Selye's (1936) pioneering work with animals, and Wolff (1953) who formulated the link between stress and illness in humans.

Recent developments have moved towards searching for correlations between measures of stress (life events) and measures of illness. There are problems with both these types of measures. The correlations obtained are usually good enough only to explain about 9 per cent of the variance in illness rates. In response to this, researchers have worked on refining their measures of stress, assuming that the poor predictive power of these input variables is not a reflection of the state of things, but more the

insensitivity of their measuring tools.

While life event measures have been refined, little attention has been paid to measures of disorder. This has not occurred as many researchers feel that stress will increase general levels of symptoms and so general measures of disorder are adequate. In contrast to this view, other researchers feel that stress-disorder interactions are quite specific, in other words the relationship between stress and disorder depends on the nature of the disorder/symptoms and the type of stressors an individual is exposed to.

Stress has been used to explain illness in a rather imprecise way. Although it is clear that responses to extreme stressors causes severe tissue and organ damage, how chronic stress may operate over long periods of time to cause illness, and what psychobiological mechanisms are involved, is far from clear.

CHAPTER FOUR
THE ASSESSMENT OF LIFE STRESS

4.1 Introduction.

As suggested at the end of the previous chapter, the measures we choose to measure life stress will, to an extent, determine the strength and nature of the relationship we find between stress and illness. This chapter will primarily be concerned with the assessment of life stress by measuring life events, the problems with this approach and possible alternatives.

It is worth noting here that there are other approaches to the assessment of life stress. Measuring events in people's lives that require adjustment or adaptation is only one possible way of assessing life stress. Other approaches to the assessment of life stress usually concentrate on chronic stress in people's lives, rather than particular types of events.

Ilfeld (1976, 1977) adopts the idea of "current social stressors". Pearlin uses "role strains" (1983) and "chronic life strains" (Pearlin et al, 1981) to assess life stress. Weiss et al (1984) have developed the Stress Response Rating Scale (SRSS) which can give an estimate of the degree of stress a person has experienced in the past week. Daily Hassles (DeLongis et al, 1982; Kanner et al, 1981; Lazarus 1984), chronic stressors (Eckenrode, 1984), minor

life events (Monroe, 1983), daily events and daily experiences (Stone & Neale, 1982, 1984) are various attempts to examine the effect of stressful events as they occur on a daily basis. Other measures of stress will be discussed later in the light of the shortcomings and problems of life events.

4.2 Background to the life events approach.

There is general agreement on the background to the life events approach. Although this background is diverse (Perkins, 1982), two major figures stand out in the early part of this century for their contributions.

Dohrenwend & Dohrenwend (1974a), Holmes (1979), and Sarason et al (1982) cite Adolf Meyer as one of these figures. Meyer used a life chart as a diagnostic tool. The life chart was a biography of the patient and included information about previous medical disorders and when they occurred, and, changes in the patient's life situation such as leaving school, changing jobs, the death of relatives and other "fundamentally important environmental incidents." (Meyer, 1951, p. 53) The emotional responses to these events was also noted. Meyer believed that an important factor in the development of disorders was the setting in which it occurred, with regard to life changes.

In summing up Meyer's contribution, Dohrenwend & Dohrenwend (1974a) say:

"Thus Meyer taught that life events may play an important part of the etiology of a disorder and that they need not be bizarre or catastrophic to be pathogenic." (p. 3)

The second figure, often mentioned in reviews of life events is Walter Cannon. Although mentioned before, it is worth restating some of his basic observations. In "Bodily changes in pain, hunger, fear and rage" (1929) he outlined some of the physiological changes which accompany emotional responses. In addition, he suggested why such changes may lead to illness.

"...the persistent derangement of bodily functions in strong emotional reactions can be interpreted as due to persistence of stimuli which evoke the reactions. They may persist because not naturally eliminated by completion of the emotional impulse, or because completion of the impulse is made impossible by circumstance." (Cannon, 1929, p. 253-254)

There were other influences in life events research. Selye (1956) outlined more carefully the response to stress and the diseases of adaptation. But the publication of "life stress and bodily disease" (Wolff et al, 1950) produced propositions about stress and disease that "have been central to subsequent research on stressful life events." (Dohrenwend & Dohrenwend, 1974a, p. 4)

The background to life events research rests on two main

assumptions. The first is that life stress is a factor in disease causation or illness onset. The second is that major life events cause life stress. From these two assumptions it follows that the main thrust of life events research is to demonstrate that life events are a causal factor in disease.

This brief introduction to the background of life events research will now be followed by a historical account of the measures of life events which have been developed and applied.

4.3 The measurement of life events.

As stated above, the measures one chooses to assess life events may well determine the nature and extent of the relationship found between life events and illness. A survey of the methods developed over the years (in an attempt to improve event-disorder relationships) will help to illustrate some of the methodological problems inherent in life events research. (This survey will be selective. Zimmerman (1983a) has listed some 18 life event inventories, so time and space do not permit a comprehensive survey.)

As Depue & Monroe (1985) point out, the statement made in a

review article by Rabkin & Struening (1976) that life events account at best for 9 per cent of the variance in disorder, still holds true today. The development of life events research is marked by the regular appearance of new improved inventories, more complex models, and more complex statistical techniques. This demonstrates the "reflexive style" (Depue & Monroe, 1985, p. 303) of researchers in this area. The poor predictive power of life events measures is viewed as a consequence of inadequate measurement rather than a result of an inadequate research paradigm, so researchers revert back to the life events paradigm, despite its obvious shortcomings.

4.3.1 The social readjustment rating scale.

The publication of the SRRS by Holmes and Rahe (1967) marked the beginning of life events research. The SRRS was a sophistication of a previous measure, the schedule of recent events (SRE). The SRE is a list of forty-two events which were chosen on the basis of clinical observations (Rahe, 1974a). Respondents could record, for specified time periods, the frequency of occurrence of these events. Also illness rates and types were recorded. It was found that for a variety of illnesses, the time of illness, or illness onset, was significantly associated with a high level (or 'cluster') of reported life events (e.g. Hawkins et al,

1957; Rahe et al, 1964). So the SRE simply used the frequency of events as an indicator of life stress.

The SRRS was a significant refinement of the SRE as it allowed for an estimate of the magnitude of these events. According to Perkins (1982), Holmes and Rahe realised that some events on the scale (c.g. death of a spouse) would impose a far greater change than other events (e.g. Christmas). In order to obtain ratings of the magnitudes of these events, subjects were asked to rate the degree of readjustment they thought the event would require "regardless of the desirability of this event." (Holmes & Rahe, 1967, p. 213) In this conception of life events, it is change per se, rather than undesirable change that is viewed as stressful. These ratings represent the 'weights' given to each event.

For the list of events, the scores range from 11 (minor violations of the law) to 100 (death of a spouse). These scores represent life change units (LCU). Holmes & Masuda (1974) report that of those respondents who had LCU scores of greater than 300 over the past year 79 per cent had an associated episode of illness. For those experiencing between 200 and 299 LCU, 51 per cent experienced associated

illness. And for those with LCU scores between 150 and 199, 37 per cent had an associated illness. These early studies were retrospective, and respondents provided information about life events (the SRE) and major health changes by year of occurrence over the previous ten years.

Although the measures and methodology were criticised and refined almost right from the beginning (e.g. Masuuda & Holmes, 1967; Mechanic & Volkart, 1961) the SRRS has been widely used. Holmes (1979) estimates that the SRRS has formed the basis of over 1,000 publications. Relationships have been found between LCU scores and many health variables. For example, sudden cardiac death (Rahe & Lind, 1971), chronic illness (Wyler et al, 1971) and clinical depression (Paykel et al, 1969).

Studies which have used the SRRS have been criticised for a number of reasons. First, they assume that it is change per se, rather than undesirable change which produces increases in symptoms. Second, many of these studies only collect information about illness episodes and life events retrospectively, despite possible recall bias (Brown, 1974a), recall accuracy (Jenkins et al, 1979), and more general problems demonstrating cause-effect relations in such studies (Hudgens, 1974; Monroe, 1982a). Third, the

weighting of the life events assumes that the stressfulness of such events is best determined by general ratings of these events instead of individual ratings. This is by no means an exhaustive list of criticisms, those which apply generally to life events research will be discussed later. These particular methodological and theoretical problems are identified here as they explain how and why new measures of life events were developed.

The problem of retrospective studies is easily cured, and many studies have used prospective designs (e.g. Hinkle, 1974; Myers et al, 1974; Theorell, 1974) where future illness rates are predicted by present measures of stress. However, the two other problems identified above require new life events assessments to be developed.

4.3.2 The life experiences survey.

The life experiences survey (LES) was developed by Sarason, Johnson & Siegel (1978) in response to some of the shortcomings of the SRRS.

The problem of individual versus general (idiographic versus normative) ratings of the stressfulness of events has been the subject of much study (e.g. Fontana et al, 1979; Horowitz et al, 1979; Redfield & Stone, 1979). Most

of the objections to general scalings of life events were based on the observation that clearly certain life events would require more readjustment for some people than for others. For example the item "divorce" on the SRRS would presumably require variable levels of readjustment dependent on previous experience of divorce, the amount of change in domestic arrangements, whether or not children were involved, how predictable the divorce was, and so on. To give this life event a LCU value of 73, regardless of the actual circumstances surrounding the divorce seems to be a very inaccurate way of assessing the amount of readjustment this event requires, even if we believe that it is the amount of adjustment, rather than the undesirability of the event that will determine its stressfulness.

The issue of whether it is the positive or negative (desirable or undesirable) aspects of life events, or the change per se involved in readjustment to life events has also been the subject of much debate and study (e.g. Brown, 1974; Muller et al, 1977; Ross & Mirowsky, 1979; Vinokur & Selzer, 1975). Although there is evidence that it is the undesirability of the events that relates best to health outcomes (e.g. Gersen et al, 1974; Vinokur & Selzer, 1975), this issue has not been resolved, as other studies have

shown that desirable events on their own have an an impact on health (e.g. Miller et al, 1961). Also, Thoits (1981) has suggested that findings which support the idea that it is the undesirability rather than change per se that is related to health outcomes may be produced by the confounding of variables, and, that undesirable events may well be related to changes in psychological health, whereas change per se may be more associated with physical health (Thoits, 1983). According to Dohrenwend & Dohrenwend (1981a) the most extensively studied issue in the debate on the nature of stressful life events has been the conceptualization of the stressfulness of life events as either determined by change per se or undesirability of the event.

The LES attempted to take account of these possible shortcomings by allowing for both the desirability or undesirability of each event to be judged by the individual, as well as the impact of each event. In addition, the LES was tailored to the population being studied, so, for example in the case of the "pregnancy" item on the SRRS (Holmes & Rahe, 1967) which would only apply to a woman, this event was changed to "wife/girlfriends preganacy" for a male, and left just as "pregnancy" for a female (Sarason et al, 1978).

The LES contains 47 items and a scale next to each event starting at minus 3 and moving through to plus 3. In addition to checking those items they had experienced, respondents were also instructed to "indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time the event occurred. That is, indicate the type and extent of impact the event had. A rating of minus 3 would indicate an extremely negative impact. A rating of zero suggests no impact either positive or negative. A rating of plus 3 would indicate an extremely positive impact." (Sarason et al, 1978, p. 943) The LES also contains space to include three life experiences of the respondent's choosing.

It was found that the negatively rated items on the LES correlated better with some dependent measures of stress (psychological screening inventory, Beck depression inventory) than the LCU scores from the SRRS (Sarason et al, 1978). A slightly adapted form of the LES developed for children and adolescents, called the life events checklist (LEC) gives additional support to the idea that it is the undesirability of the events, rather than the change per se entailed by the events that is stressful (Johnson & McCutcheon, 1980).

It appears that the LES has not been widely used in life events research. Despite this, some researchers feel it represents an improvement over the SRRS (Sarason et al, 1982). The LES is only one attempt that has been made to construct a different type of life events scale. Other modifications of life events scales have generally involved increasing the numbers of events in the list, or classifying the events into 'types' (e.g. Paykel, 1969, 1974; Tausig, 1982; Dohrenwend et al, 1978, 1982).

Before a general discussion of life events research, one further development in life events measurement will be discussed.

4.3.3 The psychiatric epidemiology research interview.

The psychiatric epidemiology research interview has been developed by Barbara Dohrenwend, Bruce Dohrenwend and their colleagues (Dohrenwend et al, 1978, 1982). This measure has been chosen as the Dohrenwends are possibly the best known researchers in the area of life events (for example, Dohrenwend & Dohrenwend, 1974, 1981) and their view perhaps best represents those researchers who are committed to life events research.

The PERI contains 102 life event items which draw on previous life events inventories and the "researchers' own experiences". (Dohrenwend et al, 1978, p. 209) These events were then rated by judges using the same instructions Holmes & Rahe (1967) used for the SRRS, again giving the item "marriage" a value of 500, so the other events could be compared, and accordingly weighted.

A great deal of time has been devoted to methodological issues in constructing the PERI. Desirability of the events was rated simply in terms of gain, ambiguous or loss. The event was rated for its setting as either universal (occurring independently of any particular setting) or limited (to particular sociocultural settings). Other factors such as controllability over the event, and possible pathological consequences were also taken into account.

For all the sophistication of this measure, it is not clear why some classifications of the events have been chosen and others have been missed out. In fact, the only advantages the PERI has over other life events inventories are those that Dohrenwend et al (1978) identify. They propose procedural improvement for three aspects of life event scale construction. These aspects are "construction of a

life event list, selection of judges, and tests of whether judges agree on their ratings." (p. 205) Although such improvements are important, the three problems they identify can not be considered as the most important, even if one basically accepts the life events hypothesis.

Dohrenwend et al (1978) say in conclusion that the PERI life events scale does have technical weaknesses, these are no greater than in other scales, but are simply more visible in the PERI because of the methodological rigor used in its construction. "We believe, therefore, that despite its technical weakness the PERI scale will provide an improved measure of stressful life events. At the same time, we want to emphasize that, like any other scale, it is neither universal nor timeless. In contrast, we hope that the procedure we propose will lead to a general and permanent methodological gain in studies of stressful life events." (Dohrenwend et al, 1978, p. 228)

4.3.4 General comments about life events measures.

Since the publication of the SRRC in 1967 by Holmes & Rahe there has been considerable development in life event assessment techniques. Despite this, little more is known about the relationship between life events and illness and, as mentioned elsewhere, the predictive power of life events

in accounting for the variability of health outcomes has remained low at about 10 per cent.

A major problem with life events scales is the problem of weighting. Lorimor et al (1978) suggest that no useful information is provided by applying different weights to life events. In other words, a simple frequency count (as originally used in the SRE (Rahe et al, 1964)) can provide correlations of the same magnitude as weighted life events scores. Rahe (1974) reports that correlations between weighted life event scores (LCU) and non-weighted scores (simply giving each event the value of 1) have reached as high as .89 giving further support to the idea that ranking and giving weights to life events gives little more information than a simple frequency count.

It is often difficult to understand the enthusiasm shown by many researchers for life events. Increases in the sophistication of techniques does little for the predictive power of life events. Some researchers do however feel that life events research, as such, has gone about as far as it can go. "It is now time to stop replicating and embroidering the basic life events finding and to push on to generating and testing systematic theories of stress processes." (Thoits, 1983, p. 87)

4.4 The meaning of life events as stressors.

It is clear that in recent years, methodological problems have become a central feature of life events research. These problems focus on the methods, procedures, and statistical analysis which should be used.

"...differences about what procedure is best often seem to emerge from an underlying difference as to whether the measure should be designed to maximise the strength of its relationship with indicators of illness and disability or whether it should be designed to test hypotheses about relations between specific aspects of life stress and illness. The former aim dictates packing as much information as possible that might be relevant to occurrences of illness into life event measures. The latter aim, in contrast, dictates using measures that indicate as cleanly as possible single aspects or dimensions of life events." (Dohrenwend & Dohrenwend, 1981a, p. 6)

The tendency in a great deal of life events research is to judge the 'accuracy' of life event measures in terms of how well they account for variability in illness rates. Dohrenwend and Dohrenwend suggest in the above quote, that only those who pack as much information as possible into their life event measures are guilty of judging the accuracy of their 'life stress' measures by how well they predict illness rates. However, the problem for nearly all life events research is how else can the accuracy of life events measures be judged?

As Brown (1981a) points out "most life-event research has been based on a dictionary approach to meaning. A birth is considered a birth and no more." (p. 187) In other words, meaning is simply ascribed on the basis of a value (e.g. LCU), irrespective of the 'kind' of birth experienced by the woman (were there complications?, or twins?), or by the context in which the event occurred (was the child wanted?, will the mother receive support?). Given this very quantitative approach to life-events assessment, it is hardly surprising that the success of these measures have to be judged in quantitative terms (illness rates).

The problem with this attitude to the measurement of life events ("if the life events measure predicts illness rates more accurately then it must be a better measure of life stress") is that it makes assumptions about the stress-illness relationship which in fact it is setting out to demonstrate by using life events measures. The a priori assumptions made by some researchers are that:

1. Life stress causes significant health changes.
2. Life events are stressful.
3. Measures of life events should therefore predict health changes.
4. If life event measures do not predict health changes

very accurately, the measure needs refinement.

Very rarely are the first three assumptions challenged however, and the focus for life events research has been to refine the measures of life events used. The assumption which is most problematic is number 2, that life events are stressful.

Whilst it is clear that dramatic events in people's lives such as the death of a spouse may well have effects on health, the processes involved are far more complex than life events models of stress-disorder relationships suggest. Neglected variables have always been a problem in life events research. This is possibly because life events have in themselves become synonymous with stress and assumed a status which they were not intended to have. Kessler et al (1985) state that life events are "methodological expedients" (p. 539) and are not in themselves more 'stressful' than, for example chronic stress.

The simple idea that life events can relate to illness has generated a great deal of research. Most of it, unfortunately concentrating solely on the life events themselves as easily measurable entities. The development

and increasing sophistication of life event measures and statistical analysis has almost become more important than demonstrating the nature of the stress-illness relationship. For nearly all research in life events, the strengthening of the life events-illness correlation has assumed primary importance.

"In spite of the repeatedly observed trivial relationships between measures of change in life events and illness onset (or care-seeking behaviour), many investigators continue to focus on the linear relationship between independent and dependent variables without consideration or control of intervening and mediating variables, some of which easily lend themselves to standard measurement procedures. To advance the accurate prediction and understanding of illness onset, the design of empirical studies must take into account, as Mechanic and others have stressed, the complexity of the phenomena being studied." (Rabkin & Struening, 1976, p. 1019)

As stated in the quote above, many researchers feel that life events measures are an over-simplification of a very complex process, or set of processes which play a part in determining the relationship between the environment and health. For example, Aagaard (1984) suggests that life event studies do not take enough variables into account, and that a move towards a qualitative approach is required. Pearlin et al (1981) agree that stress is a complex process, and that research into social stress should "be raised to a level that matches the richness and intricacy of what it strives to explain." (p. 352) Rahe (1974) considers that given the number of intervening variables

that exist between a stressful life event and health outcomes "it is impressive that something as simple as a brief questionnaire recording of subjects recent life changes shows any significant correlation with a criterion as distant and unspectacular as subjects minor illness reports up to a year later." (p. 84)

Within the context of a complex set of variables that play a part in the stress-disorder relationship (e.g. social support, coping responses, personality factors, psychophysiological responses, organic predispositions, etc) it is difficult to examine the meaning of life events as stressors.

One issue in gauging the meaning of life events concerns the ipsative versus normative method of scaling such events. Some researchers believe that the meaning of life events should be considered as emerging from the perception of that event by the individual (in a social context). "A causal link between stress and illness makes theoretical sense only when considered in terms of the meaning of life events for particular individuals." (Brown, 1974, p. 235) "What is important for their consequences (life events) is the subjective meaning of the event rather than its objective character." (Antonovsky, 1974) This position

leads to personal scaling of life events (Zimmerman, 1983). On the other hand, some researchers think that the best way of judging the meaning of life events as stressors is by general, normative weightings of the stressfulness of (or amount of readjustment required by) events (Holmes & Rahe, 1967).

One problem with weighting events by general ratings (the means of weightings given by panels of judges) is that different groups may well have very different perceptions of the stressfulness of events. Many factors have been shown to significantly alter the perception of events. For example cultural and ethnic factors contribute to variability in weighting events (Thoits, 1983).

However, problems exist with subjective ratings of events. Subjects who are depressed, and psychiatric patients tend to rate events as more stressful (e.g. Paykel, 1971) thus causing confounding (Dohrenwend, 1979). The finding that confuses the whole issue of the weighting and meaning of life events is (as said above) that little "predictive power is gained from the use of either objective or subjective weights" (Thoits, 1983, p. 55). Although 'predictive power' may not be a good way to judge the 'accuracy' of life events weightings, it is clear that if

different scaling methods are used and produce little difference in predictive power of life events scores (e.g. McFarlane et al, 1980; Ross & Mirowsky, 1979) the meaning of life events as stressors is very unclear.

More recent theories about the meaning of life events (reviewed by Thoits, 1983) attempt to take account of other factors that may lead to disorder. Resistance factors such as coping and social support (see next chapter) are being incorporated into stress-disorder models. It is thought that it is the consequences of a life event, rather than the event itself which produces stress. Getting away from the non-specific idea of stress and illness, that stress in the form of life events lowers general resistance to all illness (e.g. Holmes & Masuda, 1974), it has been proposed that particular types of life events may be associated with particular health outcomes. Gersten et al (1974) and Thoits (1983) suggest that total amount of change involved in the life events (e.g. the SRRS) is more related to physical disorder, whereas undesirable change may be more associated with psychological disturbance. If this is the case then the nonspecific notion of the stress-illness relationship needs to be reexamined, and measurements of disorder should be more carefully conceptualized (Depue & Monroe, 1985).

The meaning of life events as stressors is difficult to determine, mainly because of the lack of research that has been directed at this question. But, as indicated above, research is perhaps moving towards addressing this crucial question although the evidence for such moves is not yet apparent in published studies. The reason why the meaning of life events as stressors is difficult to grasp is perhaps because they were not designed to have 'meaning' as such. They are best seen simply as an epidemiological research tool whereby simple measures of life events can account for some (but not much) of the variance in health outcomes. Although, as Thoits (1983) makes clear, life events research has methodological limitations and an atheoretical approach, it still has a fundamental importance in that it adds weight to the view that health and disease are the product of a complex interaction between social, psychological, environmental and biological factors where disease 'causation' as well as health 'causation' is multifactoral. A fact that life events research, in its enthusiasm to show the predictive power of life events, appears to have forgotten.

Other approaches to the measurement of stress do indicate some of the shortcomings in life events research. A brief and selective review of these will now follow to conclude

this chapter.

4.5 Other approaches to measuring stress.

The assessment of chronic stress has recently become a concern of a number of researchers (e.g. Eckenrode, 1984; Monroe, 1983; Lazarus, 1984). The idea that 'stress' can be measured as an independent variable is challenged in much of the work on chronic stress (Lazarus et al, 1985).

In life events research it is assumed that stress is 'out there' in the environment and puts strain on people when it 'hits' them in the form of life events. The individual's response to the event, and how that response unfolds over time has not been the concern of most life events research. Because of this approach, stress has been seen as an independent variable and disorder as the dependent (outcome) variable. If we view stress-disorder relationships as complex and multifactoral then an independent variable approach to stress is unacceptable. Dohrenwend et al (1984) suggest that:

".....some life events, some hassles, some networks, and some types of social support are consequences of personal dispositions in general and psychopathology in particular, whereas others are independent of such characteristics."
(p. 229)

What Dohrenwend et al (1984) go on to propose is that

measures of life stress should take these factors into account. This is what Lazarus et al (1985) describe as an attempt to clean up the independent variable, so that the relationship between stress (the independent variable) and disorder (the dependent variable) can be demonstrated more positively, and measures are not confounded.

The alternative view is expressed by Lazarus et al (1985) who state that stress does not exist in the absence of the person-environment relationship. How can one speak of an independent variable (stress) when stress only exists when it is perceived and experienced as such. The definition of stress is circular and can not be defined independently of the individual's reaction, which in turn will be determined by social support, coping responses and so on.

"Thus some of the confounding.....reflects the fusion of variables in nature rather than being merely the result of measurement errors of researchers. If we try to delete the overlap in variables of genuine importance, we will be distorting nature to fit a simpler, mythical metatheory of seperable antecedent and consequent variables. We urge researchers to be very wary of throwing out the baby with the bath water in their efforts to objectify stress as an event in the environment." (Lazarus et al, 1985, p. 778)

This view reflects a concern that stress should be seen as the result of a complex interaction between the person and their environment. This has been referred to as a transactional view of the stress-disorder relationship

(Caplan et al, 1984; Fleming et al, 1984; Lazarus et al, 1982; Lazarus & Folkman, 1984; Lazarus & Launier, 1978). It also views stress as a process, rather than a response to external environmental events (Folkman & Lazarus, 1986; Pearlin et al, 1981), with this process also being dynamic (Folkman et al, in press). (See next chapter for further discussion of the transactional view.)

Kessler et al (1985) claim that the diverse strands of research to be found in stress research are beginning to converge on a common conception of the stress process.

"At its center is the notion that stress exposure sets off a process of adaptation. It recognises that this process unfolds over time, and it acknowledges that this process is modified by structural factors as well as personal dispositions and vulnerabilities."
(Kessler et al, 1985, p. 565)

Given this view of the stress process, the development of measures to assess chronic stress is an obvious step, as life event measures tell us little or nothing about the process of stress and how it might be modified over time.

Although, compared to life events, relatively few studies of chronic stress have been published, early results are encouraging. Various measures have been developed, including daily hassles (Kanner et al, 1981) and minor life events (Monroe, 1983). Such measures are better associated

(than major life events) with psychological symptoms (Kanner et al, 1981; Monroe, 1983), daily reports of mood (Eckenrode, 1984; Stone & Neale, 1984) and somatic health (DeLongis et al, 1982). (See next chapter.)

Such frequent assessments of stress also provide an opportunity to study mediating variables such as social support and coping. These will be discussed in the next chapter.

The recent moves towards the assessment of chronic stress suggest that major life events give a very rough picture of stressful person-environment transactions. Stressful life events may well exert their influence on a daily basis in terms of chronic stressors. A life event is not an isolated environmental event, rather it imposes changes in daily living, and the way individual's perceive, organise and attempt to operate on the environment. Individuals could be experiencing considerable stress which would never show on life events inventories. From the vast number of situations, experiences and events that could be experienced as stressful, life events probably represent only one small part of the total. They have the added disadvantage of encouraging a view of stress as external and objective (engineering analogy) whereas in fact stress

can not be said to exist independently of people perceiving it as such.

Research into chronic stress is an encouraging development in the assessment of stress where life events research is dominant. However, there are many conceptual and methodological problems involved with the development of chronic stress measures, so while they are a welcome departure from crude life events assessments of stress, they should be viewed critically and with caution. If this is done, some of the problems encountered in life events research as a result of over-enthusiasm and non-critical acceptance, may well be avoided.

4.6 Conclusion.

Life-events are the most widely used measure of stress. They have not proved very successful either in terms of accounting for variance in illness rates or in terms of providing adequate explanations for the stress-disorder relationship. Part of the problem is that researchers in the area have very different aims. Whilst some look for epidemiological factors, which can explain variability in general illness rates for groups of people, and how they can be readily measured for the large groups involved, other researchers are much more psychologically oriented,

looking for psychological factors such as coping responses or social support to explain the variability in disorder. These researchers are more interested in the processes involved than being able to predict disorder for large groups of people. Although these two different aims may never be resolved, there is no doubt that factors such as social support and coping responses play an important role in a multicausal model of health, disease and adpatation. It is these mediating factors I will go on to consider in the next chapter.

CHAPTER FIVE

THE ASSESSMENT OF MEDIATING VARIABLES

5.1 Introduction.

In this chapter I will briefly discuss two factors that are thought to play a part in the complex interaction between person and environment in the production of both health and disease. I have chosen to look at coping responses and social support. The reason for this choice is not because these two factors are the most important, or most interesting (see 5.2), but because they provide a good example of the kind of factors that must be taken into account when considering the effects of stress on health. Also, these two factors are often examined together (e.g. Andrews et al, 1978; Billings & Moos, 1981, 1984; Hirsch, 1980, 1981) as social support and coping are often interdependent. For example social support can lead to effective coping, and coping itself can mean the successful mobilization of social support.

In this chapter I will discuss these two factors separately, although, as indicated above there can be a large degree of overlap in these variables.

Before starting the discussion of coping and social support it is worth looking at some of the other factors which have been found to be important in the stress illness relationship.

5.2 Other mediating factors.

The factors which are said to play a part in the complex interaction between person, environment and health are referred to in a number of ways.

Jenkins (1979) calls such factors "psychosocial modifiers" which are "...various biological, psychological, and social variables.....suggested to act in powerful ways to modify the relation between stress inputs and psychiatric outcomes." (p. 15) Cronkite & Moos (1984) use the term "moderating factors" to describe social supports and coping. Billings & Moos (1982, 1984a, 1985) refer to the multidimensional aspects of social networks as "social resources". Norris & Murrell (1984) define resources as "those relatively stable conditions and supplies that are appraised by the person as available for use in meeting life changes" (p. 424). Berkman & Syme (1979) report that "people who lacked social and community ties were more likely to die.....than those with more extensive contacts." (p. 186) They refer to the idea of "host resistance" to explain these different death rates, as "social and community ties may be protective against wide variety of disease outcomes". (p. 202) Cohen & Wills (1985) review the "stress-buffering" model of social support. It is called

"buffering" as it is suggested that social support "buffers" or protects the person from the "potentially pathogenic influence of stressful events." (Cohen & Wills, 1985, p. 310)

All these terms, 'modifiers', 'moderating factors', 'social resources', 'host resistance', 'buffers' somehow suggest that stress is a physical force. This goes back to the engineering analogy discussed in chapter 1. It is as if there is a battle being fought against the external enemy, stress. We use 'resources' to put up 'resistance' to, or 'buffer' this external force. The effect of the 'input' of stress is so modified by the buffers and resisting forces.

Seward (1984), an engineer, has suggested that there are ways in which "structural engineering concepts could be used to build and analyse realistic mental models." (p. 4) Terms such as stress, strain, fatigue and collapse are common to both psychology and engineering. It appears as though many researchers picture the effects of stress in the same way as an engineer might picture the effects of stress on an object. The problem with this approach, which is rarely made explicit, is that it tends to allow researchers to talk of 'stress', 'buffers' and 'resistance' without having to look too closely at the processes

involved. For example, we can say that social support buffers the effects of stress, as those people who have higher rates of social support are less likely to fall ill than those with lower rates. The use of the term 'buffer' here neatly allows us to 'explain' how social support may play a part in the stress-illness relationship without actually explaining anything.

Although Cox (1978) suggests that the engineering analogy is too simplistic, this is probably because he uses a very simple idea of structural engineering. Seward (1984) uses more sophisticated models of structural engineering which would allow us to "go beyond simpler deterministic attempts to explain behaviour". (p. 6) Such models can analyse thousands of inter-related variables and stress within continuous structures (such as car bodies).

The main problem with the engineering analogy is that it permeates and restricts the ways in which we think about stress and its possible relationships with health and illness. In general, stress is thought of as an external force, which has to pass through certain buffers, filters, or mediators. "In sum, a subject's recent life change experience passes through several steps of perception and defense before bodily symptoms are perceived and perhaps

reported." (Rahe, 1974) Rahe also pictorially represents life change in terms of a beam of light which passes through lenses and filters before it is focused on an 'illness rule'. This uni-directional idea of stress is common in most stress research, and most 'moderating' variables are seen as filters, modifiers, or buffers in between the environment and the person.

Personality factors have been the subject of much research. The two main personality traits, or dimensions that have been examined are the hardy personality, and the type-A, type-B distinction, although other personality variables have been studied (Minter & Kimball, 1980).

Kobasa (1979) developed the idea of the hardy personality. The main hypothesis is that those who have hardy personality characteristics are less likely to become ill than those who do not have such characteristics during periods of life stress (Kobasa, 1982). The hardy personality characteristics include commitment to self; vigorousness towards involvement in one's environment; a tendency to meaningfully evaluate the impact of life events in terms of a general life plan; internal locus of control; and the ability to perceive relatively little stress emerging from personal or inner-life concerns (Kobasa,

1979a). It has been shown that "stressful life events and predisposition increase illness, whereas personality-based hardiness decreases illness." (Kobasa et al, 1981)

The type-A, or coronary-prone behaviour pattern has been described as containing the following characteristics: An intense drive to achieve poorly-defined but self-selected goals; an eagerness to compete; persistent desire for recognition and advancement; continuous involvement in diverse activities subject to time restrictions; habitual tendency to accelerate the rate of execution of mental and physical functions; and extraordinary mental and physical alertness (Taggart & Carruthers, 1977). The type-B personality displays the opposite characteristics. The type-A behaviour pattern is also described as the coronary-prone behaviour pattern as studies have shown that those individuals who display type-A characteristics are more likely to develop coronary heart disease than those who display type-B characteristics (e.g. Rhodewalt et al, 1984). It has been found that type-A persons show significant rises in serum cholesterol and enhanced discharges of catecholamines (Rosenman & Chesney, 1982), and is a source of risk for coronary heart disease independent of traditional risk factors (Carver & Humphries, 1982) such as diet, smoking and obesity.

Although personality characteristics do play a part in determining health outcomes, such distinctions as type-A, type-B have been criticized for being too simplistic in the sense that they do not take into account other factors such as hardiness, coping skills and environment. Friedman et al (1985) comment that "we no longer need additional studies that simply divide people in terms of type-A and type-B and then relate this classification to a dependant variable. Rather a multidimensional classification of peopleshould be employed." (p. 1313). This statement is typical of many researchers who find the epidemiologically useful type-A, type-B distinction psychologically unsatisfying as it does not examine the processes involved, such as coping (Rhodewalt & Davison, 1983).

Personality factors, social support and coping are the three main 'groups' of modifiers studied in relation to stress and health. However, other factors must be involved in the stress illness relationship, although such factors have certainly not been studied as extensively as they should be.

Cohen et al (1982) identify at least ten other potential mediators of the relationship between stress and illness.

These include, on an individual level, past experiences; genetic predispositions to illness; biological factors such as diseased organs, diet. On a social and environmental level, they list geographic and architectural characteristics; social prejudice and expectations; cultural belief systems; environmental stressors such as war and economic upheaval. Mechanic (1974) suggests that many stressors are "ambiguous and intangible; they are created out of the social fabric and the social climate that exist at any time." (p. 35) This perspective sees stress as arising in large part from the social structure in contrast to the life events approach which measures stress as easily identifiable, discrete events.

There is growing recognition that although stress is related to illness, the way it does so is subject to great individual variation. For many researchers (e.g. Garrity & Marx, 1985; Gentry & Kobasa, 1984) fuller consideration of the intervening variables is vital if we are to understand the way in which stress is related to both health and disease.

In this section I have only mentioned some of the factors which help to produce health and disease. Obviously in any fully comprehensive model of stress and illness a great

many factors would have to be taken into account, far more than researchers have even begun to consider. I will now go on to discuss briefly two of these areas of study, coping and social support.

5.3 Coping.

Coping has been widely studied in a rather non-systematic way. The result of this is that many definitions, conceptions, and measures of coping exist. It is not the purpose of this chapter to give a complete account of these different formulations, but rather, to selectively show the background to concepts of coping, and some of the important issues in this area.

5.3.1 Background to coping concepts.

According to Lazarus & Folkman (1984) the concept of coping has origins in two different research traditions, animal experimentation and psychoanalytic ego psychology.

From the animal experimentation tradition, coping is closely related to the idea of adaptation in evolution (Hamburg et al, 1974). Because of the biological basis of work in this area, coping tends to be defined in biological terms. Ursin et al (1978) have a definition of coping which is "based on the ultimate reduction of the physiological

arousal produced as a consequence of the novelty or threat of any given stimulus complex." (p. 13) As Miller (1980a) points out, the definition of coping as anything which reduces arousal is perhaps better described as the "coping effect" (p. 344) of a coping response, rather than coping itself. Whilst coping is related to health, and therefore must in some way affect psychophysiological responses, we do not know anything like enough about the nature of such responses, especially as they relate to long-term health outcomes to be able to say what a coping response must do, on a physiological level, to ensure health.

Coping defined in this way has mainly been used in animal experiments (e.g. Miller, 1980) or studies in humans where the task-demands can be defined by the the experimenter, such as parachute training and jumping (Ursin et al, 1978). As the scope of this discussion is limited to coping responses in naturalistic, non-experimental situations, the influence of this approach to the definition of coping is not extensive in the literature which deals with health, stress and coping.

The psychoanalytic background to coping on the other hand has had a large influence in determining coping concepts as they are used today. The main difference between the former

approach and the psychoanalytic, is that the psychoanalytic approach takes more interest in cognitions, thoughts, and feelings as coping responses, rather than overt behavioural responses, or measurable physiological changes.

It is interesting to note here, as mentioned in chapter 1, that Freud outlined the signal function of anxiety, which alerts the individual to the conflict or potential conflict, so they can respond in adaptive ways, or cope. This is in fact similar to the idea of biological coping outlined above, where coping acts to reduce physiological arousal.

Ego psychologists, such as Haan (1977), Vaillant (1977), Shapiro (1965) and Menninger (1954b) have been responsible for developing classifications of ego processes such as coping, defense and neurotic responses. Such work draws on Freud's earlier work on the functions of the ego, and more particularly on the conflict-free ego sphere (Hartman, 1958) where the ego deals with, and processes threatening information which is not involved with potentially pathological mental conflicts. In other words, everyday stressors, threats and tensions. Also, ego psychologists introduced the idea that coping responses form a repertoire. Some responses are appropriate in terms of

reducing stress or threat, whilst others are not. This allows the coping response itself to be kept distinct from the effectiveness of that response and so to examine if and how coping responses might make a difference to adaptational outcomes (e.g. Ilfeld, 1980; Menaghan, 1982; Pearlin & Schooler, 1978).

One of the most important figures in the area of coping is Richard Lazarus, whose book "Psychological stress and the coping process" (1966) first discussed the idea of 'cognitive appraisal' which has become a key element in many conceptions of coping. The work of Lazarus will be discussed later in this section. Although cognitive factors play a large part in coping responses, it is important to understand that the term coping refers to other phenomena as well.

Menaghan (1983) distinguishes three categories of coping variables. These categories provide a useful way of assessing the broad way in which coping has been conceptualized. Each category will be considered in turn.

5.3.2 Coping resources.

The first, coping resources, are defined as "generalized attitudes and skills that are considered advantageous

across many situations". (p. 159) Such resources include attitudes about self, (such as esteem), attitudes about the world (e.g. coherence, mastery), intellectual skills (e.g. cognitive, analytic abilities) and interpersonal skills (e.g. ability to communicate). Attitudes about self may also include locus of control. It has been found that subjects with an external locus of control appear to show greater mood disturbance to negative life events than those with an internal locus (Lefcourt et al, 1981). Also, those with external locus of control have significant levels of trait anxiety and depression in response to negative life change (Johnson & Sarason, 1979), and appraise stressful episodes differently (Parkes, 1984). These generalized attitudes and skills have not been formally examined in any depth in relation to stress. Such skills represent the background on which particular coping strategies will be developed. Personality factors such as type-A (see above) may well contribute to these background skills. The finding by Friedman et al (1985) that the non-verbal expressive style of some type-A men was repressed and tense indicates the complex way in which personality and situation may interact to produce general skills (or in this case, lack of such skills) that are part of resources. The repressed and tense non-verbal expressive style of some type-A individuals may well make it more difficult for other

people to talk and relate to them with ease, so reducing supportive social interaction which may well facilitate coping.

Also, factors such as social class, gender, and education will determine the level of these generalized resources and the coping responses available (Pearlin & Schooler, 1978). It has been suggested that the higher rates of psychological distress found in groups with lower socioeconomic status may well be due, in part, to the less effective coping responses used by members of such groups (Kessler, 1979, 1982). As said above, little direct research has been undertaken in this area, although general skills will obviously have a major effect on the limits of coping ability.

5.3.3 Coping styles.

The second category of coping variables described by Menaghan (1983) are coping styles. These are generalized coping strategies which remain fairly consistent over different stressful episodes. For example, Lazarus & Folkman (1984) give the example of flexibility and complexity as two possible coping styles. Flexibility refers to whether a person uses the same coping strategy or set of strategies in different situations, or whether they

vary the strategies they use depending on the situation. Complexity refers to the range of coping strategies used in stressful encounters. A complex style would be one where the person uses multiple strategies or combinations of strategies. A simple style might be one where the person tries only one coping strategy. As Lazarus & Folkman (1984a) note, the idea of coping styles comes from psychoanalytic ego psychology (e.g. Shapiro, 1965) the current usage of the term, like the current usage of the term coping, is widened to include many other factors such as situational demands, behavioural responses, and conscious cognitive appraisal.

A number of studies have looked into the use of coping styles, although each study uses different measures of coping, and different conceptualizations of styles. Ilfeld (1980a) in a paper describing the coping styles of Chicago adults finds that three major patterns of coping style. These are taking direct action, rationalization avoidance of the stressor, and acceptance of the stressful situation with no attempt to change the situation. In this study the coping styles were assessed across the particular social roles involved in marriage, parenting, finances and job. It was found that the styles used varied across the social role situations which "suggests that coping styles are tied

more to the situation than to the manifestations of a particular personality type." (Ilfeld, 1980a, p. 5) This contrasts with other conceptions of coping style where personality and coping styles are intrinsically linked and so remain constant across situations (e.g. Vaillant, 1977). Such differences in the conception of coping style arise out of different notions of what coping is, rather than conflicting or contradictory empirical evidence. Folkman & Lazarus (1980) found that the context of the stressors tends to determine the coping. For example, work contexts were more associated with problem-focused coping. Stone & Neale (1984a) found that similar types of problems produced similar coping responses within individuals. Situational determinants appear to be stronger than personality or individual determinants of coping responses (McCrae, 1984).

So it would appear that, based on non-psychoanalytic conceptions of coping responses, individuals do not have a consistent 'coping style', although some strategies may be used more often than others (Sidle et al, 1969). Furthermore it is not clear that these favoured coping strategies represent a 'style', and more likely, strategies will vary across situations (Moos & Billings, 1982). Psychoanalytic conceptions of coping, on the other hand, see individuals as displaying certain styles or traits of

characteristic patterns of coping responses (e.g. Vaillant). In addition, psychoanalytic conceptions of coping place coping responses, or ego processes in a hierarchy (e.g. Haan, 1977) which to a degree assumes that coping processes can be defined as adaptive or maladaptive independently of the situation in which they are used.

The evidence for coping styles, (that individuals use similar patterns of coping responses across different situations) is not very strong if our conception of coping includes cognitive and behavioural efforts, as well as ego processes. The idea of coping styles has been popular in the past, but with a general move towards the conceptualization of coping as a dynamic, changing process, situational factors are seen as more important in determining the type of coping response produced. Also, researchers realise that psychoanalytic conceptions of coping responses are limited. If we only count relatively few responses as coping responses, then the limited repertoire will make it much easier to characterise responses as styles (Lazarus & Folkman, 1984a). Another factor leading researchers away from coping styles is the move towards more detailed assessment of coping over a larger range of stressful person-environment transactions. Limiting the number of coping responses sampled, by

limiting the number over time, restricting the number of situations observed, and summarizing coping responses over time will blur the distinction between different types of coping and will more likely lead one to conclude that consistent coping styles are being observed.

5.3.4 Coping efforts.

The third category of coping variable Menaghan (1983) describes is coping efforts, which are "specific actions (covert or overt) taken in specific situations that are intended to reduce a given problem or stress." (p. 159)

This is the most important category of coping variable, as it is at the heart of how coping is conceptualized and measured. There is a great deal of debate surrounding the conceptualization of coping (Kessler et al, 1985; Ray et al, 1982; Moos & Billings, 1982; Haan , 1982; White, 1974). Only some of this debate can be covered here.

One of the central problems, which emerges from the problems involved in conceptualizing coping, is that of measurement or assessment. Most measurement has focused on the appraisal and/or the response to stressful situations. Pearlin & Schooler (1978) developed a measure of coping from a series of open-ended interviews. They identified 17

different coping themes, or coping responses, which sample three major types of coping. These are: "(1) responses that change the situation out of which strainful experience arises; (2) responses that control the meaning of the strainful experience after it occurs, but before the emergence of stress; and (3) responses that function more for the control of stress itself after it has emerged." (Pearlin & Schooler, 1978, p. 6) An example of an item from the scale developed is as follows. For marital coping responses, on the "controlled reflectiveness vs. emotional discharge" scale we find items such as. "How often do you: (1) Yell or shout to let off steam; (2) Find yourself thinking over marital problems; (3) Have you read any books or magazines recently about getting along in marriage." (Pearlin & Schooler, 1978, p. 20) Even though this is only a partial listing, the type of questions asked in this measure can be seen. This measure has been criticized as it does not give us any information about the way in which people actually cope in specific stressful episodes, nor does it give information about successful coping, rather it only finds out about coping with persistent and structural life strains (Folkman & Lazarus, 1980).

Another measure of coping developed by Folkman & Lazarus (1980) and others, attempts to overcome these problems, and

introduce the idea of cognitive appraisal, which is a major concept in coping theory. The 'Ways of Coping Checklist' is probably the most widely used measure of coping strategies (Kessler et al, 1985). Lazarus (e.g. 1966, 1977a) distinguishes between appraisal and coping. Appraisal is "the cognitive process through which an event is evaluated with respect to what is at stake (primary appraisal) and what coping resources and options are available (secondary appraisal." (Folkman & Lazarus, 1980) In other words, primary appraisal determines the significance of the event. There are three major types of primary appraisals: Harm-loss, where damage has already occurred; threat, which is the anticipation of harm or loss; and challenge, where the significance of the event is seen in terms of an opportunity for mastery or gain. Secondary appraisal is where the person considers the coping options available to them. According to Lazarus, primary appraisal and secondary appraisal interact to determine the degree of stress, and the degree and quality of the emotional reaction. The Ways of Coping Checklist contains 68 items "describing a broad range of behavioural and cognitive coping strategies that an individual might use in a specific stressful episode." (Folkman & Lazarus, 1980, p. 224) These items are classified as problem-focused or emotion-focused. Problem-focused items describe cognitive problem-solving

efforts and behavioural strategies for altering or managing the source of the problem. (e.g. Made a plan of action and followed it. Got the person responsible to change his or her mind.) Emotion-focused items describe cognitive and behavioural efforts to reduce or manage emotional distress. (e.g. Accepted sympathy and understanding from someone. Tried to forget the whole thing.) Usually, subjects are asked to consider the most stressful event that had occurred that month (Coyne et al, 1981) or week (Folkman et al, 1986, in press). In most of these studies, primary and secondary appraisal were assessed also. Primary appraisal was measured with items that described the stake people might have in a specific encounter involving harm-loss, threat, and challenge. Secondary appraisal was measured with items which described the range of options for coping involved.

This checklist has been used several times. Coyne et al (1981) have used it to look at the coping of depressed vs. non-depressed persons in stressful episodes. It has also been used to look at emotion and coping during a college examination (Folkman & Lazarus, 1985), the relationship between appraisal, coping, and symptoms (Folkman et al, 1986), and the relationship between appraisal, coping, and stressful encounter outcomes (Folkman et al, in press).

Another measure developed to assess coping contains 87 items which are broadly similar to the Ways of Coping Checklist (Stone & Neale, 1984a). An important difference here is that coping was recorded on a daily basis, as a response to the "most bothersome event or issue of the day". (Stone & Neale, 1984a, p. 897) The significance of the event (appraisal) was also recorded. In this study much more attention is given to the problem or stressful encounter. For example, respondents are asked how often (if at all) the problem or situation had occurred before.

These measures of coping share more or less the same conceptualization of coping. Lazarus & Folkman (1984) define coping as "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person." (p. 141) Stone & Neale (1984a) define coping as "those behaviours and thoughts which are consciously used by an individual to handle or control the effects of anticipating or experiencing a stressful situation." (p. 893) Pearlman & Schooler define coping as "any response to external life-strains that serves to prevent, avoid, or control emotional distress." (p. 3)

5.3.5 Coping as a mediator.

Although three types of coping variable have been identified, resources, styles, and efforts, it is the coping efforts or responses I have given most attention in this section. Early conceptions of coping focused on psychoanalytic ideas, where coping and defense are seen more as unconscious responses to conflicts. More recent ideas emphasise the very conscious nature of coping responses, indeed the measures of coping outlined above assume that people have knowledge of the coping strategies they are using. However, this assumption has been challenged (Haan, 1982; Ray, 1982) as many coping efforts may not be deliberate or conscious, and so not accessible by direct means.

A problem with all the above measures of coping is that they limit the number and type of coping responses an individual can record. Although these measures agree that coping responses can be categorized as emotion or problem focused, they do not agree on finer categories which more closely describe the functions of particular coping responses.

The popular conceptions and measures of coping outlined

above do not really apply to coping with life events. They apply to stressors that are likely to occur on a weekly, monthly or daily basis, or chronic life strains (Pearlin & Schooler, 1978). There is a large gap between the measurement of stress in terms of life events, and these measures of coping. Although both these phenomena are interrelated, as part of the process which leads to health and illness, the conceptualization of stress made by researchers in the area of coping, is quite different from that of life events researchers. Both Stone & Neale (1982, 1984) and Lazarus (1984) have developed measures of stress that are quite different from life events measures. Stone & Neale have studied the effects of daily events on mood (1982), and Lazarus and his colleagues use daily hassles as a measurement of stress (DeLongis et al, 1982; Kanner et al, 1981). The significance of this different approach to stress measurement amongst those researchers who also have an interest in the assessment of coping will be discussed later.

"..despite the enthusiasm and interest that have been shown for the construct of coping, we have just barely begun to scratch the surface. There is debate about how coping strategies should be conceptualized, and little progress has been made in developing objective, reliable, and valid ways of capturing the coping process. Although it is widely assumed that choice of coping strategies can ameliorate the impact of stressful experiences, there is surprisingly little sound, empirical research bearing on this assumption." (Kessler et al, 1985, p. 559)

As indicated by Kessler above, research into coping is not well advanced. We do not have the answers to basic questions about stress and coping. The reason for this may well be because of the dominance of life events research, and the idea that life stress is best represented by life events. For those who view coping as a dynamic, ongoing process, a transaction between the individual and stressful encounters, life events approaches to stress offer little chance to study coping as a dynamic process. Although research into specific life events has been undertaken (Kessler et al, 1985), the findings from such studies tell us little about coping processes and strategies in general. Also, if we ask questions about coping with the 'whole' life event, then we may well find out very little about the coping processes involved if the life event was stressful because of the chronic, day to day stresses it produced.

For example, in the case of death of a spouse, the actual death might be 'coped with' very well. However, the loss of income such a death might bring about, may well cause a great deal of chronic stress, which is not 'coped with' very well at all. Assessing coping to life events alone is not an adequate way of "capturing" the coping process. From this, it also follows that assessing life events is not an adequate way of assessing life stress, as many of the

problems and situations which people have to cope with are not picked up by gross life events assessments.

5.4 Social support.

The literature on social support is very large (e.g. Caplan, 1974; Gottlieb, 1981; House, 1981; Sarason & Sarason, 1985). According to Wilcox & Vernberg (1985), more attention has been paid to social support than all the other stress 'moderators' (e.g. coping, personality factors) combined. Even a brief review of the literature is beyond the scope of this chapter. Many reviews of the effects of social support on health already exist (e.g. Broadhead et al, 1983; Henderson, 1984; Kaplan et al, 1977; Sarason et al, 1985a; Turner, 1983). This section will be limited therefore to a discussion of some issues in research on social support which are seen as important generally in the literature, and which are relevant to this thesis.

Social relationships have long been known to play a large part in health and disease. For a long time however, the negative aspects of social relationships have been emphasised in the clinical literature. The beneficial aspects of informal social support systems have only been systematically studied in detail for the last twenty years

or so (Suls, 1982). The emphasis on the positive aspects of social support has tended to overshadow the fact that many social relations also involve a good degree of conflict (Abbey & Rovine, 1985; Kessler et al, 1985). The term 'social support' "prejudges an effect of social ties that empirically is still only putative, since whether or not social supports are in fact supportive is still at issue." (Pearlin & Schooler, 1978) The negative aspects of social relations should be borne in mind during the following discussion of two pertinent issues in the area of social support, and its relation to health.

5.4.1 Conceptualization and measurement of support.

Although there is little agreement on the conceptualization of social support, many researchers see social support as a multidimensional concept (Thoits, 1983) and that the assessment may involve both the quantity and quality of support (McFarlane et al, 1984).

As in the case of coping (or any construct), the theoretical conceptualization of social support will determine the nature of the measuring instruments developed.

Many different measures of social support exist. One result

of this is that "the task of empirically demonstrating the effects of social support has barely begun." (Sarson et al, 1983) Early measures used scales with a few items to assess support. Lin et al (1979) used nine items in their scale which included information about respondent's feelings about the local community as well as quantitative information about the frequency of talking to neighbours. Miller et al, (1976) determined who their subject's friends and confidants were in order to assess social support. Such early studies were marked by "hastily constructed (or worse, post hoc) conceptualizations of social support and relatively superficial conceptualizations of the construct." (Vaux, 1982, p.2)

Since this time however, many new scales and measures have been developed. The Interview Schedule for Social Interaction (Henderson et al, 1980) attempts to measure the number of people in different categories of relationship the respondent has contact with, as well as a detailed assessment of what each relationship provides for the respondent. Also deficiencies in social relationships were assessed in terms of availability and adequacy. An individual may have high levels of available relationships, but they may be inadequate. This measure contains 52 items and is administered during an interview. Such a measure

provides very detailed analysis of the respondents social network, and the quantity and quality of social support it provides.

Vaux (1982) views social support on three levels, namely, resources, behaviours, and feelings. The measure developed from this asks respondents to list ten people who are important to them in each of five areas (e.g. emotional support givers; advice givers). Then, for each person on this list, nine questions are asked, such as what social sector the support-provider comes from (e.g. workplace; family), and how complex the relationship is. The next section of the measure, dealing with behaviours, asks 45 questions about how likely friends, or, family are to give various support. (e.g. would listen to my feelings; would go to a movie or concert with me.) The third section deals with feelings or social support appraisals, which makes 23 statements which the respondent has to rate for the degree to which they agree with them. (e.g. My family cares for me very much; people admire me.) The social support appraisals scale has been subjected to tests for reliability and validity and was found to be as good in these respects as other measures of support appraisals (Vaux et al, in press). Using these measures the relationship between social support satisfaction and network characteristics has

been studied. This relationship was shown to be a complex one (Vaux & Harrison, 1985).

Sarason et al (1983) have developed the Social Support Questionnaire. This measure gives scores for the perceived number of social supports, as well as the satisfaction with these supports. Other measures have made a distinction between effective and ineffective social supports (McFarlane et al, 1984), assessed the objective determinants of perceived social supports (Cutrona, 1986), studied the relationship between levels of social support and social skills and attractiveness (Sarason et al, 1985b).

Such changes show an increasing sophistication in researchers' conceptualizations of social support. Many problems encountered in demonstrating the relationship between social support and health occur because of confounded measures. For example in life events inventories, loss items, such as death of a spouse may have health effects that are due as much to the loss of social support as the stress associated with loss of a spouse (Thoits, 1982). This type of confounding leads to problems in assessing the effect of social support on 'buffering' stress (Turner, 1983), which will be discussed in the next

section.

Henderson (1984) outlines six requirements for the measurement of social support. Such measurement must specify exactly what is meant by social support. The indices used must be reliable and valid. The sampling procedure used should take account of the possibility that social networks may undergo changes. Symptoms should not affect the measure of support as confounding would occur. The measurement should not be confounded by life events, social support and life events may influence each other as indicated above. Finally, social support measures should not be confounded by personality traits. Social support may be the product of social competence (Sarason et al, 1985b), and individuals may vary in their requirements for social support, depending on personality variables. Such requirements have not yet been met by any measure of social support. It is clear from the requirements that Henderson (above) gives, such a measure of social support would be impossible to obtain, because of the confounding of variables. Such confounding means that causal relationships between social support, stress, and disorder will may prove difficult to demonstrate.

"...it seems likely that future studies of the aetiological hypothesis will fail because social support and personality are inextricably linked."
(Henderson, 1984, p.51)

Establishing causal links between disorder, stress and social support is dependent on the conceptualization and measurement of social support. If current, sophisticated conceptions of social support remain, the measurement we wish to make of social support will be confounded by other variables, and so any simplistic, general causal links we may wish to demonstrate will remain unproven. Social support is only one factor which is intertwined with many others in determining health outcomes.

5.4.2 Buffering versus main effects.

This issue has been the subject of much discussion and research (Aneshensel & Stone, 1982; Cohen & Wills, 1985; Cohen et al, 1985; Gore, 1981; Lieberman, 1982; Parry & Shapiro, 1986; Thoits, 1982; Turner, 1981). A full discussion will not be attempted here, but the main problems in this debate will be briefly sketched.

The focus of the debate is the effect social support has on well-being. The main or direct effect model states that social support has an overall beneficial effect independently of the effects of stress. The buffering model states that social support exerts its effects on well-being through 'buffering' or protecting persons from the harmful effects of stressful events. In other words, is social

support beneficial irrespective of life stress, or is it only beneficial in that it provides protection against stressful events?

This debate appears to be unnecessary, why could not both processes operate? The theoretical level of this debate is typical of the simplistic and crude approach to conceptualizing social support (and to other variables in life stress research). Although it is important to know how social support operates, to set up only two possible options severely restricts possible outcomes. Lieberman (1982) lists six ways in which social support may play a part in well-being, and there are probably many more.

Where this debate has been considered, we find the following kind of conclusions. "...it does not seem currently possible to resolve the direct - versus buffering effects question ...social support tends to matter for psychological well-being independent of stressor level...support tends to matter more when stressor level is relatively high." (Turner, 1983, p. 142) "The buffering hypothesis suggests that social support can moderate the impact of life events upon mental health. However several problems have yet to be resolved...Social support has been inadequately conceptualized and operationalized; therefore,

the specific dimensions of support that reduce event impacts can not be identified." (Thoits, 1982, p. 145)

"...studies comparing the main effect and buffering models have opened an important area of psychological research. With the accumulated knowledge from a decade of work, there is no longer a need to ask which model is correct. Both models contribute to the understanding of the relationship between social support and health." (Cohen & Wills, 1985, p. 353)

The buffering versus main effect debate is only part of a larger problem faced by all areas of stress research that look at so-called 'mediators' of the stress-disorder relationship. A brief discussion of this will conclude this chapter.

5.5 Modifiers, assets, resistance resources, and stress.

In this chapter I have presented a very brief sketch of two factors which are sometimes taken into account when considering the relationship between stress and disorder. A recurrent problem in all attempts to measure variables such as coping and social support is that these measures inevitably become confounded with other modifiers, assets and resistance resources.

Some measures of coping include measures of social support. Life events measures may be contaminated with social support measures. Disorder may predispose people to view their social relations negatively, so support measures become confounded with disorder. Personality factors may determine perception of social support, as well as predispose people towards certain coping responses. The list could be continued.

The relationship between stress and disorder is not unilinear. An overwhelming number of processes, traits, environmental situations, dispositions, and many other factors together contribute towards what we might call health outcome. Any efforts made by researchers to examine what factors may be related to health outcomes can only begin to scratch the surface. This is especially true if large correlational studies are undertaken which often preclude careful consideration of the processes involved, and unduly limit the conception and measurement of both the independent and dependent variables involved. Correlational, epidemiologic studies of this kind have to suppose the simplest kinds of causal relationships between variables in order to discover any relationships at all. It is interesting to note that throughout research into stress and health, many of the methodological problems examined

are statistical in nature (e.g. the scaling of life events). It is assumed that the methods of research adopted are suitable for the phenomena under study, and it is just a matter of adjusting, or adapting such research methods to the additional complications that stress -disorder research imposes.

The argument put forward in this thesis is that traditional research methods and designs are almost wholly unsuited to examining and exploring the phenomena under study. A major problem with this criticism is that research alternatives can not be offered to replace the current ones.

Modifiers, assets, and resistance resources are obviously involved in the production of health and illness. As soon as we try to measure such discrete variables, we soon discover that the conceptualizations we have of such modifying variables are simplistic and naive, as confounding between such variables occurs. One response to this problem is to refine and purify such variables, as the new measures of coping and social support discussed in this chapter bear out. However, such attempts to purify these variables may be misguided. They assume that stress is an external force in the environment (engineering

analogy) and that it acts unidirectionally upon us, therefore all moderating factors become predictor variables, and measures of health become the predicted, dependent variable.

"Thus some of the confoundingreflects the fusion of variables in nature rather than being merely the result of the measurement errors of researchers. If we try to delete the overlap in variables of genuine importance, we will be distorting nature to fit a simpler, mythical metatheory of separable antecedent and consequent variables. We urge researchers to be very wary of throwing out the baby with the bathwater in their efforts to objectify stress as an event in the environment. The positivist position has, over the past fifteen years, repeatedly failed to demonstrate its usefulness in stress and coping research." (Lazarus et al, 1985, p. 778)

5.6 Summary and conclusions.

In this chapter I have attempted to show some of the problems involved with the measurement of two factors which play a part in producing health.

The first, coping, has been assessed in various ways. But the move towards more detailed measurements of coping which examine many more coping responses for weekly or daily events was noted. The second factor, social support, has in a similar way moved from simple assessments to more complex ones.

The reasons for these more sophisticated measures are

two-fold. Firstly researchers were finding it difficult to demonstrate that such variables actually made any difference to health outcomes. The same problem has been experienced in measures of life events, as was noted in the last chapter. Secondly, researchers realised that their conceptualizations of these factors were simplistic, and did not explain the processes by which social support, or coping may in fact affect health outcomes.

Finally, it was argued that traditional correlational and epidemiological research methods were not suited to exploration of a complex set of interacting factors which intersect to produce health and disease. Traditional models of stress-disorder relationships are simplistic and unidirectional, drawing heavily on engineering ideas of forces, stresses and resistances. No alternative to traditional research methods has been proposed, and this is acknowledged as a problem. Such issues will be taken up in the final chapter.

CHAPTER SIX
SUMMARY AND CONCLUSIONS

6.1 Summary and conclusions.

In this chapter I will give an overview of each chapter in this thesis and attempt to offer some conclusions and possible alternative approaches. Throughout this thesis, I have tried to give the reader a 'feel' for some of the issues involved, rather than produce an exhaustive review of research findings. This approach can be criticized as by being selective, one is also inevitably being biased in the results and findings which are selected. However, the issues, and the historical and conceptual background to them, discussed here, do not depend for their strength on particular research findings. They are fundamental to the areas of research that examine the relationships between stress and health, and are unlikely to be changed by any new research findings, no matter how dramatic. Because of this, a selective approach is not likely to bias discussion of the issues.

The main aim of this thesis is to examine some of the problems and issues involved in studying the relationship between stress and health. Two major sources of these problems are the definition of stress, and conceptualizing the nature of the processes whereby many factors come together (including stress, whatever it might be) to produce health and disease.

6.2 Summary.

Chapter 2 examined the background to stress concepts, and how this background determined the considerable conceptual and definitional problems that have always been associated with stress. Such definitional and conceptual problems are thought by many to hold back progress as research findings can not be integrated, and research design has to depend on badly formulated concepts of stress.

Hans Selye is responsible for popularising the term stress. The development of his ideas was heavily influenced by two other researchers, who also influenced many other conceptions of stress. The idea of the internal environment, or the milieu interieur, developed by Claude Bernard, is a necessary prerequisite for many ideas of stress, including Selye's.

The function of the internal environment was to keep conditions inside the organism steady, so that the vital functioning of the internal organs could continue, despite large fluctuations in the external environment. The mechanisms which maintain this state were studied later in detail by Walter Cannon.

Cannon coined the term homeostasis to refer to the relatively steady state of the internal environment. He suggested that many homeostatic functions operate to work towards the maintenance of this state. Many later researchers, including Selye failed to make the distinction between homeostasis and homeostatic mechanisms. It is suggested that this blurring resulted in identifying homeostatic mechanisms as internal, physiological, chemical, and automatic. Cannon himself suggested that behavioural acts could be considered homeostatic mechanisms. Selye however considered that adaptive reactions occur only internally, and in fact defines stress as the common denominator of all these reactions.

In this way, the first conceptualization of stress located it as an internal physiological reaction. Adaptation to stress would occur in an automatic way, inside the body. Selye also included in his concept of stress the General Adaptation Syndrome, which is the way in which stress affects the organism over time. Although Selye's concept of stress popularised the term stress as a whole, many researchers have used the term in different ways.

Freud's dynamic conception of mental life made it almost inevitable that Freudians would at one time or other refer

to the term stress, along with other physically dynamic words such as strain and tension. Although Freud did not use the term stress, ego-psychologists who followed psychoanalytic ideas did, and started to use the term around the same time as other researchers who had more physiological conceptions of the term stress. In addition, ego psychologists developed taxonomies of defense mechanisms (or coping mechanisms) which describe the ways in which people respond in emotionally stressful situations. This development was important as the conception of stress used here included the idea of coping, just as the idea of coping includes the idea of stress.

The first laboratory experiments into stress (apart from Selye's where he produced organ and tissue damage in rats by exposing them to 'stressors' such as extreme cold, and poisons) were performed by ego psychologists who were interested in the use of defense mechanisms. Ego psychologists later looked at adaptation life stress in individuals over long periods of time.

A third major area where the term stress is used is in relation to human performance. Many of these early experiments were closely connected with performance as it related to the functioning of soldiers. Other experiments

were designed to look at how stress would disrupt skilled performance. It was noted that experimentation in this tradition was still widespread today. The conceptualization of stress in this area has never been as important as it is in others, as it is the disruption of performance that is of key interest, rather than the nature of the phenomena that can act to disrupt it.

The fourth area where the concept of stress is widely used is in areas such as psychosomatic medicine, health psychology and other areas where the effect of social and psychological factors on health and disease are examined. This area most critically has problems in conceptualizing and defining stress as it cuts across both the physiological and the psychological conceptions of stress mentioned above.

There are many different and confusing uses of the word and concepts of stress. This is mainly due to the different interests of researchers who use the term. The first chapter finished by suggesting that these different definitions of stress can be integrated by using a more general notion of adaptation. Using adaptaton as a framework, it can be seen that these diverse research traditions are looking at adaptation at different stages

and on different levels. They all use the term stress to refer to stages of the adaptive process. In Selye's biochemical model, stress is a state within the body induced by adaptive responses, and to which adaptive responses must respond to restore homeostasis. In psychoanalytic ego-psychology, stress is defined variously, but most importantly it is linked with adaptive responses in the form of ego defense or coping responses. This is adaptation on the psychological level. In stress and performance, stress disrupts performance and researchers are interested in how those processes which control skilled performance adapt to the stress. In stress and health, stress can also mean different things, but in general it refers to those factors which are likely to tax both physiological and psychological adaptive resources as they attempt to preserve health.

Chapter 3 was an attempt to show how stress became implicated as a factor in disease, both historically and conceptually.

Theories of disease play a crucial role in determining if stress will be implicated as a factor in disease. Historically we find that in the ancient past physicians accepted the role of the emotions in disease. The

discoveries of Pasteur and others encouraged a unicausal model of disease causation where psychological or social factors were thought not to play a part. However, one general conception of medicine, psychosomatic medicine, has always considered stress as a crucial factor in disease causation.

Early psychosomatic thinking was greatly restricted by dualistic notions of the mind and the body. In the more recent past, Freud reawoke interest in psychosomatic medicine and influenced Dunbar and Alexander who related certain personality characteristics to particular organic disease, and suggested that unconscious conflicts could play a role in the development of diseases. The term stress was not yet used in these explanations.

Psychoanalytic approaches to psychosomatic medicine suffered as no adequate psychophysiological mechanisms were put forward to explain how thoughts and emotions could produce diseases.

The idea of stress became very important in psychosomatic medicine as it provided an explanation of how psychological phenomena could express themselves in bodily responses. Selye's ideas about the General Adaptation Syndrome and the

diseases of adaptation had obvious applications to the field of psychosomatic medicine. It is interesting to note that both Bernard and Cannon had suggested many years before the rise in psychosomatic medicine in the 1950's that emotional experiences produced both psychological and physiological responses.

Psychosomatic medicine now had an adequate scientific explanation of how psychological factors could cause disease, and its popularity rose considerably as a result. Also, now that stress and disease had been linked together, research into stress and disease became an area of study in its own right, and was no longer linked so strongly to psychosomatic medicine.

The key link then, between stress and illness is the way in which psychological or emotional 'stimuli' can induce physiological change. Cannon described the fight or flight response, which was the first attempt to establish the functional relationships of physiological responses and psychological stimuli. Although such responses are useful in preparing us for physical action, they can be damaging if repeated or too prolonged.

A major problem is explaining why such physiological

responses occur when physical action (which the response prepares us for) is often an inappropriate and unhelpful course of action to take. Although some people have suggested that such responses remain as an evolutionary throwback, there is little evidence for this.

Another major problem in explaining the relationship between external stimuli and internal physiological responses is that so many different stimuli seem to produce the same response. How does the nervous system detect such stimuli, what can they all have in common to produce a similar response?

Selye mainly used 'physical' stimuli (such as low temperatures and poisons) to produce stress in laboratory animals, so for a long time it has been assumed that emotional stimuli are somehow 'like' physical stimuli in their ability to produce a physiological stress response. However Mason has suggested that the common denominator in all these different stimuli is the psychological perception of threat. Physical stimuli such as cold have a large psychological component, as being exposed to inescapable low temperatures may well produce a fear reaction, and a perception that the situation is harmful or threatening. In this way, it may be the case that the common denominator of

these different stimuli is threat, and so physical stimuli are more 'like' emotional stimuli, and not the other way around.

The relation between imprecisely described reactions such as fight or flight and particular illnesses is very complex. Relatively little is known about physiological responses to different types of threat. Although it is clear in animal experiments that exposure to extreme stressors will produce illness, the link between stress and illness in humans is not so clear. Evidence suggests that responses to psychological stimuli are highly complex, and may be more specific than Selye suggested.

Some diseases are more obviously linked to stress responses such as fight or flight than others (e.g. heart disease, stomach ulceration). The causal link between stress responses and other diseases is harder to demonstrate. It is thought that stress might affect the immune system and so lower resistance to infectious diseases. One problem with checking the nature of the link, is that many studies make no attempt to distinguish between different illnesses and use very general measures of disorder.

Psychological disorders and symptoms have also been linked

with stress. The intervening mechanisms involved here are even harder to conceptualize.

The associations found between measures of stress and various illnesses are not strong. Because of this, and conceptual shortcomings in research, an increasing amount of attention is being paid to theoretical issues. One problem involves the assessment of stress which is normally made through life events measures. Other problems involve the number of variables taken into account in the relationship between stress and illness. Very often studies are correlational, and use only a few variables. Also, those variables that are studied are crudely conceptualized.

The very general approach to both the measurement of stress and the measurement of illness has been criticized. Some researchers now believe that the relationship between stress and illness is not the same for all forms of stress and all forms of illness and so can only be understood by looking at specific disorders.

Stress-illness research is at a crude level. Little is known about the mechanisms involved, and the measures and research techniques used do not usually allow for

consideration of such mechanisms. The term and concept of stress have been very imprecisely used in this area. Stress is normally seen as a stimulus in terms of a stressful event, and illness as non-specific measures of disorder. The processes and mechanisms involved in stress and illness are largely unknown. It is clear that the measure of stress we use will help to determine the strength of the relationship we find between stress and illness (if one exists).

Chapter 4 was concerned with how life stress has been conceptualized and measured. The main approach has been to use life events inventories.

The background to this approach is diverse. Meyer used a life chart as a diagnostic tool as he believed that major events in people's lives could play an important part in causing illness. Cannon also provided evidence that major events could produce physiological responses.

Life events research assumes that life stress is a factor in disease causation or illness onset, and that major life events cause stress.

In general, life events have been able to account for no

more than 9 per cent of the variance in disorder. With this in mind, many different life events inventories have been produced with the hope of increasing this figure. The poor predictive power of life events is viewed as a consequence of inadequate measurement, rather a result of an inadequate research paradigm. In life events research, scores for any individual in terms of life events are then related to subsequent illness scores.

The first life events inventory to appear was the Schedule of Recent Events. The SRE was simply a list of events which required some form of adjustment or adaptation. Life stress was measured simply by the frequency with which such events were experienced. The Social Readjustment Rating Scale gave these events different weightings by asking a panel of people to judge how much adjustment they felt each event would require.

The assumptions of these measures are that change per se is stressful, rather than just negative life change, as the inventories included events that were both positive and negative. Many studies which used these measures collected information retrospectively, which is subject to recall bias. A third problem involves the weighting of events for the relative adaptive demands they impose. It is assumed

that the stressfulness of a life event is best determined by general ratings rather than individual ratings.

The Life Experiences Survey attempted to resolve some of these problems by allowing for desirable and undesirable ratings to be given, and individual weightings.

More recently, the Psychiatric Epidemiology Research Interview has been developed. The PERI contains more events and more factors about the meaning of the event, for the individual, are taken into account.

Despite these developments, in terms of measurement, the predictive power of life events has not been increased. Little more is known about the nature of the relationship between life events and disorder.

Another problem, is that the weighting of life events appears to give no more predictive power than a simple frequency count. This makes it almost impossible to determine the meaning of life events, as stressors.

Life events measures can only take in very little information about the stress being experienced by an individual. They gather the minimum of information about

the event itself, and can not assess the response to the event, and so can not really judge how stressful it is at all.

Two responses to this unsatisfying level of progress in life events research can be identified. The first is to try and consider many more factors along with life events, such as social support and coping. The second is the development of alternative measures of life stress.

These alternative approaches involve the measurement of chronic stress, or stress as it occurs on a day to day, week to week basis. The assumptions of such research are that much of the stress people are exposed to can not be picked up by life events assessments, and that life events themselves are stressful in that they impose changes and demands in daily living which can only be measured by frequent observations.

The implications of this for stress research in general will not be summarised from chapter 3 here as a discussion of such issues will form the conclusion to this chapter.

Life events are the most widely used measure of life stress. Despite their lack of success in predicting

illness, they are still used. This may well be due to a model of stress which conceptualizes stress as an external event in the environment. Another reason for the persistent use of these crude measures is that the epidemiological approach, adopted by many researchers in this area, is more concerned with establishing general relationships between easily measurable social variables and health outcomes, rather than understanding the nature of such relationships and the processes involved.

Chapter 5 looked at two variables which are thought to play a part in stress-illness relationships. Social support and coping were used as examples of the complex assessment that is required when looking at the effects of stress on health.

Factors such as social support and coping are often referred to as moderating factors, or resistance resources in the stress-illness relationship. These phrases have a physical meaning and almost treat stress as though it was a physical force. This is like an engineering analogy, where stress is an external force, and the individual under stress is like a material, which may collapse or buckle as a result of the strain. The problem with this analogy is it restricts the way we think about stress. It implies that

stress is external and objective. And that the direction of the relationship between stress and a person is one way. No allowance is made for the way in which people actively operate in their environments as much as their environments operate on them.

Apart from social support and coping, personality factors are often studied as mediators. The hardy personality and the type-A/type-B distinction have been studied. Other possible variables which might play a part in the relationship between stress and health include such things as genetic factors, diet, cultural belief systems, and many others that we may choose to consider.

Research and theory about coping with stress comes from two traditions. Animal research and ego psychology. In animal research, the idea of coping is closely related to adaptation, hence successful coping is seen as coping which is biologically advantageous. This often means reducing the physiological arousal associated with stress, as prolonged elevation of arousal levels is damaging.

The ego-psychology concept of coping has had a larger influence on stress research. Ego defense mechanisms form an important part of many coping conceptualizations.

However, many conceptualizations exist. These can be best discussed in terms of coping variables.

Coping resources refers to general skills that may help an individual cope. For example locus of control is thought to play a part in the perception of life events. Personality factors also contribute to these background skills. The non-verbal style of type-A men may put them at a disadvantage when coping by asking others for advice. Class, gender and education have also been found to alter coping skills.

The second coping variable, coping styles involves the consistent use of particular coping strategies across different situations. As an example, a flexible coping style might be one where many different strategies are used, depending on the situation. Although many different measures of coping style are used, it appears that people do not have particular coping styles, but vary the coping responses they make across situations. The concept of coping styles is becoming less popular as coping is now viewed as a dynamic and changing with the situation.

Coping efforts are the third class of coping variable. These are actions (overt or covert) which are taken with

the intention of reducing a given problem or stress. This variable is at the heart of how coping is conceptualized.

Measures of coping efforts usually describe thoughts or actions which the respondent has to check if it applies to them. One of the most important ideas in concepts of coping is that of primary and secondary appraisal. Primary appraisal is where the significance of the situation is determined, and secondary appraisal involves calculating what coping resources and options are available.

Measures of coping recently developed take account of this distinction, such as the Ways of Coping Checklist. This contains items which cover behavioural and cognitive coping strategies. These items are divided as either problem-focused or emotion-focused.

It is interesting to note that nearly all measures of coping are not directed towards life events as the source of stress. Although coping is probably one of the most important factors mediating the relationship between stress and health, there is little evidence to support this.

Social support is a large area of research. There are many conceptualizations of social support, with most viewing it

as a multidimensional concept.

Measurement problems are dominant in this area. Early measurements were simplistic and naive. Later measurements make a distinction between resources, behaviours, and feelings surrounding social support. Very often the individuals network of family and friends is built up, so that the characteristics of the network as a whole in relation to health can be assessed.

Social support is very difficult to measure as it is confounded with so many other factors such as coping, personality, and illness itself. Any simplistic causal links between social support and health will be difficult to prove.

A current debate in social support research involves conceptualizing the effects of social support on health. The buffering hypothesis suggests that social support plays a part in well being by protecting or buffering the individual from the harmful effects of stressful events. The main effect hypothesis states that social support is beneficial to health independently of the effects of stress. This debate reflects the simplistic level on which many researchers are operating, as an alternative to this

buffering versus main-effect dichotomy is to suggest that social support may operate in both ways, depending on a host of factors, and is likely to operate in many other ways as well. Such a debate only gives two possible options for the action of social support.

In this chapter, it can be seen that when these modifiers are considered in any depth, they are no longer isolated variables, and can no longer be clearly thought of as independent variables in the stress disorder relationship. All measures taken in stress research are contaminated or confounded. Also, stress can no longer be seen as if it were an external, objective event.

The measurement of modifiers has proceeded from simplistic assessments, to more and more complicated procedures, reflecting more sophisticated conceptualizations of these variables. This is indicative of the area of stress-health research as a whole. The move towards new research methods will be discussed later in this chapter.

6.3 Overview.

Stress has been carelessly defined and conceptualized. One of the major reasons for this, apart from oversights on the part of researchers, is that an analogy exists which makes

it sound as if we have good explanations when we talk of stress, strain and buffers. The engineering analogy has allowed us to use these words, and talk about these concepts without having to look too closely at what they really mean. Researchers have hastily completed studies using what are really very vague notions, conceptualizations, and measures of the phenomena under study. One of the consistent coping strategies researchers have used in reponse to the low predictive power of stress in explaining illness is to refine measures. This reflexive coping style has not achieved an increase in predictive power. What it has done, is demonstrate that poor definitions and poor conceptualizations can not be improved simply by refining the measurement, in the hope that in the process, the conceptualizations will become more accurate. What may well be required is a complete rethink of the concepts of stress, health, and the other factors which may play a part in the production of illness and well-being. Before this can be done however, we have to try and understand the concepts we are currently working with, so that we can begin to rethink them. One way of doing this is to look at the ways in which such words and concepts came to be used, and how measurements derived from such concepts have developed and changed. This thesis represents a very small part of such an effort.

6.4 New directions.

New directions in theoretical perspectives have become apparent in the literature. These new perspectives are partly summarized by Kessler et al (1985):

"At its center is the notion that stress exposure sets off a process of adaptation. It recognises that this process unfolds over time, and it acknowledges that this process is modified by structural factors as well as personal dispositions and vulnerabilities." (p. 565)

There are a number of ideas here. The first is the idea that stress exposure does not simply cause a response, such as coping, or a physiological response, but it causes a process to be started. Actually, whatever processes are at work here will probably not simply "start" as Kessler et al (above) suggest. As Stone (1985) has suggested for coping, anticipated and past problems will be just as likely to set off coping processes, this is also true for other factors. It is probably the case that we are nearly always engaged in some form of coping activity, either anticipating future problems, reappraising past problems, or responding to current demands, and possibly all three together. In a sense, such processes of adaptation never start or stop, but they vary in rate of activity, or intensity. As Vaux (1982) has suggested, social support can be considered as having three levels, resources, behaviours, and feelings. Whilst our social support behaviours may be switched on and

off by stress exposure, social support resources and feelings continue to operate without exposure to stress.

Others agree that stress or responses to stress are best viewed as processes (e.g. Casapi et al, in press; Fleming et al, 1984; Folkman & Lazarus, 1985; Pearlin et al, 1981). This is in recognition of the view that "a stressful encounter should be viewed as a dynamic, unfolding process, not as a static unitary event." (Folkman & Lazarus, 1985) This contrasts with the life events approach which more often than not has conceptualized stress as a "static unitary event".

The idea that stress unfolds over time is well accepted among many researchers who suggest that research into stress must be longitudinal. Any research into stress can only ever sample a small slice of the process of adaptation. Some ego-psychologists such as Vaillant (1977) have attempted to study long term adaptation. The methods involved in this are impractical for more cognitive and behavioural researchers. The increasing trend towards fine-grained analysis of stress and health demonstrates that researchers are trying to capture the processes involved, even if they only do so over a period of weeks or months.

The assessment of stressful experiences which occur on a frequent daily or weekly basis is becoming increasingly popular. The Unpleasant Events Schedule (Lewinson et al, 1983) was generated from daily diary data and contains 160 items. This has been found to be sensitive to clinical improvement in depression level (Lewinson & Talkington, 1979). Eckenrode (1984) examined the effect of chronic and acute stressors on mood. Chronic stressors were assessed by daily diary data which asked respondents to report anything that had "gone wrong" during the day. These chronic stressors were found to partly determine mood. Daily stress as assessed by daily diaries, has been found to increase the use of health services (Roghamann & Haggerty, 1973). Minor events (hassles) have been found to be better predictors of psychological distress than major life events (Monroe, 1983). Stone & Neale (1982) have developed a methodology for assessing daily experience. Negative events on this assessment have been found to be associated with reports of mood. The best developed measure of minor stressful events is probably daily hassles (DeLongis et al, 1982; Kanner et al, 1981, Lazarus, 1984). The Hassles Scale consists of a list of 120 hassles and respondents indicate if they have experienced any of the listed hassles in the previous month. They are also asked to rate each hassle

they have experienced for severity on a three point scale. Hassles scores have been shown to be better predictors of concurrent and subsequent psychological symptoms (Kanner et al, 1981) and more strongly associated with somatic health (DeLongis et al, 1982) than life events scores.

In addition to the assessment of stressful experiences on a daily, weekly or monthly basis, measures of coping have been developed which apply to these minor events. Stone & Neale (1984a) have developed a measure of daily coping which gathers information about the event and coping strategies employed. Folkman et al (1986; in press) have used the Ways of Coping Checklist to examine coping with the most stressful event respondents had experienced in the past week. This measure uses Lazarus's idea of primary and secondary appraisal.

The findings of these studies which assess chronic stress and coping are not dramatic. They are encouraging, in that measures of chronic stress have been found to be related to health measures. Although, as said above in the case of life events inventories, better correlations between the measure and health outcomes does not mean that the measure of stress is better or more accurate. They are more encouraging in that they suggest a viable alternative to

the life events approach in the study of stress and adaptational outcomes.

Another reason for supporting these attempts is that they adopt a transactional approach to stress and disorder. Disease is the product of a complex relationship between the person and their environments. Stress is just one factor in that relationship which, according to the transactional view, is neither situated in the person or in the environment but is a product of the interaction between the two. Frequent measures of coping, and the assessment of minor events are one way of observing the continuous interactive processes between the person and their environments.

A number of researchers have adopted models of stress which could generally be described as transactional. For example, the notion of person-environment fit (French et al, 1974, 1981) views adjustment as "the goodness of fit between the characteristics of the person and the properties of his environment." (French et al, 1974, p. 316) This model takes into account the interactive nature of stress and adjustment. Cox (1978) puts forward a "transactional model of stress." (p. 19) He suggests that "stress can be most adequately described as part of a complex and dynamic

system of transaction between the person and his environment." (p. 18) However, one problem with both these models is that they still attempt to make a clear distinction between the person and their environment. A truly transactional model would have to acknowledge that properties of the person and their environments can not be clearly separated.

More recent transactional approaches have tried to acknowledge these difficulties. Lazarus & Folkman (1984) define their model in this way.

"In contrast to the unidirectional, static, antecedent-consequent model, the transactional model views the person and the environment in a dynamic, mutually reciprocal, bidirectional relationship. What is a consequence at Time 1 can become an antecedent at Time 2; and the cause can either be in the person or the environment. This transactional model forms the metatheoretical foundation on which our cognitive theory of stress rests." (p. 293)

Although many researchers claim to be transactional, some are more transactional than others, as the above quote shows. The move away from traditional research methods, and traditional ways of thinking about stress is a slow process. One reason for this is the number of practical problems involved in moving from a new model, to new ways of testing that model. It is these problems I will go on to discuss in the next section.

6.5 Problems with the new approaches.

Despite the admirable theoretical soundness of these new approaches, and their attractiveness to the author, they have been severely criticised for a number of reasons. Not surprisingly, their main critics are major researchers in the area of life events.

Dohrenwend et al (1984) report that the hassles scale is heavily confounded with psychological distress. For 37 of the 117 items on the hassles scale, a panel of 500 clinical psychologists rated these items as more likely than not to be symptoms of psychological distress.

"The use of measures such as these almost guarantees positive correlations between stress and illness outcomes, but contributes little to our understanding of the role of environmentally induced stress in psychological distress and disorder."

(Dohrenwend et al, 1984, p. 228)

They propose as an alternative, that measures of life-stress variables take into account the fact that "some life events, some hassles, some networks, and some types of social support are consequences of personal dispositions in general and psychopathology in particular, whereas others are independent of such characteristics." (Dohrenwend et al, 1984) In other words, life stress variables should be as free as possible from confounding with other variables.

Lazarus et al (1985) respond to this by arguing that confounding is inevitable in stress research.

"One must conclude that stress is an "unclean" variable in that as a concept it depends on the interaction of two complex systems, the environment and the person. There is no way to separate them without destroying the concept of stress as a relational and cognitively mediated variable."

(Lazarus et al, 1985, p. 778-779)

Dohrenwend & ShROUT (1985) respond to this reply by claiming that "the hassles scale is even more confounded than we had originally supposed." (p. 780) They also claim that "the strategy that Lazarus and his colleagues have chosen to measure hassles is far from the best way to pursue their own theoretical formulations with empirical research." (p. 785)

This debate is highly significant for current research in stress and disorder. One way of explaining these differences is in terms of the goals these two different groups of researchers have. Dohrenwend & ShROUT (1985) state as their aim "to evaluate the role of environmentally induced stress in the occurrence and distribution of various types of psychological symptomology and disorder in communities." (p. 783)

On the other hand, Lazarus (1984) suggests that examining daily stress will "yield a better understanding of how and

why people, looked at individually or as groups, get along well or poorly, and, ultimately, will yield better suggestions for interventions to facilitate more effective coping..." (p. 388).

Given these different research aims, it is hardly surprising that these two methodologies are in conflict. Dohrenwend takes a quantitative, epidemiological approach to stress and disorder. The conceptions of stress used never go beyond the measuring instruments available. If measures are contaminated with other variables, then the measures have to be improved. There is no suggestion that the models being used are incorrect. Lazarus, on the other hand, takes a more qualitative, psychological approach. The conceptions of stress adopted by Lazarus (and others who share his views) are very complex, interactive, and virtually unexplorable by traditional contamination-free conceptions of independent variables. In a way these two approaches should not be in conflict, as they are not trying to achieve the same aims.

This mistake has been made in stress research almost since it first started. It has often been assumed that any research which used the term 'stress' necessarily is talking about more or less the same thing. This tendency

can be observed in books of collected papers about stress (e.g. Hamilton & Warburton, 1979) where the conceptualizations of stress used in different papers and research areas are completely incompatible. There is a feeling that these different strands of research somehow 'contribute' to a general effort that is being made to understand stress. Unfortunately attempts to integrate these very different concepts of stress are rare. The first chapter of this thesis was an attempt to show what the different uses of the term stress might have in common, if anything at all.

Apart from these different research aims of the two approaches, there are other reasons why these approaches are in conflict. These will be outlined in the next section.

6.6 The integrative concept of adaptation.

Time and space prevent a detailed discussion of the idea of adaptation in integrating and analysing stress research. Such arguments are beyond the scope of this thesis, but any detailed discussion would take account of the following points.

As suggested elsewhere, adaptation can describe all kinds

of homeostatic mechanisms, which operate on different levels, the social, the psychological, the physiological and the chemical, to work towards the maintainance of a dynamic steady state, or, to work towards the attainment of new or different levels of dynamic steady states. Viewed in this way, many of the adaptive functions of people, and other organisms, are not viewed as reponses to stimuli, but more part of a much larger, ongoing concern, of general adaptation. Disease represents only one possible phenomena which may appear during this continuous process of adaptation. One factor involved in disease may in fact be a 'side-effect' of the more general homeostatic mechanisms, namely, stress. Whilst adaptive/homeostaic mechanisms will generally work towards maintaining health, the concept of health in itself needs to be examined in its social context. Health on one level may take priority over health in another sense, and on a different level. Occasionally, physical and psychological health may deteriorate as adaptive/homeostatic mechanisms are directed towards the maintainance of other dynamic steady states or the attainment of new or different levels of such steady states.

This view of adaptaion fits in closely with Lazarus's relational or transactional conception of coping. However,

the idea of a transactional, relational approach to stress has many other sources. White (1974) suggests that adaptation is "the only firm platform" (p. 49) on which to build a classification of coping responses. Hamburg et al (1974) state that "the study of adaptation links biological sciences, social sciences and the clinical professions." (p. 439) Howard & Scott (1963) in a proposed framework for the analysis of stress in the human organism say that "stress may only be properly understood in terms of the total organism responding to the total environment." (p. 158) Hinkle & Wolff (1957) present an analysis of illness in terms of "man's adaptation to his total environment" (p.442). The idea of person-environment fit (French et al, 1974, 1981) assumes that adjustment is the goodness of fit between the characteristics of the person and the properties of their environment.

The recent trend towards the assessment of chronic stress and coping, in an ongoing context, and the acknowledgement by some researchers that the variables involved are inextricably linked and hence always subject to contamination and confounding, shows that the above ideas concerning the nature of stress and adaptation are, for the first time showing through in terms of empirical studies of stress.

There are considerable problems with this approach. The major problem is finding ways of testing or demonstrating the phenomena under study, when it is assumed that they are very complex, dynamic, and interlinked with a host of other factors. Not until researchers can begin to formulate some reasonable hypotheses concerning these adaptive/homeostatic mechanisms will these ideas begin to be accepted. In addition, new research methods will have to be devised. In a scientific environment where research involves measuring independent and dependent variables and testing hypotheses, it is unlikely that these broad integrative ideas will ever be accepted as anything more than unhelpful speculation.

6.7 Conclusion.

In this thesis, I have attempted to present a broad sketch of stress research, mainly in relation to illness. This broadness has included looking at the development of the different uses and concepts of stress, as well as the theoretical background to the use of stress as an explanation in disease causation.

The complexity of the relationship between stress and illness was demonstrated by looking at some methodological problems involved in stress-illness research. The

measurement of life stress, and two other variables, social support and coping were used to make very general points about the relationship between stress and illness and shortcomings in current research. Alternative research strategies were presented, and their shortcomings noted.

This thesis was written with the conviction that progress in stress-illness research, with its obvious practical implications, is slow, and will continue to be slow if researchers adopt simplistic models of stress, and make no attempt to solve the many conceptual and theoretical problems that exist. One reason for these problems is the term stress itself, and the power it has to 'explain' without explaining very much. Another reason for such problems is that new models are not put forward, and so new research methods are not developed. My intention in this thesis was to show that the methodological and conceptual problems are resolvable if one takes a broad and historical view.

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