

OCCUPATIONAL STRESS:

TYPE A BEHAVIOUR AS A MODERATOR

OF RELATIONSHIPS BETWEEN

ROLE DEMANDS

AND

PSYCHOLOGICAL AND BEHAVIOURAL

STRAIN

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OCCUPATIONAL STRESS:
TYPE A BEHAVIOUR AS A MODERATOR OF THE
RELATIONSHIPS BETWEEN ROLE DEMANDS AND
PSYCHOLOGICAL AND BEHAVIOURAL STRAIN

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Department of Psychology, University of Cape Town
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In Memory of my grandfather, parents-in-law, Father J McMorrow and Anne-Marie de Wet.

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To study Type A behaviour as a moderator of relationships between role demands and psychological and behavioural strain, 234 volunteer subjects from a medium-sized life insurance society completed three questionnaires under standardized testing conditions, tapping Type A behaviour (Session 1) and various role dimensions (Session 2) and indices of strain (Session 3). Absenteeism data were taken from employee record cards, as were data for some demographic and organizational variables (race and sex), while others (company tenure, age and organizational level) were explored in the questionnaires. Assessment sessions were staggered, with one-month intervals between each, to reduce the effects of response sets. Factor analysis of responses to the role dimensions questionnaire confirmed the hypothesized factor structure and led to the development of scales for role conflict, ambiguity, overload and qualitative underload. The reliability and validity of these scales are discussed. Partial correlations (with the linear effects of the demographic and organizational variables removed) and multiple linear regressions indicate that role conflict, ambiguity, overload and underload may be described as social-psychological stressors, in terms of psychological strain, while only underload is weakly related to absenteeism. Type A behaviour is not found to moderate relationships between stressors and strain, with the exception of an effect for underload which may be accounted for in statistical, rather than psychological, terms. Results are interpreted as evidence of the need for improved work design and redesign, particularly in South African organizations. Implications of findings with respect to sequential models of strain, as well as the nature of the relationship between Type A behaviour and CHD, are discussed.

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Preface

The past few decades have seen a great increase in knowledge concerning the effects of physical and chemical work environments on physical health and well-being (Levi, 1981). However, the possible effects of such aversive factors on emotional stress and resultant mental and psychosomatic ill-health, and particularly the corresponding effects of social-psychological factors (ibid.), have received much less attention. Though some links between aspects of occupational environments and noxious work reactions seem clear, there is still much uncertainty regarding the need for, and design of, improvements to work environments. Further work in this area is necessary, to develop an informed understanding of the relevance of various characteristics of work for mental health, as well as the role of individual differences in moderating these relationships. Only through the explication of these relationships may the need for careful "new" job design and "old" job redesign be evaluated, as well as those aspects of work environments requiring particular attention. Such exercises are necessary steps in the direction of possible primary prevention of disease-provoking reactions to work, prevention rather than attempted cure reflecting the developing orientation of a health psychology of work.

Consequently, the current study was undertaken, particularly with a view to supplementing knowledge concerning the effects of social-psychological components of work environments on mental health. This research involves constructive replication of some questions addressd by Caplan and Jones (1975) and Keenan and McBain (1979), as well as the

consideration of some additional aspects of the work/health debate. Specifically, the relationships between role demands and psychological and behavioural strain, and the role of Type A behaviour in moderating/conditioning these relationships, are examined. Clearly, the superordinate concern is with the design of satisfactory work environments, though the orientation here is more towards determination of the need for improved work design and redesign (and the possible need for individualized work design) than the precise manner in which satisfactory environments should be structured. Additionally, and in a somewhat different vein, the consideration of Type A behaviour in relation to levels of strain may shed some light on the nature of the relationship between the Type A behaviour pattern and coronary heart disease, which has been elusive.

The integrative term that has been variously used in describing some or all of the above work-related concerns is that of occupational stress and in essence, therefore, this is the subject matter of the current study.

CHAPTER I INTRODUCTION

1.1 DEFINITIONS AND MODELS OF STRESS

The subject matter of this study is occupational stress. Hence, it is important to indicate what this term means in the context of the current research and to clarify some additional terms. This is particularly so, considering the plethora of meanings attached to the word "stress" and the confusion that may result in the absence of such clarification. Lazarus (1971) noted that the definition of stress and related concepts makes for dull reading, yet it is clearly essential, as additionally indicated by the enormous number of publications which have been concerned with the concept of stress. Though McLean (1974) concluded that the term is useful for no more than designating a broad area of study, and while Hinkle (1973) offered a reasoned argument that the term is altogether useless and should be abandoned, it is retained here because, with careful definition, it enables the efficient expression of a great complexity of meaning.

In considering the concept of stress, it is necessary to distinguish between three main approaches to the problem of its definition: response-based approaches, stimulus-based approaches and interactional approaches. These have been discussed in detail by Appley and Trumbull (1967), Cox (1975, 1978), Lazarus (1966), Levine and Scotch (1970) and McGrath (1970,

1976), while Kasl (1978) and Shirom (1982) have contributed with some valuable comments. These sources form the basis for the following discussion. It should be noted that, as Cox (1978) points out, there is overlap between these approaches and the most salient differences involve the emphasis of the definitions and associated methods.

1.1.1 Response-based Approaches

Response-based approaches treat stress as a dependent variable, as the person's response to disturbing or noxious environments. Those who have used this approach include Cooper and Marshall (1978), Kearns (1973), Margolis, Kroes and Quinn (1974) and Warr and Wall (1975), as well as others to be discussed. This conceptualization of stress may be illustrated in the following way:

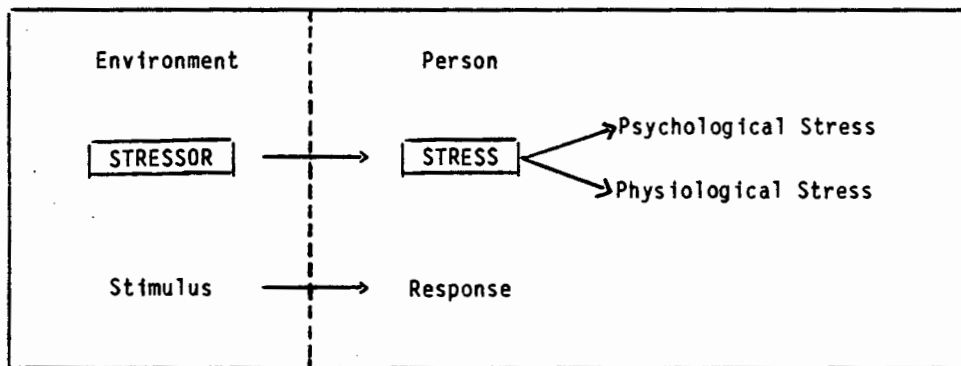


Figure 1.1: RESPONSE-BASED APPROACH TO STRESS

(from Cox, 1978, p.4)

The emphasis is on the specification of the responses or patterns of responses which may be taken as evidence that the person has experienced or is experiencing pressure from a disturbing environment (Cox, 1978). The most influential proponent of this view of stress was Hans Selye, who is often called 'the father of stress', and who defined stress as "the non-specific response of the body to any demand made upon it" (1976, p.55). The central tenet in this definition is that of the non-specificity of the stress response. This idea developed out of Selye's observations of a general malaise associated with being ill, irrespective of the specific nature of the illness (1956). Though Selye distinguished between stress arising out of unpleasant, harmful and disabling demands (dystress) and stress arising out of pleasant, facilitating and even enabling demands (eustress), he nevertheless believed that all stress-producing demands elicit the same pattern of adaptation of the body. Thus, precisely the same concurrent physiological changes are hypothesized to occur (as well as progression through the non-specific General Adaptation Syndrome, to be discussed later) with exposure to any type of stressor (1976). The idea of non-specificity has been enormously influential in physiology for many years (Cox, 1978) and, when transferred into psychology, has influenced many authors in this field as well (Strumpfer, 1983a). However, there is now a growing body of opinion that the position has been overstated. In psychological terms, Strumpfer (1983,b) has presented a reasoned argument for the differing implications (i.e. specificity) of eustress and dystress. In physiological terms, Mason (1971), for example, has shown that some noxious physical conditions (e.g. exercise, fasting, heat) do not produce the typical physiological response, while other research has shown that even if

all symptoms of the response are evoked, they do not appear together (Lacey, 1967). Further, in concentrating his attention on the body's physiological stress response, Selye ignored the role of psychological processes, which are now felt to be important determinants of the physiological response (Cox, 1978).

Still working within a response-based framework, Levi and Kagan have developed Selye's view of stress to include the operation of psychological factors in the mediation of physiological responses (Kagan and Levi, 1971, 1975; Levi, 1973; 1974). While maintaining the importance of non-specificity, they have constructed a theoretical model which reflects their belief that psychosocial factors can and do cause undesirable physiological change and which outlines several steps in the development of physical disease. The basis of the argument is that the physiological stress response to demands (identified as psychosocial stimuli) prepares the person for the physical activity of coping, but that this coping response may lead to structural or functional damage if prolonged, intense or often repeated. This formulation may be criticised in that it maintains the non-specificity component.

There has also been some attention given to a definition of stress in terms of performance degradation, which is also a response-based definition (Welford, 1974). The idea is that, where performance is impaired, the individual is being exposed to harmful stressors and that a measure of stress is given by the extent of degradation of performance. However, such a formulation is inadequate, for several reasons. Firstly, not all

conditions which are thought to be intuitively stressful actually lead to performance degradation and, as for example Bass and Barrett (1973), Brief, Schuler and Van Sell (1981), Davies (1968), Sales (1969), Scott (1966) and Welford (1974) have shown, the pattern of effect can in fact be very complex. Secondly, the effects of identical stimuli seldom have the same effects on different people or on the same people on another occasion (Cox, 1978). This relates to the primary problem with this definition, which is that coping mechanisms (which vary in quality from person to person and from time to time) are not considered. Thus, performance may remain unimpaired, even under most aversive conditions, due to highly developed coping strategies. In terms of the definition no stress is present, while costs to the individual are likely to be high with prolonged, intense or often repeated exposure. Thirdly, it is difficult, if not impossible, to establish baseline, unimpaired performance levels to enable the determination of the absolute stressfulness of the situation, though this approach may have some merit for a limited consideration of stress as response to change.

In addition to the above criticisms, McGrath (1970) has noted several weaknesses generally associated with response-based definitions. These are not discussed here, as the more specific comments with respect to particular definitions are adequate justification for not employing the conceptual frameworks associated with them in this study.

1.1.2 Stimulus-based Approaches

Stimulus-based approaches describe stress in terms of the stimulus characteristics of disturbing or noxious environments. Thus, stress refers to factors in the person's environment which are likely to be unhealthy or deficient (Strumpfer, 1983a) and which give rise to strain within the individual. Amongst those who have used this approach are Parrot (1971), McPherson (1973) and Van Dijkhuizen (1980), as well as others to be discussed later. This 'engineering' model of stress may be illustrated in the following way:

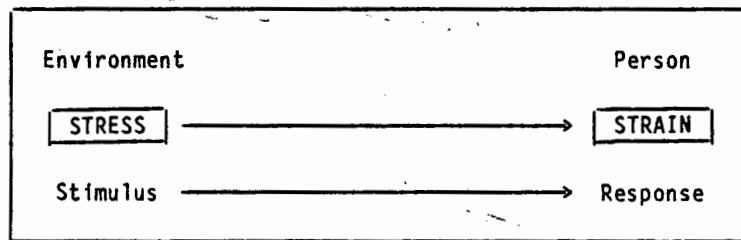


Figure 1.2: STIMULUS-BASED APPROACHES TO STRESS
(from Cox, 1978, p.12)

This model has been considered in parallel with Hooke's Law of Elasticity, which describes the relationship between the pressure exerted on a metal (demand/stress) and the resultant deformation in the metal (strain). The idea is that if the pressure exerted falls within the elastic limit of the metal, then on termination of the pressure the metal returns to its original state. On the other hand, if the pressure exerted exceeds the elastic limit then permanent damage may result. Applied to human systems, this formulation has intuitive appeal and, further, introduces the

Continued/...7

possibility of individual differences in ability to withstand stress. Given the concern of stimulus-based definitions with the questions of what can be accepted as stressful and what their common characteristics are, this individual differences component results in an overwhelmingly complex problem, as it means that all statements about the stressfulness of certain situations should rely on normative data for the groups being studied (Cox, 1978). Clearly, this is a major problem with stimulus-based definitions.

Cox (1978) has presented some additional criticisms of the elasticity analogy. Firstly, he notes that the analogy suggests that an undemanding situation (in the narrow sense, i.e. underload) is not stressful, but that this is certainly not the case with man at work (research by Frankenhaeuser, Noordheden, Myrsten and Post [1971] on psychophysiological reactions to understimulation and overstimulation supports this). Secondly, Cox points to the importance of intervening psychological processes (i.e. perceptions, as informed by personality traits) which mediate the outcome of stress in terms of health (recalling the work of Levi and Kagan) and which are irrelevant for engineering problems. Therefore, direct application of Hooke's Law of Elasticity to the conceptualization of stress in humans is inappropriate. It should be pointed out that most researchers employing stimulus-based definitions have not applied this analogy completely and take account of exactly those criticisms raised by Cox. Sales (1969; 1970), for example, considers both overload and underload (undemanding situation in the narrow sense), while he and the other researchers from the Institute for Social Research (ISR) at the University of Michigan (the 'home' of

stimulus-based definitions) all consider perceived stress (psychological processes are involved), though they might consider objective stress as well (e.g. Kahn, Wolfe, Quinn, Snoek and Rosenthal, 1964; Sales, 1969). Further, personality factors are often considered directly (e.g. Caplan, Cobb, French, Van Harrison and Pinneau, 1975; Kahn et al, 1964; Sales, 1969). Thus, criticisms of the direct application of Hooke's Law of Elasticity to issues in occupational stress should not be seen as applying to stimulus-based definitions in general.

Cox (1978) has also presented some more general criticisms of stimulus-based definitions relating to problems with the identification of what is stressful about real-life situations and with the measurement of degree of stress present. Essentially, the criticisms of the definition assume that stress per se is treated as the independent variable and that no attempt is made to outline preconditions for it. In practice, most researchers using stimulus-based terminology have not operated totally within this approach and have theorized extensively about the origins and sources of stress (stressors). French and his colleagues, for example, have set up a model based on person-environment fit theory which is widely cited and amongst the most extensively tested in field research (French and Caplan, 1972; French, Rogers & Cobb, 1974; French, 1976). The associated definition includes clear guidelines on what aspects of situations may be considered stressful and leads to a particular method of measurement of stress (i.e. subtraction of the amount of a characteristic a respondent would like to have on the job from the amount of the

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characteristic provided on the job (Caplan et al, 1975b). Thus, though criticisms of pure stimulus-based approaches might be valid, they are not so for the approach of the researchers at the ISR. Clearly, these researchers employ the stimulus-based terminology, but the actual orientation is interactional, given that stress is defined more as an intervening variable between environmental preconditions for it and responses to it, rather than as a pure stimulus alone. This argument indicates that the classification of the above approach as stimulus-based is not altogether accurate and, further, that the actual difference between the ISR approach and interactional definitions involves the absence of the clear specification of preconditions for stress in the ISR model, though this is made explicit in theorizing. This point will become clear on consideration of interactional approaches in general.

1.1.3 Interactional Approaches

Stress has also been defined in terms of an interaction rather than simply as a response or as a stimulus (Appley and Trumbull, 1967) and, in the occupational context, as an interaction between an employee and the work environment (Shirom, 1982). Further, the interaction is reciprocal and implies multidirectional causation while, most importantly, stress arises from the person-environment interaction as it is appraised by the person. Thus, stress "resides neither in the environment nor in the person, but in the appraisal of both by the employee" (ibid. p.22). Clearly, stress in this

Continued/...10

form is studied in terms of its antecedent factors and its effects and it is seen as an intervening variable between stimulus and response (Cox, 1978). Shirom (1982) and Kasl (1978), amongst others, have commented on the increasing popularity of interactional approaches and the enormous influence that they have had on the field. Further, Cox (1978) has suggested that interactional approaches are possibly the most adequate of the three major approaches presented above. With these points in mind, an interactional definition of stress has been used in this study. A general formulation of stress in these terms may be illustrated in the following way:

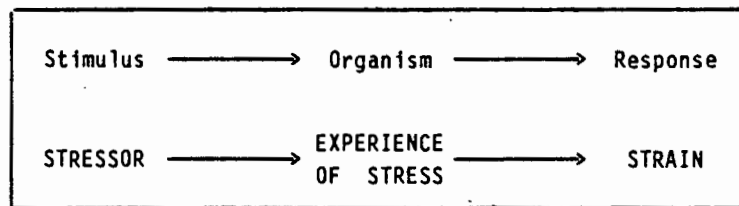


Figure 1.3: GENERAL INTERACTIONAL APPROACH TO STRESS
(from Strumpfer, 1983 a, p.374)

In this formulation, the stimulus (the factor in the environment which has the potential to cause the experience of stress) is referred to as the stressor and the response to the experience of stress is referred to as strain. The experience of stress is therefore both a stimulus (to strain) and a response (to stressors), while stress itself is a particular form of interaction between the person and the environment (to be discussed below). Following Schuler (1980; 1982), it is emphasized that the presence of a stressor may not be accompanied by the experience of stress, but that the presence of some stressor(s) is a precondition for it. However,

Continued/...11

the experience of stress is always accompanied by some sort of strain. As van Dijkhuizen (1980) points out, this formulation represents a phenomenological stimulus-organism-response (S-O-R) approach rather than a simple stimulus-response (S-R) view. The distinction between stress and the experience of stress highlights the importance of psychological processes as mediators of the relationship between stimulus and response. As numerous authors have discussed (cf. Lazarus, 1966, 1969; McGrath, 1976; Selye, 1976; Van Dijkhuizen, 1980), it is not the objective characteristics of the environment "impinging on the person that cause behaviour; instead the view is that sets of cognitive structures intervene between stimuli and responses, so that observer-defined stimuli shape behaviour" (Strumpfer, 1983a, p.375). As Selye puts it, "it is 'how you take it' that determines, ultimately, whether one can adapt successfully to change" (1976, p.74), or, in the words of Shirom (1982), "stress is in the eyes of the beholder" (p.24).

Within the general interactional formulation of stress, many definitions have been developed. Some differ in terms of the specificity with which stress is defined (Kasl, 1978) and others in the particular emphasis of the definition. As it is really only these two which have had a substantial impact on the field so far (Shirom, 1982), only McGrath's (1970; 1976) definition and definitions in terms of person-environment fit theory are discussed here. Finally, Cox and Mackay's person-environment fit definition and model are adopted for use in this study and stress is operationalized in terms of this definition.

McGrath (1970) defined stress as a "[perceived] substantial imbalance between demand and response capability, under conditions where failure to meet demand has important [perceived] consequences" (p.20). Thus, stress may also be defined as "a set of preconditions which, once satisfied, warrant describing a certain situation as having stress in it from the viewpoint of an employee" (1976, p.1352). The first precondition is that an employee must perceive that a demand is directed at him/her. The second is that a cognitive appraisal must take place in which the demand is perceived to be substantially out of balance with the employee's capabilities. This precondition allows for an excess of demands over capabilities as stressful (the excess demand view) as well as for an excess of capability over demands as stressful (the excess resources view). The final precondition is that failure to meet the demand must be seen as likely to result in negative rewards (ibid.).

In reviewing McGrath's definition, Shirom (1982) accepts the first and third preconditions (though he considers the specification of the latter to be superfluous, as he sees this evaluation of the cost of failure to be implicit in the cognitive appraisal), but raises difficulties with the second. He presents a sound argument that the excess resources view of stress is not theoretically meaningful in the context of a definition involving demands and the third precondition. The basis of the argument is that the excess resources view "renders the third major precondition for stress..... theoretically meaningless, since failure to meet the demand is inconceivable" (p.23). Thus, McGrath's definition is only theoretically

meaningful for the consideration of the excess demand view of stress (other applicable, related terms are overload and overstimulation), and this is considered to be a narrower perspective of stress at work (Kasl, 1978). As a definition is required for this study which includes a meaningful treatment of the excess resources view of stress (given the consideration of underload items, following the work by Brook (1973), Frankenhaeuser et al (1971) and Sales (1969) which has shown the relevance of understimulation, underload and/or under-utilization for occupational stress), it is clear that McGrath's definition of stress is not appropriate. Rather, in Kasl's terms, a broader definition of stress is necessary, one which considers the role of needs and values (the lack of satisfaction of which is the stressful component of underload) as well as more formal demands, in the definition of stress.

In large measure, this is provided by person-environment fit theory (cf. Berger, 1969; Dawis, England and Lofquist, 1964; French, 1974; French et al, 1974; Lofquist and Dawis, 1969; Van Harrison, 1978; Veroff and Feld, 1970). In terms of this theory, stress is seen as inadequate person-environment fit, or misfit, while the experience of stress involves the perception of appreciable misfit by the person concerned. This view "includes not only the narrower version above but also the relation of needs in the person to sources of satisfaction in the work environment to meet such needs" (Kasl, 1978, p.13). It rests on the general assumption that the more congruent the characteristics of the person are with the characteristics of the working environment, the more

favourable the work-related outcomes for the person (Kulka, 1979). On the other hand, the theory also includes the basic prediction that misfit of either of the above two kinds (qualities and skills versus demands and requirements, as well as internal needs, values and desires to use skills versus the maintenance and fulfillment of these) may result in increases in anxiety, depression, job dissatisfaction, etc. and in the physiological stress response, i.e. in psychological and physiological strain (French et al, 1974). In the context of this interactional theory, the role of research into occupational stress is to consider the antecedent factors in person-environment misfit and its consequences with regard to undesirable individual and organizational outcomes. As mentioned earlier, person-environment fit theory forms the basis for the definitions of stress used by researchers at the ISR and it is precisely their consideration of the antecedent factors in person environment misfit (stress) which moves their approach into the interactional realm (in clarification of an earlier point).

1.1.4 Approach followed in this Study

The basic person-environment fit model outlined above has recently been expanded and modified by several researchers (e.g. Cox and Mackay in Cox, 1978; Schuler, 1980, 1982) and is becoming increasingly popular (Kasl, 1978). Particularly, Cox and Mackay developed a working definition of stress which includes the terminology used by McGrath (1970; 1976) and Lazarus (1966) but which is concerned with the broader perspective of

stress (excess demand and excess resources views). In the opinion of this author, Cox and Mackay's definition of stress and accompanying model of the stress system constitute the most thorough, detailed and intuitively reasonable formulation thus far adequately developed. Hence, these are adopted for use in this study.

Cox and Mackay define stress as an imbalance between perceived demand (broadly defined to include internal and external demands) and perceived capability to meet the demand, while the experience of stress is the perception of an appreciable, unwanted imbalance. Thus, their definition is eclectic and draws from both response- and stimulus-based definitions as well as McGrath's interactional definition. The generality of the description and its concern with excess demand and excess resources views, of course, locate it squarely within person-environment fit formulations. Following the standard interactional approach, the definition "underlines that stress is an individual perceptual phenomenon rooted in psychological processes" (Cox, 1978, p.18). Further, the stress system highlights feedback components which mean that it is cyclical rather than linear. The system may be represented by a flow diagram (see Figure 1.4).

Clearly, this view of stress represents an extensive convergence of theoretical formulations and incorporates the idiographic, subjective approach discussed by Kasl (1978) as a source of convergence for most formulations. The idiographic, subjective view "formalizes the presumed

wisdom of the saying 'one man's meat is another man's poison'" (ibid. p.13). Gardner and Taylor (1975) give a characteristic formulation: "Stress is an individual phenomenon, is subjective in nature, and can occur in anyone who feels that he or she is under pressure" (p.140). The incorporation of this view in Cox and Mackay's is clear.

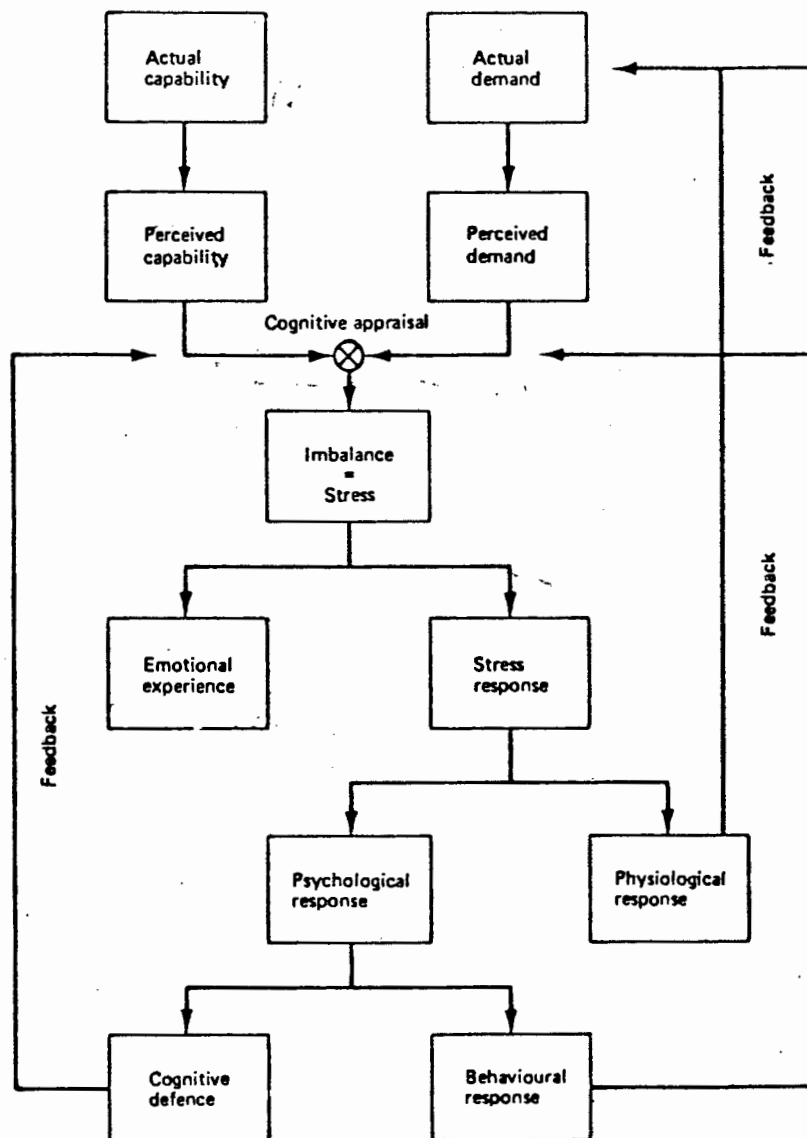


Figure 1.4: COX AND MACKAY'S MODEL OF STRESS

(from Cox, 1978, p.19)

Cox notes that there are five recognisable stages in the system. The first stage involves the actual demands of the situation and the actual capability of the individual. As mentioned, the model distinguishes between internal and external demands. The internal demands are the person's psychological and physiological needs and these constitute internally generated demand. In the second stage, demands are perceived as well as ability to cope. Stress arises when there is an imbalance between the perceived demand and the person's perception of his capability to meet that demand. It is important to note that the extent of balance is not between actual demand and actual capability but between perceived demand and perceived capability. What is relevant is the individual's cognitive appraisal of the relationship between demand and capability. If a situation demands too much of him but he is unaware of this, he will not experience stress. Thus, it is the experience of stress which is important. The presence of this perceptual component in the development of stress allows for the operation of a wide variety of individual variables and enables the model to account for individual differences. The third stage of the model consists of the result of any imbalance, which is the subjective (emotional) experience of stress as well as accompanying physiological, behavioural and cognitive responses. The fourth stage is concerned with the consequences of the coping responses, with the actual as well as perceived consequences being important. In the final stage, the importance of feedback at each of the stages is emphasized, with feedback being important in determining the outcome of each of the stages.

In terms of the general interactional formulation of stress presented earlier (Figure 1.3), the term stressors is therefore used to refer to situational demands which cause an imbalance between internal and/or external demand and capability to meet that demand (stress). The experience of stress is the perception of such an imbalance and this is accompanied by physiological, behavioural and/or cognitive responses, which are referred to as strain. Thus, "the not directly or indirectly measurable intrapsychical result of the actions of the stressor (which is only interesting from a theoretical point of view, but is without practical implications) is called stress, and the external measurable effect of that stress will be called strain" (Van Dijkhuizen, 1980, p.6)

1.1.5 Operationalization of the Experience of Stress

Within the conceptual framework outlined above, at least two possibilities (to be discussed here) exist for the operationalization of the experience of stress. Arising naturally from classical person-environment fit theory is the use of discrepancy scores. As already described, this methodology involves the subtraction of the amount of a characteristic a respondent would like to have on the job from the amount of the characteristic provided on the job (Caplan et al, 1975b). Thus, any person-environment fit dimension which gives rise to differential responses for amount of the dimension present and amount of the dimension desired, is a stressor. However, this procedure is undesirable from a statistical point of view, as measurement errors are compounded rather than restricted (Shirom, 1982).

To avoid this compounding of errors of measurement, the approach of many researchers has been to operationalize the experience of stress by seeking subjects' perceptions of an excess or deficiency of various characteristics of work (presumably hypothesized as stressors) with single, subjective items, rather than with two factually orientated items and the mathematical relationship between responses (e.g. among recent research into role dimensions: Abdel-Halim, 1978, 1980; Arsenault and Dolan, 1983; Bateman, 1981; Keenan and McBain, 1979; Parasuraman and Alutto, 1984; Posner and Randolph, 1979, 1980; Randolph and Posner, 1981). This amounts to tapping employees' perceptions of the degree of balance or imbalance between internal and external demands and response capability, directly. Though this appears to be the conceptual basis of the methodology employed in the research listed above, this is never made explicit in the relevant reports, nor in earlier reports. (In fact, it seems that much stress research has tended to be carried out largely independently of theoretical considerations. It is preferable that measurement practise should be determined by the particular formulation of stress selected, this being the one most appropriate for the subject matter but also one preferably compatible with other formulations. The adoption of such a stress research strategy would do much to reduce confusion in the field and facilitate the integration of research findings into a comprehensive meaningful whole.) Further (and here it is necessary to pre-empt and mention the hypothesized groups of hypothesized stressors examined in this study), the treatment of role conflict and role ambiguity differs from the treatment of role underload and role overload in this

literature. The difference is that, while items written to tap overload and underload are expressed in a manner which conforms to the above operationalization of the experience of stress (i.e. it often seems that I have too much work to do; I perform tasks that are too easy or boring), at first sight it appears that items written to tap conflict and ambiguity do not altogether conform (i.e. I receive incompatible requests from two or more people in my job; there are clear, planned goals and objectives for my job). This apparent contradiction between theory and practice is, in fact, the logical outcome of an unwritten assumption that any degree of perceived conflict or ambiguity is 'too much', whereas for overload and underload, individual differences in perceived abilities and needs are instrumental in determining the perception of these (hypothesized) stressors.

It is not altogether clear whether the above assumption is valid, as the issue has not been much researched, to the knowledge of the author. Intuitively, the position is defensible in so far as it is difficult to conceive of employees actively preferring conflict and/or ambiguity in their work environments. However, some of the findings of Kahn et al (1964) may be interpreted as casting doubt on the validity of this assumption. Kahn et al found that 48% of their sample reported intersender conflict at work, while only 39% reported being bothered by it. Presumably, 9% of their sample were not bothered by intersender conflict. Hence, though this is a small proportion, the possibility of individual differences in what constitutes person-environment mis/fit with respect to role conflict and ambiguity cannot be ruled out. Therefore, the making of this assumption

may include a conceptual criticism of this study. Notwithstanding this point, the relevant assumption was made in the current study to avoid the known pitfalls of dual-item discrepancy measures (also discussed by Blau, 1981). Thus, all items written to tap the hypothesized role stressor constructs may be seen as single-item, discrepancy measures, responses to which reflect the extent to which demands and capability are perceived to be balanced or imbalanced (i.e. person-environment mis/fit).

It is appropriate at this stage to provide a statement of the broad purpose of the present study within the framework of the person-environment fit theory. In terms of this theory, the present study is concerned with testing whether conflict, ambiguity, overload and underload have adverse consequences in terms of the tenet of this theory that misfit leads to strain, and the assumption that these role demands involve such misfit. The central question of this study could equally well be rephrased as whether or not conflict, etc. are stressors, stressors being defined as those factors which have adverse consequences for the individual — which lead to the presentation of strain. This, then, relates to the fundamental pragmatic concern of the study. Kahn and Quinn (1970) summarize the latter approach by defining role stressors (to use the terms of the current study) as any aspect of an organizational role that has adverse consequences for the individual and/or the organization.

In concluding this discussion of conceptualizations of stress, it is necessary to point out that this discussion is by no means complete. Many

other views of stress have not been presented, while other methods of measurement are obviously available. In passing, it is mentioned that facet analytic conceptualizations of stress (e.g. Beehr and Newman, 1978; Shapira and Zevulun, 1979; Shirom, 1982) may well be the domain of the future, while other measurement practises (e.g. Repertory Grid Technique, applied to stress at work, Crump, Cooper and Smith, 1980; phenomenological methods, Fineman, 1979) could well replace the questionnaire and/or observational methods. In both these cases, however, development of the particular content and usage with respect to occupational stress is only in the preliminary stages.

1.2 SOURCES OF OCCUPATIONAL STRESS - STRESSORS

Prior to a discussion of the stressors hypothesized in this study, elements of the broad spectrum of possible sources of stress relating to occupational settings will be briefly discussed. The categorization of potential occupational stressors has received the attention of a number of authors (e.g. Adams, 1981; Brief et al, 1981; Cooper and Marshall, 1976, 1978; Cox, 1978; Dirken, 1967; McGrath, 1976; McLean, 1981; Strumpfer, 1983a; Weitz, 1970). The categorization used here draws largely from Cooper and Marshall's (1978), but includes elements of McGrath's (the task-based/role-based distinction) and is broadly structured in terms of Cox's distinction between internal and external demands as sources of stress.

1.2.1 Internal Demands

Though these are seldom discussed in the stress literature, person-environment fit theory emphasizes the importance of internal needs and values in the experience of person-environment misfit. In terms of the particular version of this theory employed here, each individual experiences internal demands which he seeks to fulfil in a way which does not offend his values. Fulfilment of these needs in this way leads to feelings of satisfaction (Locke, 1976). However, the failure of efforts to fulfil these needs, or their fulfilment in a way which violates the individual's values, leads to feelings of dissatisfaction, which are associated with strain (ibid.).

The need theories which have dominated the literature are those of Maslow (1954) (and Alderfer's (1972) modification), Herzberg (1966) and McClelland (1951). Maslow proposes that all individuals have basic sets of needs that they strive to fulfil. He lists five basic sets of needs which can be organised in a hierarchical manner: starting with physiological needs, then safety needs, needs related to belonging, friendship and love, esteem needs, related first to a need for achievement and second to a need for recognition and approval, and, finally, the need for self-actualization. When a given need is fairly well satisfied the next higher level of needs emerges as the chief motivator of behaviour. Alderfer, on the basis of his research, postulates a revised need hierarchy known as ERG theory (existence-relatedness-growth), in which Maslow's five sets of needs are reduced to these three: existence (physiological and safety), relatedness (belonging and esteem) and growth (self-actualization). The important difference is that Alderfer does not specify that satisfaction of lower order needs is a prerequisite for salience of higher order needs. McClelland identifies three basic needs: the need for achievement, for power and for affiliation. The need for achievement relates to a striving for some standard of excellence in task accomplishment. This includes a strong goal orientation. The need for power reflects a desire to exert control or influence over people, while the need for affiliation refers to a need for establishing, maintaining or restoring pleasant emotional relationships with other people. This includes particularly a need to be liked by others. Herzberg's theory has the same foundation as all need theories: that each individual is born with certain needs that must be satisfied. In contrast with the five factor theory of Maslow, the three

factor theory of Alderfer or the three factor theory of McClelland, Herzberg proposes that all individuals have two basic sets of needs: hygiene needs and motivator needs. Hygiene needs are basically maintenance needs, while motivator needs are higher-order or growth needs.

Though the relevance of other theories of psychology (e.g. psychodynamic theory, personal-construct theory, learning theory, etc.) for the understanding of psychological needs is evident, the theories presented above enable some insight into the question of what may constitute internal demands, depending on the individual concerned. These internal demands "interact with external demands in producing the overall level of demand as perceived by the person when he appraises his work situation" (Cox, 1978, p.152).

1.2.2 External Demands

Under the heading of external demands fall several categories of possible sources of stress: the environment, career development, organizational structure and climate, extra-organizational factors, the task and organizational role. It is emphasized that these categories are broad and that extensive theoretical and practical overlap exists between them.

1.2.2.1 Environmental Factors

The potential environmental sources of stress to be briefly considered are temperature, humidity and noise. The concern here is with extremes of sensory stimulation which may lead to a perceived imbalance between environmental demands and ability to cope.

Though air-conditioning and central-heating are rapidly reducing the importance of temperature as a potential stressor, there are still many jobs where individuals either work outdoors or in manufacturing concerns (e.g. steelmills) where temperature cannot be controlled (Macpherson, 1973). Excessive heat is likely to result in severe psychological and physiological costs to the individual, particularly if he is engaged in heavy labour (Bass and Barrett, 1973). Heat stress results in increased skin-blood circulation, thereby increasing heart rate and perspiration (Turell and Hellerstein, 1958). Further, when individuals experience discomfort and fatigue, their working capacity falls, errors in perception and judgement appear and eventually serious physiological disturbances may lead to exhaustion and collapse (Lind, 1960). It does not seem that cold is as serious a source of stress as heat (Fox, 1967).

Humidity is possibly a more noxious source of stress than heat. Higher humidity associated with a particular temperature is more stressful than the same temperature associated with lower humidity. It appears that there are limits to humidity and temperature, beyond which rapid deteriorations in performance occur. Those most immediately affected are the less skilled workers and workers who have to place more effort into work to yield the same amount as others (Bass and Barrett, 1973).

The importance of noise as a stressor is not clear. Though those exposed to certain noise intensities for a continuous period will suffer a hearing loss at some time (Cox, 1978), noise does not seem to have any significant effect on the efficiency of the employee (Bass and Barrett, 1973; Levi, 1981). In evaluating the extent to which noise is annoying, and possibly stressful, Bass and Barrett emphasize the importance of the individual's subjective reaction to noise. Also important are the extent to which the noise is predictable and the employee's perception of his ability to terminate it if he wishes (Glass, Singer and Friedman, 1969) as well as the noisiness (spectrum complexity) versus loudness of the sound (Kryter, 1966).

1.2.2.2 Career Development

Potential sources of stress related to career development include the impact of overpromotion, underpromotion, status incongruence, lack of job security, thwarted ambition (Cooper and Marshall, 1978), unemployment and obsolescence (Strumpfer, 1983 a).

Brook (1973) has discussed case-studies which illustrate how overpromotion (when a person has reached the peak of his abilities and is given responsibility exceeding his capacity) and underpromotion (when a person is not given responsibility commensurate with his ability level) may result in behavioural disorders. Status incongruence arises when an individual's advancement or lack of advancement differs from his expectation (Erikson, Pugh and Gunderson, 1972). A later study by Erikson, Edwards and Gunderson (1973) found that status congruency was negatively

related to the incidence of psychiatric disorder. Social status incongruency (incongruity between an individual's social status and that of his parents, or social class differences between his parents) has also been found to relate to indices of physical and mental ill-health (e.g. Berry, 1966; Kasl and Cobb, 1967; Shekelle, Ostfeld and Paul, 1969).

Lack of job security (or job future ambiguity, in Van Dijkhuizen's [1980] terms), which is tied up with issues of obsolescence (most likely on account of technological change, e.g. computerization, Strumpfer [1983a]) and thwarted ambition are intuitively reasonable stressors (Cooper and Marshall, 1978) and have some moderate empirical support as such (e.g. Van Dijkhuizen). More importantly, considering the apparent size of the problem in South Africa today (Survey of Race Relations in South Africa, 1981), is the question of unemployment. This has been found to relate to poor mental health (e.g. Fineman, 1979; Stafford, Jackson and Banks, 1980), though Fineman, employing a phenomenological methodology, has pointed to the importance of mediating variables such as prior job involvement, social support, confrontation approach, belief in personal worth, etc. in the actual personal outcome associated with unemployment.

1.2.2.3 Organizational Structure and Climate

Particular organizational structures may contribute to the emergence of a number of characteristics of organizations which are seen as potential stressors (Strumpfer, 1983a). Examples are: little or no participation in the decision-making process, lack of effective consultation, restrictions on behaviour (e.g. budgets), office politics (Cooper and Marshall, 1978), inter-

departmental conflict (Parasuraman and Alutto, 1984; Van Dijkhuizen, 1980) and inappropriate management styles (Strumpfer, 1983a). The most researched of these stressors is lack of participation (e.g. French and Caplan, 1970, 1972; Kasl, 1973; Margolis, 1973). The evidence is clear; that lack of participation is associated with lower job satisfaction and higher levels of physical and mental ill-health.

1.2.2.4 Extra-organizational Factors

A number of possible sources of stress exist outside of the organization but affect the physical and mental well-being of an individual at work (Cooper and Marshall, 1978). Among these may be listed lack of social support (Van Dijkhuizen, 1980) (which may be more appropriately treated as a mediating variable, following Fineman's (1979) findings, mentioned earlier), life satisfaction and crises (Dohrenwend and Dohrenwend, 1974; Gunderson and Rahe, 1974) family problems (Pahl and Pahl, 1971), financial difficulties and mobility (Cooper and Marshall, 1978).

1.2.2.5 Task-inherent Factors

Task-inherent factors are those potential sources of stress related to the task itself (McGrath, 1976), i.e. those factors which are an intrinsic part of the job and which may be stress-producing (Cooper and Marshall, 1976). Important here are factors such as repetitiveness, shiftwork and workload. (As workload refers to a class of variables hypothesized as stressors in this study, it is discussed with the other hypothesized stressors, in Section 1.2.4.)

Repetitiveness in work has resulted from the practice of work simplification and automation (e.g. in paced assembly lines) and is clearly justifiable in economic terms. However, there is much evidence to suggest that it is detrimental to health. Benyon and Blackburn (1972) studied repetitiveness and found that it led to tension resulting from boredom. Benyon (1973) examined the same question again in greater detail and found that most workers view production line work as dull, monotonous, tedious and without any intrinsic interest. The "switching-off" reaction to this work environment has implications for mental health, as it results in difficulty in introspection and in individuals' abilities to report their own feelings (*ibid.*). Kornhauser (1965) also reported findings supporting the idea of production-line work leading to undesirable individual outcomes. He found that many of the production line workers he interviewed had an unsatisfactory adjustment to life and generally poorer mental health than white-collar workers. The implications of repetitiveness for physical ill-health have also been documented (e.g. Kritsikis, Heinemann and Eitner, 1968; Levi, 1981; Marcson, 1970; Shepard, 1971). Notable among these is the higher risk of angina pectoris associated with conveyor line systems than with other technologies (Kritsikis, 1968). Though repetitiveness in industrial settings has been most studied, it is clear that many white-collar jobs (e.g. clerical positions) entail repetitive, monotonous work as well. The effects of repetitiveness in these positions have not been extensively documented though some support for its harmful effects is given by research on job design theory which has demonstrated significant positive relationships between skill variety and job satisfaction (e.g. Brief and Aldag, 1975; Hackman and Lawler, 1971).

Shiftwork is a relatively recent phenomenon in industry and may be classed among what Bass and Barrett (1973) call the newer forms of work stressors. They consider the physiological and psychological costs of shiftwork to the employee to be amongst the most serious of consequences of these newer stressors. The basis of physiological problems arising out of shiftwork appears to be the upsetting of circadian rhythms (Levi, 1981). Thus, Bass and Barrett suggest that the most satisfactory systems are steady shifts, or one month rotating systems, which enable the circadian rhythm to adjust for the individual. From the point of view of social problems with shiftwork, rotating shifts appear to present the greatest difficulty as there is constant change in the possible social pursuits of the worker. This has the result that it is not possible to establish any measure of routine, which is to some degree essential for psychological and physiological health (ibid.). Clearly, the only reasonably satisfactory alternative is steady shift systems.

1.2.2.6 Role-inherent factors

The potential sources of stress to be discussed in this section involve the role of the individual in the organization. The word 'role' refers to behaviours which are attached to certain positions rather than to individuals who hold these positions (Warr and Wall, 1975) and develop originally from task requirements (Katz and Kahn, 1966). In their pure or organizational form, roles are "standardized patterns of behaviour required of all persons in a given functional relationship, regardless of personal wishes or interpersonal obligations irrelevant to the functional relationship" (ibid. p.37). Stated operationally, the term 'role' denotes the behaviour

expected of an employee as it relates to the particular position he holds in the organization (ibid.). A number of additional concepts of role theory (Kahn et al, 1964) are relevant: when considering roles in the analysis of the position of any individual, the individual concerned is given the name of focal person (Handy, 1981); the group of people with whom an individual interacts in carrying out his/her role is called the role set (Katz and Kahn, 1966); the behavioural expectations associated with a role are a combination of the role expectations that the members of the role set have of the focal role (ibid.).

Those factors which involve the roles an individual holds and which may be stress-producing include responsibility, relationships at work, conflict, ambiguity and role load. (As role conflict, ambiguity and load are hypothesized stressors in this study, they are discussed together with workload in Section 1.2.4).

Two different types of responsibility at work are distinguished: firstly, responsibility for people, for their work, welfare and promotion and, secondly, responsibility for things, for buildings, machinery, money, etc. (Cobb, 1974). Though heavy responsibility generally carries a substantial risk to physical health, it seems that responsibility for people carries a greater risk than responsibility for things (ibid.; Wardwell, Hyman and Bahnson, 1964). Thus, research has often tended to consider responsibility for persons alone (e.g. Van Dijkhuizen, 1980). Studies of occupational groups with considerable responsibility, like air-traffic controllers (Cobb and Rose, 1973) and surgeons (Fraser, 1968), have provided clear evidence of

the costs to individuals in these groups, in terms of hypertension, cholesterol level and increased risks for diabetes and peptic ulcers. While discussing high-risk groups and the medical profession, it is interesting to note the findings of Cooper, Mallinger and Kahn (1978) which show that dentistry is a high-risk profession from the point of view of stress-related disease, though not because of responsibility. For the dentists studied, the major sources of stress were the common public conceptions of dentists as inflictors of pain, their difficult working conditions, frequently dull and routine work and little patient appreciation!

Relationships with others have been seen as constituting a separate category of potential sources of stress (Cooper and Marshall, 1978) but clearly involve the focal person as he/she relates to members of the role set. Thus, it is probably more appropriately discussed in the context of role-inherent factors. French and Caplan (1972) define poor relations as "those which include low trust, low supportiveness and low interest in listening to and trying to deal with problems that confront the organizational member" (p. 324). A number of researchers (e.g. Argyris, 1964; Buck, 1972; Cooper, 1973; McLean, 1981; Parasuraman and Alutto, 1984) have suggested that good relationships between members of a workgroup are important for organizational health, while their absence may contribute to the experience of stress in the individual. Studies by Kahn et al (1964) and French and Caplan (1970) both led to the conclusion that poor relationships at work are associated with low job satisfaction and feelings of job-related threat to one's well-being. Buck (1972) found that relationships at work were significant in determining the experience of job pressure, which he related to the experience of stress.

1.2.3 The Interaction of Stressors

Possibly one of the most complex problems in the understanding of stress is the question of the interaction of stressors. While some fairly good information exists concerning the effects of any one stressor acting by itself, there is relatively little information concerning the effects of the interaction of two or more stressors on individual and organizational outcomes. For example, it is known that beyond 81°F, heat seems to play a fairly important role in decreasing performance (Broadbent, 1963). However, it is not known whether temperatures in excess of 81°F, when combined with other stressors, have an additive or possibly cancelling out effect in terms of the employee's performance and how this combination affects health (ibid.). A simple assumption is that stressors interact additively (Poulton, 1978), i.e. if noise, vibration and heat each reduce efficiency by 10%, then the combined effects of the three stressors will reduce efficiency by 30%. However, the work on noise and loss of sleep, for example, indicates that the number of errors made (in a laboratory situation) when noise is combined with loss of sleep is less than the sum of their individual effects (Warr, 1971). This reflects the view of loss of sleep as arousal reducing and noise as arousal increasing (ibid.). Clearly, then, the additive view may be inaccurate, at least for some combinations of stressors. However, in the absence of sufficient research to enable informed conclusions, Poulton (1978) suggests that it is probably safest to assume the additive model and emphasizes the need for additional research in this area.

1.2.4 Hypothesized Stressors in this Study

The preceding discussion has indicated the concern of research and theory with a broad spectrum of factors considered to be potentially important in determining the experience of stress at work. In the course of this discussion, the hypothesized stressors to be considered in this study were mentioned, i.e. workload and role conflict, ambiguity and load (the reason for the repetition of 'load' will become clear later). It is immediately apparent that these represent a small proportion of the total number of variables that could be considered. This gives rise to two important issues, one concerning the reasons for the focus of this study on these particular variables, the other concerning the implications of this selective investigation of hypothesized stressors for expected statistical results. These issues will be addressed when the current study is discussed as a whole, in Section 1.5.1.

1.2.4.1 Role Conflict

Role conflict is the "simultaneous occurrence of two or more role sendings such that compliance with one would make difficult compliance with the other" (Katz and Kahn, 1966, p.184). Thus, role conflict emerges when it is necessary for an individual to carry out more than one role in the same situation (Handy, 1981). It may be that the expectations held by each member of the role set with regard to the focal person are quite clear and that the expectations associated with each role are compatible, but that the roles themselves are incompatible (*ibid.*). To the extent that the expectations of members of the role set include some pressure on the

focal person towards different kinds of behaviour, he will experience a psychological conflict (Kahn et al, 1964).

Kahn et al (1964) identify several types of role conflict. The following listing draws from their presentation. (Originally, Gross, Mason and McEachern (1958) distinguished between two types of conflict: intrarole and interrole conflict. Kahn et al's categories are basically an elaboration of theirs) -

Intra-sender conflict occurs when the same member of the role set sends two or more incompatible "prescriptions" or "proscriptions" (p.19). An example is where a supervisor asks a subordinate to acquire materials which are unavailable through normal channels and yet prohibits violations of normal channels.

Inter-sender conflict refers to opposing expectations/pressures from two or more members of the role set. The dilemma of foremen, who receive pressures from above for stricter supervision and pressures from below for looser supervision, is a classic example of this type of conflict.

Inter-role conflict occurs when the focal person experiences pressures associated with membership in an organization conflicting with pressures associated with membership in other groups. A typical example is given by conflict arising from the focal person's role as worker and his role as a husband and/or father, with regard to, for instance, overtime and take-home work.

In addition to the above types of "sent role conflict" (p.20), conflict may also exist between the expectations of the role set and

the focal person's needs and moral values. This is called person-role conflict. An example of this would be conflict between an individual's code of ethics and pressures to enter "price-fixing conspiracies" (p.20).

1.2.4.2 Role Ambiguity

In order to perform effectively on the job, a certain amount of information concerning behavioural requirements is required. Where there is a lack of appropriate information, role ambiguity may result. In other words, "role ambiguity is a state in which the person has inadequate information to perform his role" (French and Caplan, 1972, p.311). More succinctly, Kahn et al (1964) define role ambiguity as "the lack of clear, consistent information" (p.23). Kahn et al and Rizzo, House and Lirtzman (1970) further describe two major components of ambiguity as it relates to work. The first is an individual's experience of a lack of predictability of outcomes to behaviour. This involves uncertainty regarding the quality of his/her work and the bases of employee evaluation, as well as the "ability to predict sanctions as outcomes of behaviour" (Rizzo et al, p.156). The second concerns the existence or clarity of behavioural requirements and includes "certainty about duties, authority, allocation of time and relationships with others; the clarity or existence of guides, directives and policies" (ibid.).

Clearly, the crucial question in role ambiguity is the extent to which information required by the focal person is available. However, as Kahn et al (1964) discuss, there are many situations which may give rise to the

(non)availability of information, of which they give five. Firstly, the information may simply be lacking in the organization. Secondly, the information may be in the organization but not in the role set of the focal person. Thirdly, the information may be in the focal person's role set but may be withheld owing to dislike or mistrust. Fourthly, the information may be communicated in a fragmentary or garbled way. Fifthly, several members of the focal person's role set may communicate the information but in an inadvertently contradictory way, thereby producing confusion and uncertainty. It is this last form of ambiguity which establishes a close conceptual link between ambiguity and conflict (ibid.).

1.2.4.3 Workload and Role Load

In the general review of sources of stress at work, workload was mentioned in the context of task-inherent factors. This reflects a distinction that is often drawn, between workload (or amount/difficulty of work to be done) on the one hand and what may be called role load (or number of roles to be handled) on the other (e.g. Cooper and Marshall, 1976, 1978; Handy, 1981; Rizzo et al, 1970). Further, and as mentioned above, workload is seen as a variable inherent in particular tasks and role load as a variable inherent in particular roles. However, as Van Dijkhuizen (1980) and Katz and Kahn (1966) have indicated, there is considerable overlap between components of task and components of role. For example, an increase in number of roles is likely to cause an increase in amount, and possibly difficulty, of work. Whatever the nature of the relationship between the two, it is almost certain that their separate domains cannot be isolated in practice. Thus, in the opinion of this author, the distinction

between workload and role load largely constitutes a theoretical debate and it is not made in this study. Rather, workload and role load are considered together and referred to as role load. Role load, therefore, is used here in the broader sense to include workload.

It is possible to conceive of a role load as too demanding — this is called role overload — or as too undemanding — this is called role underload (Sales, 1969, 1970). Thus, role overload may be described as a "condition in which the individual is faced with a set of obligations which, taken as a set, requires him to do more than he is able in the time available" (Sales, 1969, p.342). This usage of the term role overload is identical to that of Kahn et al (1964, p.59). Role underload may be described as arising "when an individual feels that the role definition is out of line with his self-concept — out of line, that is, in terms of his capacity to handle a bigger role or a greater set of roles" (Handy, 1981, p.60). Role overload and underload may reflect a lack of person-environment fit with respect to one or both of the dimensions of load distinguished by French and Caplan (1972). These authors describe quantitative load and qualitative load. The former refers simply to the total amount of work to be done, irrespective of its difficulty, while the latter includes the difficulty component and whether or not demands of the task or role are in line with the skills, abilities and knowledge of the person. Combining the above dimensions of role load, four distinctive sources of stress may be hypothesized: qualitative and quantitative overload and underload. These lie at opposite ends of two continua of quantitative and qualitative role load and are illustrated in the following way:

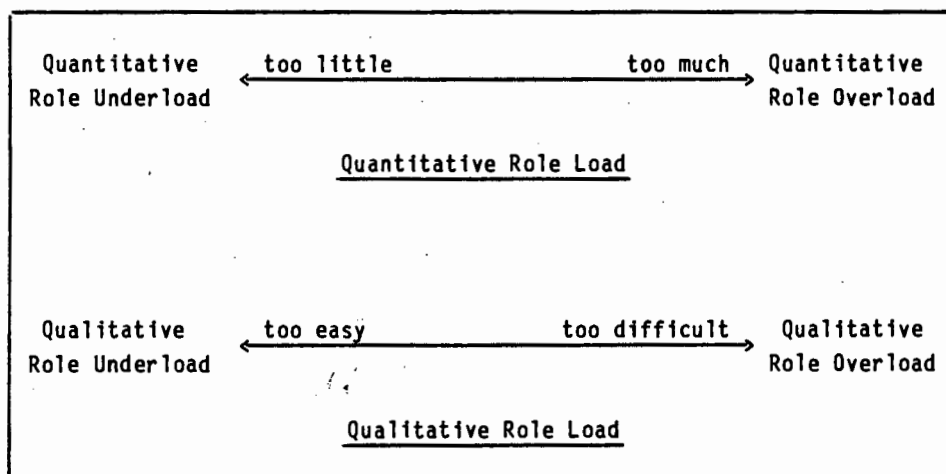


Figure 1.5: TYPES OF ROLE LOAD AS SOURCES OF STRESS

The emphasis in the current study is on both quantitative and qualitative role overload. Considering the importance attached to underload by some authors (e.g. Du Brin, 1978; Handy, 1981; Poulton, 1978), some items tapping this variable were included in the role dimensions questionnaire (see Section 2.3.1). However, as the flexitime system in operation in the target company serves to confuse issues surrounding quantitative underload, only qualitative underload was examined.

Excessive role demand (underload and overload) has its origins in role conflict (French and Caplan, 1972; Handy, 1981; Kahn et al, 1964; Katz and Kahn, 1966). Role overload "could be regarded as a kind of inter-sender conflict in which various role senders may hold quite legitimate expectations that a person perform a wide variety of tasks, all of which are mutually compatible in the abstract" (Kahn et al, 1964, p.20) but which are virtually impossible for the focal person to complete in the available time. Additionally, of course, overload involves a kind of person-role

conflict and Kahn et al suggest that overload is probably most appropriately regarded as a complex type of conflict combining aspects of inter-sender and person-role conflicts. Role underload may be described as a specific form of person-role conflict, i.e. conflict between the needs and values of the focal person and the demands of the role set, but specifically concerning these demands being too limited in relation to his/her needs.

Rizzo et al (1970) have related certain aspects of role conflict and ambiguity to principles of classical organization theory. Inter-sender role conflict is seen as a result of violation of two classical organization theory principles: the principle of chain of command and the principle of unity of command and direction. According to the principle of chain of command, organizations should operate on the basis of hierarchical relationships, with a clear and single flow of authority from top to bottom. This principle accords with the principle of unity of command, which states that for any action an employee should receive orders from not more than one superior and that there should be a single leader and a single plan for a group of activities having the same objective. Rizzo et al note that the principle of single accountability, as developed by a more recent classical theorist — Davis (1951), is a corollary to the principle of unity of command. Davis' principle states that "a person should be accountable for the successful execution of his tasks to one and only one superior" (p.150-151). The logic underlying the view of intersender conflict as the outcome of transgression of the principles outlined above is self-evident. Most fundamentally, implementation of these principles prevents "a member from

being caught in the crossfire of incompatible orders or incompatible expectations from more than one superior" (Rizzo et al, p.159). Important aspects of role ambiguity can be seen in terms of transgression of a further principle of classical theory — a principle that states that for every formal organizational structure there should be a specified set of tasks or position responsibilities. Once again, the connection between role ambiguity and the principle under discussion is self-evident. This description of the relationships between classical organizational theory and aspects of role conflict and ambiguity illustrate(s) that the specification of role constructs has arisen from decades of formal organizational theorizing.

1.3 RESPONSES TO THE EXPERIENCE OF STRESS - STRAIN

According to the model of stress employed in this study (see Section 1.1.4), the experience of stress is accompanied by physiological, behavioural and cognitive responses which are referred to as strain — the external measurable effect of the experience of stress (see Van Dijkhuizen (1980) quote, Section 1.1.4). Most descriptions of strain use the term psychological instead of cognitive, thus implying a broader classification (e.g. Beehr and Newman, 1978; Brief et al, 1981; Schuler, 1980, 1982). Those definitions which have focused upon the meaning of strain in and of itself have defined it in terms of psychological and physical "ill-health" or "lack of well being" and the behavioural manifestations of these (e.g. Beehr and Newman, 1978; Kahn et al, 1964; Schuler, 1980, 1982). In the terms of Cox (1978): "The World Health Organization defines 'health' as the presence of physical..... and psychological well-being. The cost of stress is expressed in terms of its effects on that well-being" (p.91). These definitions are consistent with the equation of strain with adverse consequences, as referred to in Section 1.1.6.

The terms "ill-health" or "lack of well-being" need not necessarily refer to illness per se but may refer to responses potentially aversive to the individual in this sense. McLean's (1974) description of strains as maladaptive responses characterizes this view well, as does Levi's (1981) definition of strains as the psychological and physical reactions of the individual to stressors, these reactions usually being unpleasant and sometimes producing emotional or physiological disability (the latter also

being referred to as strains within the model used here). Similarly, with regard to physical strains, Beehr and Newman (1978) distinguish between transient physiological changes and actual physical disorders but refer to both as strains, the former falling into the "potentially aversive" category given above. Physical and psychological responses not involving actual illness need not necessarily be potentially related to such illness in order to be described as strains. As the term "lack of well being" in fact indicates, their aversiveness or maladaptive nature may lie in the individual's experience of them (this, of course, not excluding their potential relation to actual illness). Once again, Levi's definition reflects the view being expressed here.

Behavioural strains, as noted above, are seen as manifestations of physical and psychological strain. In the terms of McLean (1974) and Schuler (1980; 1982), they may be described as outcomes of maladaptive responses which can in turn have further maladaptive results for the individual and/or the organization.

It is by virtue of their relation to strains that factors are defined as stressors within the perspective of this study. This was made clear in section 1.1.5.

Strain, then, has been defined in terms of physical, psychological and behavioural responses. It should be noted that, at some point, it becomes difficult to distinguish in practice between psychological and behavioural responses (Schuler, 1980). For example, is depression more accurately

conceived of as a psychological or behavioural response? Further, physiological responses cannot be rigidly separated from psychological and behavioural responses. Anxiety, for instance, has psychological, behavioural and physiological aspects (Mowbray and Rodger, 1973). In fact, arguing from a reductionist standpoint, psychological and behavioural responses may all be reduced to physiological factors. Clearly, then, the categories of responses to the experience of stress cannot be seen independently of each other. However, the above categorisation is useful for description and is utilised in this study as in most discussions of responses to stress (e.g. Brief et al, 1981; Burns, 1981; Caplan et al, 1975b; French, 1976; French and Caplan, 1972; Levi, 1981). Despite the usefulness of this categorization, it should always be qualified with reference to the above points. Thus, in this study it is noted that the description of strains is limited in that it does not include a detailed discussion of the interactions between the three classes of strains. Although this is necessary for a full understanding of responses to stress, it is beyond the scope of this study.

1.3.1 Van Dijkhuizen's Sequential Model of Strain

Prior to an examination of the above categories of strain, it is important to consider their temporal relations as Cox and Mackay's model is largely cross-sectional and does not have particular implications in this regard. By temporal relations is meant the hypothesis that some strains act as mediators between stressors and other strains so that a temporal chain or sequence is formed (Van Dijkhuizen, 1980).

The sequence idea seems to have been first mentioned by French and Caplan (1972): "we do in fact assume that psychological strains affect heart disease by means of some intervening physiological strains" (p.310 footnote). Caplan and Jones (1975) provided some support for this assumption, and for the sequence idea, when they showed that the relationship between workload (the stressor) and pulse rate (an index of strain) was presumably mediated by anxiety/tension (another index of strain). Subsequently, the idea of sequentiality in strains was incorporated into a model produced by Caplan (1976b). In this model, job related effects such as dissatisfaction and boredom are hypothesized as leading to affects such as general depression and irritation which, in turn, are hypothesized as leading to physical disease.

Van Dijkhuizen (1980) commented that, with the exceptions of the partial evidence and theorizing mentioned above, not very much has been done to test the sequence idea. Consequently, he sought to extend knowledge in this area. Though longitudinal research is clearly preferable (as sequences inevitably involve time-lags), he employed cross-sectional data, with the age of subjects providing a temporal dimension, to test the general sequence model illustrated below. The test of this model was also based on the notion that, in a sequence, measures of association between two concepts or classes that are near to each other in the model are likely to be higher than those between classes that are more distant.

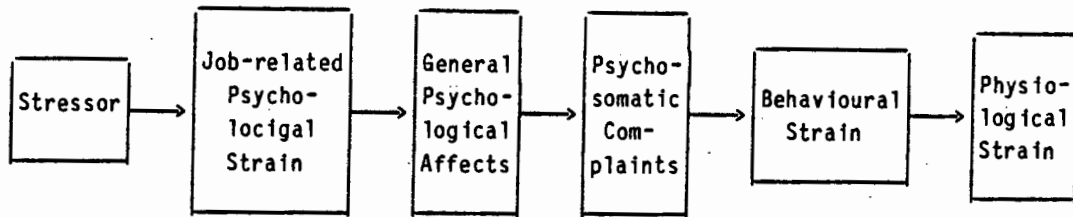


Figure 1.6: GENERAL SEQUENCE MODEL TESTED BY VAN DIJKHUIZEN (FROM VAN DIJKHUIZEN, 1980, p. 127)

This model reflects the general classification of strains into psychological, behavioural and physiological but includes Caplan et al's (1975b) subdivision of psychological strain into job-related psychological strain and general psychological affects. In addition, a category of psychosomatic complaints was added (which included complaints concerning general health and the heart in particular). Research findings led Van Dijkhuizen to develop the following Empirical General Sequence Model.

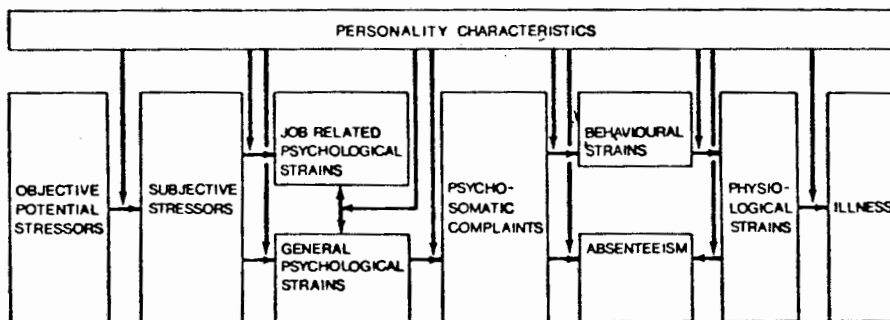


Figure 1.7: VAN DIJKHUIZEN'S EMPIRICAL GENERAL SEQUENCE MODEL (FROM VAN DIJKHUIZEN, 1980, p. 127)

This model takes cognizance of his findings that measures of general psychological affects were often associated with stressors as strongly as job-related strains. On the basis of these findings, Van Dijkhuizen concluded that general psychological affects and job-related strains are two subclasses at the same stage in the sequence. Further, the model separates absenteeism from other behavioral indices of strain such as smoking, etc. This reflects the difficulty of establishing cause and effect with respect to absenteeism. As Aldridge (1970) states: "Measures of absenteeism can be most helpful in following broad trends of sickness behaviour in various working groups but are notoriously inaccurate when it comes to the diagnostic cause of the absence" (p.614).

Though Van Dijkhuizen appears to have overlooked some prior work in this area, these earlier findings are consistent with his model. Russek and Zohman (1958) provide empirical support for the view that psychological strain precedes physiological strain, as does other work by Hom, Katerberg and Hulin (1979), Porter, Steers, Mowday and Boulian (1974) and Steers (1977). Later work by Parasuraman and Alutto (1984) with path analysis also supports this general proposition.

Clearly, the limited available data are consistent with Van Dijkhuizen's formulation. Notwithstanding this empirical support for his general propositions, Van Dijkhuizen's methodology invites criticism, particularly the use of age as a longitudinal dimension. It should also be noted, in relation to this, that Van Dijkhuizen's model fails to take account of the role of physiological strains in the development of

psychosomatic complaints, as suggested by, for example, French and Caplan (1972), Levi (1981), Lipowski, Lipsitt and Whybrow (1977), Pelletier (1977), Selye (1976) and Strumpfer (1983a). Psychosomatic or psychophysiological disorders are, in fact, defined in terms of the fact that the physical conditions involved stem from the physiological concomitants of affective states (DSM III 1980; Friedman, Kaplan and Sadock, 1980; Grings, 1978) which have been described in this context as psychological strains. It is therefore suggested that, although Van Dijkhuizen did not establish this empirically, there is likely to be a link from the psychological strains through the physiological strains to the psychosomatic complaints. The model presented above should, therefore, be seen as tentative, requiring considerable empirical testing. However, at this stage it is the most comprehensive model available and, in conjunction with the general categories of strain listed earlier, was used to select indices of strain for this study. Some hypotheses were formulated regarding sequential relations suggested by the model (to be discussed in Section 1.5.4).

1.3.2 Physiological Responses to the Experience of Stress

Following Strumpfer (1983a), this discussion of physiological responses to the experience of stress deals first with an individual's immediate response ("fight-or-flight", Cannon 1929; 1931) and then with the individual's adaptation to the demands over a longer period of time ("general adaptation syndrome, Selye, 1956, 1976). In fact, the fight-or-flight response may be seen as the initial adaptational response in the

countershock stage of the alarm reaction in Selye's general adaptation syndrome. In combination, these two provide a physiological framework upon which responses of the body to the experience of stress "can be arranged", although their status is still controversial (Cox, 1978, p.54).

1.3.2.1 Fight-or-Flight Response

The Cannon-Bard theory suggests that arousing events (presumably the perception of imbalance, i.e. the experience of stress) lead to specific sequences of activity in the hypothalamus and cortex which heighten the level of physiological activity in the central nervous system. In a situation of danger or threat, these complex bodily reactions prepare the animal to deal with the situation by a fight-or-flight response (Mowbray and Rodger, 1973). Specifically, the physiological response to threat leads to activation of the autonomic nervous system by messages from the cerebral cortex, via the hypothalamus. Activation of the autonomic nervous system involves increased heart-rate, blood pressure and rate of breathing as well as the redistribution of blood to the skeletal muscles and the brain. Simultaneously, the secretion of the hormones adrenalin and noradrenalin by the adrenal glands takes place. The secretion of adrenalin reinforces the sympathetic reaction and leads to the mobilization of blood sugar reserves in the liver, the acceleration of sugar reserve transformation in the muscles, the release of red blood cells into the blood stream and the increased coagulation of blood. The secretion of noradrenalin leads to the constriction of blood vessels and consequently to higher blood pressure while the associated activation of the pituitary gland leads to the secretion of still more hormones by other endocrine glands (Strumpfer, 1983a).

These physiological responses are adaptive biological responses or mechanisms of species survival which enable the organism to take the action necessary to deal with stressful situations. In this sense, the physiological response to stress may be seen as a coping response to threatening situations (Lipowski, 1977; Pelletier, 1977). Under primitive conditions, the physical activities of fight-or-flight were always appropriate behaviours in response to threatening situations. However, Simeons (1961) argues that the human brain (the diencephalon in particular) has failed to develop at the pace needed to respond to the symbolic stressors of the twentieth century. With the advent of so-called civilization, the physical emphasis of life has largely been removed and fight-or-flight behaviour may now often be simply inappropriate or even maladaptive (Strumpfer 1983a). For example, when our self-esteem is threatened, the brain prepares the body with the fight-or-flight response. If the threat to self-esteem stems from fear of embarrassment during public speaking neither fighting nor running away are appropriate reactions. Consequently, the body has prepared to do something our psychology prohibits and the body has to continue functioning without the relief which physical activity would have brought. The unused stress products break down the body and psychophysiological disease may result (Simeons 1961; Strumpfer 1983a).

1.3.2.2 General Adaptation Syndrome

Turning now to longer-term physiological reactions to the experience of stress, Selye (1976) has described a process of bodily adaptation which he calls the "general adaptation syndrome" (GAS). These adaptive, defensive reactions progress with the repeated or continued experience of stress

through three stages: alarm, resistance and exhaustion. In the alarm phase, the body shows the characteristic changes associated with the experience of stress (i.e. the fight-or-flight physiological arousal pattern) and moves towards the resistance phase in which the capacity to resist the demand rises above normal. The final stage of exhaustion is the result of the long-term experience of stress, to which the body has adapted and involves exhaustion of the energy available for such adaptation. In this stage, resistance decreases and eventually drops below normal. When resistance is excessive (intense) or prolonged (either in that it is continuous or recurrent), it may lead to physiological disorder — to structural changes or to disturbed functioning of tissue systems. Intense or prolonged nervous and hormonal reactions, as part of this resistance, may also indirectly lead to disease by adversely affecting the immune system (Lipowski, 1977; Pelletier 1977). Selye (1976) refers to these stress induced disorders as diseases of adaptation.

1.3.2.3 Evidence linking Cardiovascular Disease and Stress

A long list may be compiled of the possible physical health consequences of the experience of stress. Such a list would include cardiovascular disease, gastrointestinal disorders (peptic and duodenal ulcers), respiratory problems, cancer, arthritis, headaches, bodily injuries, skin disorders, diabetes mellitus and death (Beehr and Newman, 1978). As this study is not directly concerned with individual physiological outcomes, not all of the relevant literature will be reviewed. Rather, given the indirect involvement of cardiovascular disease (through the Type A behaviour pattern — to be discussed in Section 1.4), some of the more important

evidence for the stress-cardiovascular disease link will be briefly reviewed. Most of the research on cardiovascular disease has focused on coronary heart disease (CHD). CHD has two major manifestations: angina pectoris and myocardial infarction. Angina pectoris results when the heart muscle receives insufficient oxygen and this occasions a type of chest pain. Insufficient oxygen is received by the heart because of an inadequate blood supply caused by the obstruction of one or more coronary arteries. Myocardial infarction involves the death of heart tissue where an insufficiency of oxygen continues over a relatively long period of time. This is the disorder commonly called a heart attack and is associated with pain of greater severity and duration than with angina. Acute myocardial infarction may cause sudden death (Brief et al, 1981).

Research into stress and CHD has generally used two measures of health: actual disease (e.g. heart attacks) and behavioural and physiological risk factors (e.g. cigarette smoking, obesity, blood sugar, blood pressure, cholesterol, etc) (House 1974).

Actual Disease Studies: Russek and Zohman (1958) reported a study comparing 100 young coronary patients between the ages of twenty five and forty years with one hundred healthy subjects in a control group. The most striking difference between the two groups was in terms of their experience of stress. Prolonged stress, largely associated with job responsibility, preceded the attack in 91% of the coronary group but was experienced by only 20% of the controls. A later study by Russek (1962) found that high stress groups (general practitioners and anaesthetists in his

study) were more prone to coronary heart disease than low stress groups (pathologists and dermatologists). Bruhn, Chandler and Wolf (1969) examined the relationship between emotional state, physiological condition and coronary heart disease in hospitalised CHD patients. It was found that situations leading to an upset emotional state (and hence stress) resulted in a deterioration of physiological condition and often in further cardiac arrest. Kritsikis et al (1968) found an association between paced-assembly line work (a supposedly stressful work environment) and angina pectoris (mentioned earlier). Syme, Hyman and Enterline (1964) and Syme, Borhani and Buechley (1965) showed that CHD patients had experienced more occupational changes and had been fewer years in their principal occupations than matched controls. More evidence linking occupational mobility to CHD is provided by Jenkins, Rosenman and Friedman (1966) who found that men who had experienced a "silent" myocardial infarction were more likely to have received a job promotion within the previous three years than matched controls. Working excessive hours and/or holding down more than one full-time job may also be associated with CHD morbidity and mortality (Bruhn, Wolf, Lynn, Bird and Chandler, 1968; Buell and Breslow, 1960; Theorell and Rahe, 1972). Studies of Trappist monks (who live in relative seclusion) and Benedictine monks (who conduct seminars, schools and parishes) have indicated that the former have lower rates of CHD than the latter (Barrow, Quinlan, Edmunds and Rodillosso 1961; Caffrey 1969).

Risk-factor Studies: Friedman, Rosenman and Carroll (1957) found marked increases in cholesterol levels in tax accountants as the deadline for filing

income tax returns approached (overload). Air traffic controllers (a high stress group) have a much greater incidence and prevalence of hypertension than second-class airmen (Cobb and Rose, 1973). Researchers at the ISR have contributed extensively in this area and have shown that quantitative work overload is linked to cigarette smoking, cholesterol level and heart rate and that responsibility for people is positively associated with smoking and diastolic blood pressure (Caplan 1971; French and Caplan 1970, 1972). House's (1972) total community study showed a significant association between a composite measure of job pressures (including overload, responsibility and conflict) and heart disease risk factors. Van Dijkhuizen (1980) found positive associations between role conflict, lack of support at work (from those other than superiors and colleagues), job future ambiguity and tensions in relations with superiors and subordinates and systolic blood pressure and between lack of support from colleagues and diastolic blood pressure.

The above research is interpreted, within the framework of the present study, as indicating the stress-CHD link and, in relation to this, the stressfulness of certain factors. It should, of course, be noted that many factors other than stress can give rise to heart problems. Nevertheless, the research reviewed does seem to indicate that stress is at least an element of relevance here. As far as the research on the direct stress-CHD/risk factor link is concerned, the point being made is obvious. As regards the other research reviewed, the relationships found seem best explained by this link.

Findings such as the above, then, can be interpreted as lending considerable support to the notion that stress plays a significant role in the etiology of CHD. However, a number of studies have failed to replicate these findings. Wardwell and Bahnson (1973) and Lehman, Schulman and Hinkle (1967) found no association between occupational mobility variables and CHD while Groen, Tijong, Koster, Willebrands, Verdonck and Pierloot (1962) failed to replicate findings with respect to benedictine and Trappist monks. Caplan et al (1975b) found no significant relationships between hypothesised stressors and cholesterol level and blood pressure. Finally, though Van Dijkhuizen obtained several expected associations in his study, other risk factors such as heart rate, cholesterol level, obesity and smoking failed to correlate with factors such as those mentioned in his research above.

Clearly, the role of stress in the development of CHD is not as clear as some studies would indicate. Many of the findings conflict and are controversial in nature (Kasl, 1978). However, overall it appears that stress probably does contribute to CHD (ibid.).

The present study does not include measures of physiological strain for reasons given in Section 2.2.2.

Further studies which have investigated the relationship between physiological strains and the stressors hypothesized in this investigation are reviewed in Section 1.5.3.

1.3.3 Behavioural Responses to the Experience of Stress

Behavioural responses to the experience of stress that are mentioned in the literature include poor work performance (e.g. Beehr and Newman, 1978; Brief et al 1981), high absenteeism and turnover (e.g. Bass and Barrett, 1981; Beehr and Newman, 1978; Cooper and Arbose, 1984; McDonald, 1981; Melhuish, 1981; Van Dijkhuizen, 1980), drug abuse — including excessive smoking (e.g. Caplan et al, 1975b; French and Caplan, 1970; Melhuish, 1981; Van Dijkhuizen, 1980), drinking (e.g. Beehr and Newman, 1978; Brief et al, 1981; Margolis, Kroes and Quinn, 1974; Melhuish, 1981; Vetter, 1981) and dependence on tranquilisers and sleeping tablets (e.g. Beehr and Newman, 1978; Cooper and Arbose, 1984), suicide, antisocial behaviour, go-slows, strikes and industrial sabotage (e.g. Beehr and Newman, 1978; Cooper and Arbose, 1984). These are the stress-related individual outcomes of most interest to companies as they detract from organizational effectiveness. Lost time, accidents, training expenses and decreased individual effectiveness, as concomitants or aspects of maladaptive behavioural responses, relate directly and indirectly to productivity and hence to organizational effectiveness.

To quote Matteson and Ivancevich (1979): "From a managerial perspective any aspect of organizational functioning linked to negative behavioural outcomes represents an undesirable condition..... the attendant organizational dysfunctions provide serious consequences for managerial personnel" (p.351). Behavioural strains are clearly, to a greater or lesser extent, not only of concern from the managerial point of view but also

from that of the individual (these two viewpoints seldom being entirely separable). The most frequently referred to behavioural responses to the experience of stress are: reduced performance, smoking, excessive drinking, turnover and absenteeism. These are discussed below.

The relationship between stress and performance was briefly mentioned in Section 1.1.1. There it was pointed out that the relationship can be very complex. Anderson (1976), Brief et al (1981) and Welford (1973) have stressed that the pattern of effect of the experience of stress on work performance is not a simple linear function. A number of laboratory based experiments have indicated that "performance under stress follows an inverted U-shaped function" (Anderson, 1976, p. 30) i.e. that there is an optimum level of stress as far as its effects on performance are concerned. Stress levels higher or lower than the optimum lead to steady degradation of performance (Anderson, 1976; Brief et al, 1981; Welford, 1973). Theoretical reasons which have been postulated for the decrease in performance under high levels of stress include narrowing of the perceptual field, motivation to reduce anxiety rather than to perform the task and overreliance on emotional and defensive methods of coping, together with underreliance upon problem-solving techniques. Lower performance associated with low stress is typically explained with reference to the low levels of motivation and high distractibility of those performing under such stress conditions (Anderson, 1976; Vroom, 1964). Anderson (1976) found a curvilinear relationship between experienced stress and organisation performance in a field setting. The relationship found was a reasonable approximation of the inverted U-function except for the

fact that performance under high stress tended to be average rather than declining. Parasuraman and Alutto (1983), however, describe the field study evidence as to the impairing effect of stress on performance as "both sparse and mixed" (p.332).

The relationship between stress and performance is further complicated by the influence of factors such as task difficulty and quality versus quantity of output. These will not be explored in detail here. It is sufficient to note that the effect of stress on performance does not follow a simple inverted U-shaped curve in all circumstances but that variables such as those just mentioned interact in determining the specific nature of the effect (Brief et al, 1981; McGrath, 1976; Welford, 1973, 1974). As indicated above, reduced performance levels constitute a problem of considerable relevance to organizational effectiveness.

Caplan, Cobb and French (1975) found that quitting smoking is negatively related to responsibility and lack of social support while French and Caplan (1970) found a positive association between responsibility for persons and smoking level. Van Dijkhuizen (1980) reported a positive correlation between smoking and underutilization of skills and abilities and lack of social support from those at work other than colleagues and superiors. Similar relationships are discussed by Melhuish (1981) and Van Dijkhuizen (1981). In some ways, smoking is a facilitative coping response in that it helps concentration (Frankenhaeuser et al, 1971), assists memory (Anderson, 1976) and improves learning (Kleinman, Vaughn and Christ, 1973). However, physical disease that may be encouraged by smoking can

be costly to organizations and, of course, to the individual. In this respect, Dobson's (1982) comment that the nicotine in tobacco is a stimulant which increases heart rate can be seen as relevant.

Margolis et al (1974) found that non-participation relates significantly to escapist drinking. Melhuish (1981) and Vetter (1981) refer to similar research findings. The intake of alcohol is associated with anxiety reduction — Dobson (1982) describes escapist drinking as an operant response reinforced by anxiety reduction but which cannot be seen as a facilitator of more integrated coping behaviour. Drinking appears to be an ever-increasing problem for organizational effectiveness as reflected in the data on relationships between it and lost time, accidents, productivity and turnover. Escapist drinkers are likely to show increased levels of absenteeism, accidents and turnover and their productivity is likely to decrease (Brief et al 1981).

Beehr and Newman (1978) describe absenteeism and turnover as examples of "employee withdrawal from work" which sometimes represents "an attempt to cope with job stress" (p690). Bass and Barrett (1981) describe absenteeism and turnover more specifically as temporary and permanent withdrawal, respectively. Arsenault and Dolan (1983), Hill and Trist (1962) and Van Dijkhuizen (1980) are amongst other authors who have also described turnover and absenteeism in these terms.

Beehr and Newman's view of absenteeism and turnover clearly refers to these behaviours as ways of escaping or avoiding the experience of

stress at work. As regards absenteeism, Van Dijkhuizen (1980) reflects this view when he says: "One of the opportunities to escape from a stressful situation is the flight into illness" (p.31). Absenteeism in the sense referred to here refers to withdrawal from work under the excuse of illness which may be entirely fictional or which may be exaggerated (to quote Aldridge (1970): "symptoms which would normally be entirely bearable become significant as a result of difficult..... experiences at work" (p.614)). Hill and Trist (1962) refer to such absences as "sanctioned" (p.16) in the sense that some ratification of the absence is provided. Absence can also, of course, include "unsanctioned absences" (ibid.) where the individual simply takes time off work without any attempt to provide a reason for doing so. Hill and Trist refer to both these types of absence as "voluntary" (p.21) in that there is no real basis for the absence in illness.

It has been suggested that absenteeism is not only related to the experience of stress in the ways outlined above. It can also be "involuntary" (ibid.) i.e. a manifestation of stress-induced physical ailments (Hill and Trist, 1962; Van Dijkhuizen, 1980). Absenteeism is thus related to "malingering" and actual stress-induced physical illness. It may also, of course, be related to "genuine" psychological "illness", the latter being conceptualised in the present study as an extreme form of psychological strain (this, of course, raises the question of how to establish a cut-off point between "less serious" psychological strain and "genuine" psychological illness).

Turnover, when representing a change in jobs obviously does not normally involve illness. However, when it refers to termination of work due to illness, the above comments as regards illness and absenteeism become equally applicable.

Accidents leading to absence from work have also been related to stress at work. They may, at varying degree of consciousness, take place so as to provide a socially acceptable reason for absence (Hill and Trist, 1962) and hence for escaping or avoiding the experience of stress. In addition, psychological and/or physical strains may contribute to the likelihood of accidents occurring (Aldridge, 1970; Bass and Barrett, 1981).

Research has indicated significant positive relationships between lack of participation on the one hand and turnover (Cobb and French, 1948) and intention to leave (Margolis et al, 1974) on the other. Relationships similar to these are discussed by Melhuish (1981) and Van Dijkhuizen (1981). Researchers have also obtained significant positive relationships between other hypothesized stressors and absenteeism. For example, such relationships have been found between absenteeism and non-participation, lack of social support from colleagues and others at work, job future ambiguity (Van Dijkhuizen, 1980) and a summary index of context factors, these referring to restrictions on behaviour, skills underutilization, career ambiguity, workload instability, pay inequity, role ambiguity, linguistic pressure — characteristic of the Quebec working environment — and role conflict (Arsenault and Dolan, 1983). Absenteeism as a response to stress is further discussed by McDonald (1981), Melhuish (1981) and Van Dijkhuizen (1981).

Studies which have investigated the relationship between absenteeism and the stressors hypothesized in the present study are reviewed in Section 1.5.3.

Absenteeism is obviously undesirable from an organizational point of view. Employees in attendance may become overloaded and experience higher levels of stress as a result of handling additional roles, this having the potential to lead to further negative consequences. Absenteeism may also have the effect of increasing stress for the absentee due, for example, to his falling behind in his work. High staff turnover necessitates the continual retraining of new staff which, aside from its financial costs, has serious implications for productivity and hence organizational effectiveness. From the individual's point of view, of course, leaving the "stressful" company is not necessarily maladaptive.

The other indices of behavioural strain mentioned in this section (perhaps with the exception of smoking) can also, to a greater or lesser extent, be interpreted as means of withdrawing from stressful work situations. Even low performance levels can be interpreted in this way — Bass and Barrett (1981) describe "passive job behaviour" as a form of withdrawal behaviour (p.65).

The research cited in this section is interpreted, within the perspective of the current investigation, as indicating the stressful nature of various factors, given the assumption that behavioural strains arise from psychological and physical strains. As in the case of research with respect

to CHD, it must be noted here that many factors other than stress can contribute to behaviours such as those discussed (recall the quotation from Aldridge [1970] as regards absenteeism in Section 1.3.1). However, once again as in the CHD studies, the research reviewed does seem to provide strong grounds for arguing that stress is at least an element of relevance to the behaviours in question — the stress hypothesis provides the most acceptable basis for understanding the relationships found.

The present study focuses upon absenteeism as behavioural strain for reasons given in Section 2.2.2. The definition of absenteeism as measured in the present study is also provided in Section 2.2.2.

1.3.4 Psychological Responses to the Experience of Stress

The above discussion of behavioural strains implies the importance of psychological strains. To summarise, Van Dijkhuizen's sequential model of strain, including the modification suggested in Section 1.3.1, proposes that behavioural symptoms are a consequence of psychological strain (physical strain which contributes to behavioural symptoms such as absenteeism is seen as following from psychological strain). Thus, though the stress problem manifests for the organization in behaviour, it is important to focus on the underlying psychological factors which determine this behaviour, i.e. to increase organizational effectiveness, the psychological strain of employees should be reduced. This is obviously also of importance purely in terms of improving the individual employee's well-

being although, as already noted, this is in most cases intrinsically related to organizational effectiveness.

In the terms of Banks, Clegg, Jackson, Kemp, Stafford and Wall (1980), the psychological strains can be seen as "surrogate measures" (p187) of "lack of positive mental health" (own quotes). This is in accordance with the definition of strain presented at the beginning of this section where psychological strains were defined as measures of psychological "ill health" or "lack of well being".

A number of psychological strains have been described by those working in the area of stress. Examples of these are: work-related anxiety/tension (e.g. Abdel-Halim, 1978; Beehr, Walsh and Taber, 1976; Brief and Aldag, 1976; Brief et al, 1981; French and Caplan, 1972; House and Rizzo, 1972; Kahn et al, 1964; Keenan and McBain, 1979; Lyons, 1971; Miles, 1975; Schuler and Van Sell, 1981); general anxiety/tension (e.g. Brief and Aldag, 1976; Brief et al, 1981; Caplan and Jones, 1975; Cox, 1978; Kornhauser, 1965; Mettlin and Woelfel, 1975; Miles and Perrault, 1976; Turney, 1974; Van Dijkhuizen, 1980); work-related depression (e.g. Beehr, 1976; Brief et al, 1981; Quinn and Shepherd, 1974); general depression (e.g. Brief et al, 1981; Caplan and Jones, 1975; Cox, 1978; Mettlin and Woelfel, 1975; Van Dijkhuizen, 1980); job dissatisfaction (e.g. Abdel-Halim, 1978; Beehr, 1976; Beehr et al, 1976; Brief and Aldag, 1976; Cooper and Arbose, 1984; French and Caplan, 1972; House and Rizzo, 1972; Johnson and Stinson, 1975; Kahn et al, 1964; Keenan and McBain, 1979; Lyons, 1971; Posner and Randolph,

1979; Sales, 1970; Schuler, Aldag and Brief, 1977; Quinn and Staines, 1979; Van Dijkhuizen, 1980); life dissatisfaction (e.g. Beehr, 1976; Margolis et al, 1974); work-related low self-esteem (e.g. Beehr, 1976; Quinn and Shepherd, 1974; Van Dijkhuizen, 1980); general low self-esteem (e.g. Cox, 1978; French and Caplan, 1972; Frost and Jamal, 1979; Gechman and Weiner, 1975; Jamal and Mitchell, 1980; Kornhauser, 1965; Ronan, Cobb, Garrett, Lazarri, Mosser and Racine, 1974; Van Dijkhuizen, 1980); hostility (e.g. Cox, 1978; Kornhauser, 1965); fatigue (e.g. Beehr et al, 1976; Brief and Aldag, 1976; Cameron, 1971; Cox, 1978; Quinn and Shepherd, 1974; Rizzo et al, 1970; Schuler et al, 1977); boredom (e.g. Beehr and Newman, 1978; Brief et al, 1981; Cooper and Marshall, 1976; Cox, 1978; Schuler, 1980); feelings of futility (e.g. Beehr and Newman, 1978; Brief et al, 1981; Kahn et al, 1964); alienation (e.g. Beehr and Newman, 1978; Brief et al, 1981); loss of concentration (e.g. Beehr and Newman, 1978; Brief et al, 1981; Cox, 1978; Schuler, 1980); resentment (e.g. Caplan and Jones, 1975); indecisiveness (e.g. Cox, 1978); irritation (e.g. Van Dijkhuizen, 1980); job-related threat (e.g. Kahn et al, 1964, Van Dijkhuizen, 1980); neurosis (e.g. Beehr and Newman, 1978) and psychosis (ibid.).

Psychological responses to the experience of stress can involve defensive reactions which may form the basis for a lack of psychological well-being. In Brief et al's (1981) terms, the defence mechanisms "deny, falsify or distort" reality (p.22). Cox (1978) reflects the same view when he points out that the defence mechanisms reduce the perception of threat but not its reality. Amongst the more important defence mechanisms are:

repression, projection, reaction formation, displacement, rationalizations and intellectualizations (Brief et al, 1981; Cox, 1978). When present to an extreme degree, these mechanisms may lead to neurotic psychological disorder (Brief et al, 1981), mentioned above as a psychological strain.

The above examples demonstrate that, as Schuler (1980) notes, the psychological strains incorporate both cognitive and affective elements.

The psychological strains with which the present study is concerned are: general and work-related tension/anxiety; general and work-related depression; general and work-related low self-esteem; job dissatisfaction and general fatigue and hostility (the reason for inclusion of these variables is provided in Section 2.2.2). Thus, this study involves both work-related and general measures of psychological strain, i.e. measures of the degree to which individuals experience certain states specifically in relation to their jobs and in their lives in general.

Brief definitions of the psychological strains focused upon in the present study are provided below. The distinction between work-related and general indices of strain ought to be borne in mind here.

Anxiety/tension may be defined in terms of either state or trait anxiety/tension. State anxiety refers to "momentary, acute feelings of apprehension and tension...." (Schalling, 1976, p. 51). It is a transitory emotional state (Spielberger, 1979). Trait anxiety, on the other hand, denotes "habitual anxiousness, anxiety proneness, the disposition to judge

many situations as threatening and react with state anxiety over a range of situations" (Schalling, 1976, p. 51). In other words, it describes individual differences in anxiety proneness (Spielberger, 1979). This study is concerned with state rather than trait anxiety/tension. Beehr et al (1976) define anxiety/tension, as the term is used in the present study, as a "feeling of nervous energy" (p.43).

Depression "is characterised by feelings of worthlessness, hopelessness, lethargy and helplessness" (Brief et al, 1981).

Job dissatisfaction, as measured in this study, refers to the individual's general attitude toward the work situation (Tosi, 1971). It is an overall measure of the degree to which the employee is dissatisfied and unhappy with his job rather than a composite measure comprised of the individual's attitudes to specific aspects of his job (e.g. pay, co-workers, etc). As such, it is what Hackman and Oldham (1974) refer to as "general (dis)satisfaction" rather than a composite of "specific satisfactions" (p.6) or what Quinn and Shepherd (1974) (p.30) and Quinn and Staines (1979) (p.205) refer to as "facet free" as opposed to "facet specific" (dis)satisfaction. Beehr (1976) defines general job dissatisfaction as "negative affect associated with the job" (p.43).

Low self-esteem, in Van Dijkhuizen's (1980) terms, refers to low self-respect and a lack of feelings of importance and of being successful. Kornhauser (1965) defines low self-esteem more generally as "negative self-feelings" (p.25). Van Dijkhuizen (1980) points out that self-esteem itself is

a personality characteristic and not a strain. It is the loss of self-esteem that is a strain.

General fatigue is defined by Beehr et al (1976) as a subjective feeling of lack of energy.

General hostility can be defined in Kornhauser's (1965) terms as lack of trust in, and acceptance of, other people.

Studies which have employed the strains of concern in the present investigation to test the stressfulness of factors other than those of interest in this research, include those of Beehr et al (1976), French and Caplan (1972), Tosi (1971) and Van Dijkhuizen (1980). Beehr et al found significant positive correlations between nonparticipation and job dissatisfaction and fatigue but not work-related anxiety/tension. French and Caplan's finding that participation correlates positively with job satisfaction and general self-esteem parallels the above result as regards nonparticipation, as does Tosi's finding that participation is positively related to job satisfaction. The significant positive correlation between lack of participation and job dissatisfaction, job-related low self-esteem and general anxiety/tension indicated by Van Dijkhuizen's study parallels French and Caplan's finding too. French and Caplan's study also demonstrated a positive correlation between poor relations with superiors, colleagues and subordinates and job dissatisfaction. Positive relationships between responsibility for persons, underutilization of skills and abilities, tensions with superiors and/or subordinates, tensions in relation to other

departments, lack of social support from superiors and others at work (i.e. other than superiors and colleagues) and job future ambiguity, on the one hand, and job dissatisfaction and general anxiety on the other, were indicated by Van Dijkhuizen's work. In addition, Van Dijkhuizen found such relationships between: responsibility for persons and job related loss of self-esteem; underutilization of skills and abilities and loss of self-esteem, anxiety and general depression; tensions with superiors and/or subordinates and depression; tensions in relations with other departments and depression; lack of social support from superiors and others at work and loss of self-esteem and depression; job future ambiguity and loss of self-esteem and depression; lack of social support from colleagues and loss of self-esteem, anxiety and depression.

Studies which have investigated the relationship between the psychological strains employed in the present study and the stressors hypothesized in this investigation will be reviewed in Section 1.5.3.

1.4 INDIVIDUAL DIFFERENCES IN STRESSOR/STRAIN RELATIONSHIPS

In Sections 1.2 and 1.3, some causes of, and responses to, the experience of stress were discussed. However, as almost every investigator in the area of stress has pointed out at some time or another, the relationships between stressors and strain are not uniformly linear (dose-response) across all groups. Rather, these relationships are influenced by differences in personality, social and situational variables which affect the cognitive appraisal upon which the experience of stress depends, as well as typical patterns of response to this experience. These variables are described by various names, the most common term being that of moderator variables. Clearly, in seeking to determine the impact of hypothesized stressors on strain, it is necessary to consider the effects of these variables which may mask this impact (this is also known as the "third variable" problem, Kerlinger, 1964). McMichael (1978) expresses this cogently: "The likely outcomes of given work environment stressors can..... be predicted much more accurately if we also know other relevant individual..... characteristics" (p.130-1). In addition, knowledge of individual differences facilitates the prediction of the potential for adaptive coping by any one individual (ibid.).

A number of moderator variables in the relationships between stressors and strain have been identified: e.g. need for achievement and need for independence (Johnson and Stinson, 1975); authoritarian personality (Adorno, Frenkel-Brunswik, Levinson and Sanford, 1969; Kelvin, 1970); dogmatism, introversion/extraversion, flexibility/rigidity and need

for cognition (Kahn et al, 1964); intolerance of ambiguity (French and Caplan, 1972; Keenan and McBain, 1979; Lyons, 1971); need for structure (French and Caplan, 1972); interpersonal relations (French, 1974); locus of control (Anderson, 1977; Batlis, 1980; Houston, 1972; Keenan and McBain, 1979); anxiety level (Warr and Wall, 1975); field dependence/independence (Witkin, 1965); higher-order need strength (Beehr et al, 1976); job involvement (Batlis, 1980; Brief et al, 1981); job characteristics (enriched or not) (Abdel-Halim, 1978); situational variables in the form of group cohesiveness, supervisor support and autonomy (Beehr, 1976); and the Type A behaviour pattern (Caplan and Jones, 1975; Keenan and McBain, 1979).

This study focuses on the Type A behaviour pattern as a hypothesized moderating variable in the relationships between hypothesized role stressors and strain, as the two studies directly concerned with this question have yielded conflicting results. Further, descriptions of the Type A behaviour pattern suggest that it may be a powerful moderator variable in stressor/psychological strain relationships, while its association with CHD establishes its importance for physiology. Clarification of the moderating role of Type A behaviour in relationships between role stressors and psychological strain is therefore necessary for a fuller understanding of the impact of aversive components of role on psychological health. In addition, much uncertainty exists regarding the basis of the relationship between Type A behaviour and CHD (Matthews, 1982; Williams, Friedman, Glass, Herd and Schneiderman, 1978). Examination of differences in levels of strain between A and B groups may also enable some conclusions in this regard.

1.4.1 Description of Type A Behaviour Pattern

Specification of the Type A behaviour pattern arose from observations made by Friedman and Rosenman of the behaviour of cardiac patients. They noticed characteristic differences in behavioural style between coronary disease patients and patients with other kinds of illnesses (Friedman and Rosenman, 1974). It had long been suspected that behaviour and emotions affect the cardiovascular system and the writings of Harvey (1628), Hunter (late 18th century), Osler (1897) and the Menningers (1936) (in Jenkins, Zyzanski and Rosenman, 1979), as well as Dunbar (1943), indicate early awareness of this. However, it remained for Friedman and Rosenman to formulate an integrated description of psychological and behavioural contributions to coronary heart disease. They defined the Type A, or coronary-prone behaviour pattern, as "an action-emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time and, if required to do so, against the opposing efforts of other things or other persons" (Friedman and Rosenman, 1974, p.67). Rosenman (1978) suggests that the most central aspects of Type A behaviour are easily aroused hostility and excesses of aggression, hurry and competitiveness, all of which may be seen as attempts to overcome environmental barriers. To this list should be added high job involvement (Jenkins et al, 1979). The orientation of this behaviour is towards achievement striving (French and Caplan, 1972; Sales, 1969; Suinn, 1977).

The overt manifestations of the syndrome also include explosive accelerated speech, a heightened pace of living, impatience with slowness, concentrating on more than one activity at a time, self-preoccupation, dissatisfaction with life, evaluation of the worthiness of one's activities in terms of numbers, and a tendency to challenge and compete with others even in noncompetitive situations (Matthews, 1982). Further characteristics of Type A individuals are hyperalertness, restlessness, tenseness of facial musculature and feelings of being under the pressure of time and the challenge of responsibility (Jenkins, 1975). Those who "exhibit the opposite type of behaviour — a relaxed, unhurried, mellow, satisfied style — are designated Type B" (Jenkins et al, 1979, p.3). Jenkins et al point out that Type B individuals are also likely to be interested in progress and achievement, but that they tend to "flow with the stream of life rather than constantly struggling against it" (ibid.).

The Type A behaviour pattern is not considered to be a trait, nor is it considered to be a standard reaction to a challenging situation. Rather, it is used to refer to the set of overt behaviours described above, that are elicited from characterologically predisposed individuals by an appropriately challenging environment (Howard, Cunningham and Rechnittzer, 1977; Jenkins, 1975; Matthews, 1982; McMichael, 1978; Rosenman, 1978; Rosenman and Chesney, 1980, 1982; Roskies, 1983; Strumpfer, 1983 a, b, c). In this regard, Rosenman and Chesney (1980) write of an appropriately challenging environment as one which threatens a Type A individual's sense of control over the environment. Thus, Type A individuals are motivated to assert control over their environment and the overt manifestations of

this pattern represent the individual's attempts to assert and maintain control whenever this is challenged or threatened (ibid.; Glass, 1977, 1978; Van Dijkhuizen, 1980). Examples of situations which may threaten or challenge control are frustrating situations (Glass, Krakoff and Contrada, 1980) and difficult situations (Dembroski, MacDougall, Shields, Petitto and Lushene, 1978; Friedman, Byers, Diamant and Rosenman, 1975; Glass et al, 1980). It should also be pointed out, and this is evident from the above descriptions of Types A and B, that the coronary-prone behaviour pattern is not seen as a discrete typology, but is conceived of as a continuum of behaviours ranging from extreme Type A to extreme non-Type A or Type B (Matthews, 1982).

1.4.2 Type A Behaviour as a Moderating Variable

The theoretical rationale underlying the hypothesized moderating effects of Type A behaviour is not discussed in much detail in the literature. Rather, it is generally loosely described in relation to the higher achievement orientation and job involvement of Type As than of Type Bs (see Caplan et al, 1975a; Caplan and Jones, 1975; Keenan and McBain, 1979; Sales, 1969). In the opinion of this author, the higher achievement orientation of Type As provides the basis for the hypothesized moderating effects of coronary-prone behaviour. However, consideration of this achievement orientation does not lead to moderating hypotheses directly. Instead, it is the higher job involvement of Type As as well as their heightened concern with control of their environments (Glass and Carver,

1980) which suggest differential predictive hypotheses with respect to Types A and B. Both of these may be seen as manifestations of achievement striving: an enhanced dedication to occupational activity (Jenkins et al, 1979) (job involvement) and the attempted mastery (hence control) of current situations are consequent to achievement striving, while actual mastery could be a prerequisite for further achievement. Thus, to the extent that Type A's greater job involvement heightens sensitivity to changes in the level of stressors and the degree to which Type A's needs for control are threatened by stressors (as obstacles to control or mastery) and therefore similarly enhance sensitivity to them (the stressors), it is expected that the relationships between stressors and strains will be stronger for Type As than for Type Bs. More specific reasoning will be presented in Section 1.5.4.

1.4.3 Type A Behaviour and CHD

As mentioned earlier, Type A behaviour is associated with coronary heart disease (hence coronary-prone behaviour). The most important of the retrospective and prospective studies which have demonstrated this association is the Western Collaborative Group Study (WCGS) (Rosenman, Brand, Jenkins, Friedman, Straus and Wurm, 1975). In this prospective study, 3154 men aged between 39 and 59 were followed for 8,5 years. On intake, interview assessments of the Type A behaviour pattern were made and measures of a number of physiological indices relating to CHD were obtained. After 8,5 years, Type A subjects had exhibited 2,37 times the

rate of new CHD than their Type B counterparts, and independently of standard risk factors. Questionnaire assessments (Jenkins Activity Survey - JAS) of the behaviour pattern in the same study also revealed a higher level of new CHD in the group classified Type A than in the group classified Type B on this measure. Jenkins, Rosenman and Zyzanski (1974) report an incidence of 70% more new CHD in the group scoring in the top third of the distribution of Type A scores than in the bottom third. This is the only prospective study involving the JAS. Both the Structured Interview (Rosenman, Friedman, Straus, Wurm, Kositchek, Hahn and Werthessen, 1964) and the JAS (Jenkins et al, 1979) assessments in the WCGS also predicted the recurrence of CHD (Jenkins et al, 1974; Rosenman et al, 1975). In addition to the WCGS, several other studies (both retrospective and prospective) have indicated that the Type A behaviour pattern is an independent risk factor for CHD and possibly also for atherosclerosis — the underlying chronic disease process (Matthews, 1982). One of the most extensive of these is the Belgian Heart Disease Prevention Project (Kornitzer, De Backer, Dramaix and Thilly, 1979; Kornitzer, Dramaix, Kittel and De Backer, 1980; Korniter, Kittel, De Backer and Dramaix, 1981). Comprehensive reviews of this and other studies are provided by Cooper, Detre and Weiss (1981), Dembroski, Weiss, Shields, Haynes and Feinleib (1978) and Rosenman and Chesney (1980, 1982). Thus, the point need not be laboured here — it is sufficient to note that Type A behaviour is firmly established as a risk factor for CHD (Matthews, 1982). (Recent contradictory findings by Shekelle et al in the Multiple Risk Factor Intervention Trial and Reed in the Honolulu Heart Programme are explained by Rosenman in terms of sampling bias (reported in Tonus, March 1983; May 1983; August 1983)).

Though the association between Type A behaviour and CHD seems reasonably clear, the actual process by which this effect occurs is not. Component analyses of Structured Interview responses (Matthews, 1977) have yielded some dimensions which predict task-induced elevations in systolic blood pressure and heart rate (rapid speech, hostility, competitiveness and speed and impatience) (Dembroski et al, 1978a). Considering Herd's (1978) speculation that episodic elevations in blood pressure may potentiate atherosclerosis and CHD, these results may be important. Scherwitz, Berton and Leventhal (1978) adopt a different standpoint and argue that the higher self involvement of Type As (determined by comparison of the number of self-references in interview responses of As and Bs) accounts for the observed higher systolic blood pressure of As than Bs. A further contribution to understanding of the Type A/CHD connection was made by Glass (1977) when he suggested that Type A behaviours constitute an attempt by A individuals to assert and maintain control over their environments and reflect the need of these individuals to establish control. Thus, when faced with an uncontrolled/stressful event, it is assumed that Type As will struggle to control that event. This is known as the uncontrollability approach and leads to a link between Type A behaviour and CHD, via the physiological and neuroendocrine processes that characterize efforts to establish control (Matthews, 1982).

All three of the above contributions may be seen as specific descriptions of the dynamics underlying excessive elicitation of the fight-or-flight response in Type As over Type Bs. In general terms, it is this

differential elicitation of the fight-or-flight response across Types A and B which is thought to be the basis of the TypeA/CHD link (Jenkins, 1976; Organ, 1978; Rosenman and Friedman, 1971; Strumpfer, 1978) and some empirical support for this view exists. The most impressive evidence is that role overload, which is positively related to risk factors for, and actual, CHD (Breslow and Buell, 1960; Dreyfuss and Czaczkes, 1959; Frankenhaeuser et al, 1971; French and Caplan, 1972; Friedman and Hellerstein, 1968; Grundy and Griffin, 1959a, b; Kornitzer et al, 1980b; Miles, Waldfogel, Barrabee and Cobb, 1954; Mueller, 1965; Russek, 1962, 1965; Sales, 1969; Theorell and Floderus-Myrhed, 1977; Thomas and Murphy, 1958; Wertlake, Wilcox, Haley and Peterson, 1958) is also positively related to Type A behaviour (Bateman, 1981; Caplan, 1971; Caplan et al, 1975a; French and Caplan, 1972; Friedman et al, 1957; Friedman and Rosenman, 1960; Howard et al, 1977; Keenan and McBain, 1979). Thus, Type A individuals experience more overload at work than Type Bs and this is considered to be responsible for the differential elicitation of the fight-or-flight response across these groups. Sales (1969) therefore concludes that it is the higher overload of Type As than Type Bs which establishes the increased risk for CHD in the former group over the latter. Hence, considering the apparent importance of this relationship, and provided that a factor for role overload is identified in this study, it is intended that the association between this variable and Type A behaviour be examined here.

There are a number of problems with this view of overload as of central importance in the Type A/CHD link. For one thing, it is not

immediately clear why Type A individuals report more overload at work than their Type B counterparts. Bateman (under review), Howard et al (1977), Keenan and McBain (1979) and Sales (1969) have suggested that the ambition, competitiveness and achievement orientation of Type As will lead them to select overloading positions, or to increasingly add to present role requirements, in an attempt to constantly improve their positions — "overload might be a persistent, highly pervasive and perhaps sought after condition in the life of a Type A individual" (Sales, p.348). Alternatively, the possibility that Type As simply perceive more overload than Type Bs in objectively similar situations should not be overlooked. This possibility is raised by McMichael (1978) and Schuler (1980, 1982). Recalling that "stress is in the eyes of the beholder", consequences may be identical, while the perceptions of greater overload may reflect perceptual clouding as a result of enhanced sensitivity to threatened control. McMichael (1978): "It is easy to envisage such a [Type A] person, enmeshed in his inexorable torrent of life, creating harsh but unnecessary self-imposed deadlines and work standards; making a mountain of urgency and perfection out of a molehill of moderate work demands" (p. 136). In the absence of suitable longitudinal research, this question remains unanswered.

The association between overload and Type A behaviour also raises the question of whether Type A characteristics bring about overload or whether they develop as a result of such environmental pressures (Bateman, under review). This issue is partially addressed in definitions of the behaviour pattern, which ascribe some degree of causality to the individual ("characterologically predisposed") and some to the environment

("appropriately challenging"). However, when it is argued that differential experiences of overload are responsible for the differential risks of A versus B individuals for CHD, it becomes a matter of central importance to assign weightings to the individual and to the environment in determining the experience of overload. In clarification, intervention may only proceed successfully when it is clear which of the environment or the individual warrant most immediate attention. Answers to this question are also unavailable and call for longitudinal research. In the absence of clarity regarding this issue, it is also not clear how the view that overload is basic to the Type A/CHD connection fits in meaningfully with the three formulations of the underlying dynamics of this connection presented earlier. In essence, descriptions of principal components, self involvement and uncontrollability may be seen as causes and effects of overload and Type A behaviour. Thus, integration of overload with these formulations is problematic. This further emphasizes the importance of research aimed at elucidating precisely what is cause and what is effect in the Type A behaviour pattern. Kasl (1978) raises similar points.

Solutions to the problems discussed above are not obtainable in this study as these were not primary concerns. Rather, the intended consideration of differences in perceived overload between Types A and B demands that problems associated with such a treatment of the data be appreciated. It should also be noted that these problems are not only applicable to overload but are general areas of confusion within the domain of coronary-prone behaviour.

The preceding discussion of Type A behaviour and CHD has focused on role overload, to the exclusion of role conflict, ambiguity and underload. This is because only role overload has been related to Type A behaviour while conflict and ambiguity have not (Keenan and McBain, 1979) and role underload has yet to be researched in this context. Keenan and McBain report that there is little evidence that personality influences the amount of conflict or ambiguity experienced, with the exception of a study by Organ and Greene (1974) on locus of control, which indicated that internals had lower perceived role ambiguity than externals. However, recalling the earlier suggestion that Type As may perceive more overload as a result of perceptual clouding associated with enhanced sensitivity to threatened control, it is possible that they may perceive more conflict and ambiguity as well. In the absence of prior research or theorizing in this context, it is suggested that role underload, even though it refers to qualitative load and overload primarily to quantitative load, will be experienced inversely to overload for Type A individuals. Hence, considering the positive relationship between overload and Type A behaviour, it is likely that Type A individuals will experience less underload than their Type B counterparts. It is emphasized that these are highly tentative suggestions and are not explicitly hypothesized in this study. Rather, as a peripheral, exploratory concern, the data will be examined for trends in these directions. Of course, the possibility of such examination depends on the identification of the defined factors in the role dimensions data.

As the role dimensions are hypothesized to relate positively to indices of strain, and as it is suggested that Type A behaviour relates positively to the hypothesized role stressors, it follows that there is an implicit suggestion that Type A behaviour will be related to indices of strain. However, it is not at all clear how the expectations regarding higher perceived overload, conflict and ambiguity, in relation to lower perceived underload, of Type A individuals may be integrated to suggest differential outcome levels of strain across the A and B groups. The work implicating anxiety, depression and hostility (Haynes, Feinleib and Kannel, 1980; Matthews, Glass, Rosenman and Bortner, 1977; Medalie, Kahn, Neufeld, Riss and Goldbourt, 1973; Medalie and Goldbourt, 1976; Ostfeld, Lebovits, Shekelle and Paul, 1964; Williams, Thomas, Lee, Kong, Blumenthal and Whalen, 1980) and job dissatisfaction (via Wolf's [1961] comments regarding men who "strive without joy") in the etiology of CHD invites reasoned speculation that the hypothesized aversive consequences of higher perceived overload, conflict and ambiguity counteract and exceed the lowering of strain presumably associated with less underload in Type A individuals. In light of Poulton's (1978) suggestion that, at this stage, combined stressors should be conceptualized additively, and with no reason to suppose that underload is a potentially more aversive stressor than any of the others, it seems that this speculation has some substantive basis. Finally, of course, the speculation that Type As will exhibit higher levels of strain than Type Bs is appealing as, in conjunction with the evidence implicating indices of strain in the etiology of CHD, this provides an intervening link between Type A behaviour and CHD. This link has been mentioned by several researchers (e.g. Keenan and McBain, 1979; Sales, 1969). Thus, it may be

tentatively suggested that Type A individuals will display higher levels of strain than Type B individuals, overall.

The final point to be made in this section concerns the implications of research into the status of Type A behaviour as a moderating variable for the link between this behaviour pattern and CHD. Caplan and Jones (1975) see the hypothesized moderating effects as an explication of the relationship between these variables. Following a statement of the uncertainty regarding the nature of the relationship between Type A behaviour and CHD, they write: "It is our belief that Type A persons should be the most strongly strained by the effects of a job stress such as an impending computer shutdown because they are more involved in their work and more persistent than persons without Type A traits. On these bases, it was predicted that Type A persons would show stronger relationships between changes in stress and changes in strain than Type B persons, their opposites" (p. 714). Results indicated a stronger relationship between changes in workload and changes in anxiety for the Type A group than for the Type B group. Caplan and Jones concluded that "Stress had its greatest effects on strain in the hard driving, involved, Type A person" (p. 719) and go on to interpret these results as evidence of the increased risks associated with Type A behaviour for mental and physical ill-health. Now, as argued earlier, there are reasons to believe that Type A persons will display higher levels of strain. Further, it is also hypothesized here that relationships between role dimensions and strains will be stronger for Type As than for Type Bs. However, it is incorrect to interpret a test of the latter hypothesis in terms of the former, which is what Caplan and

Jones do. To illustrate, several possible, differential relationships for Types A and B are indicated in the following scatterplots:

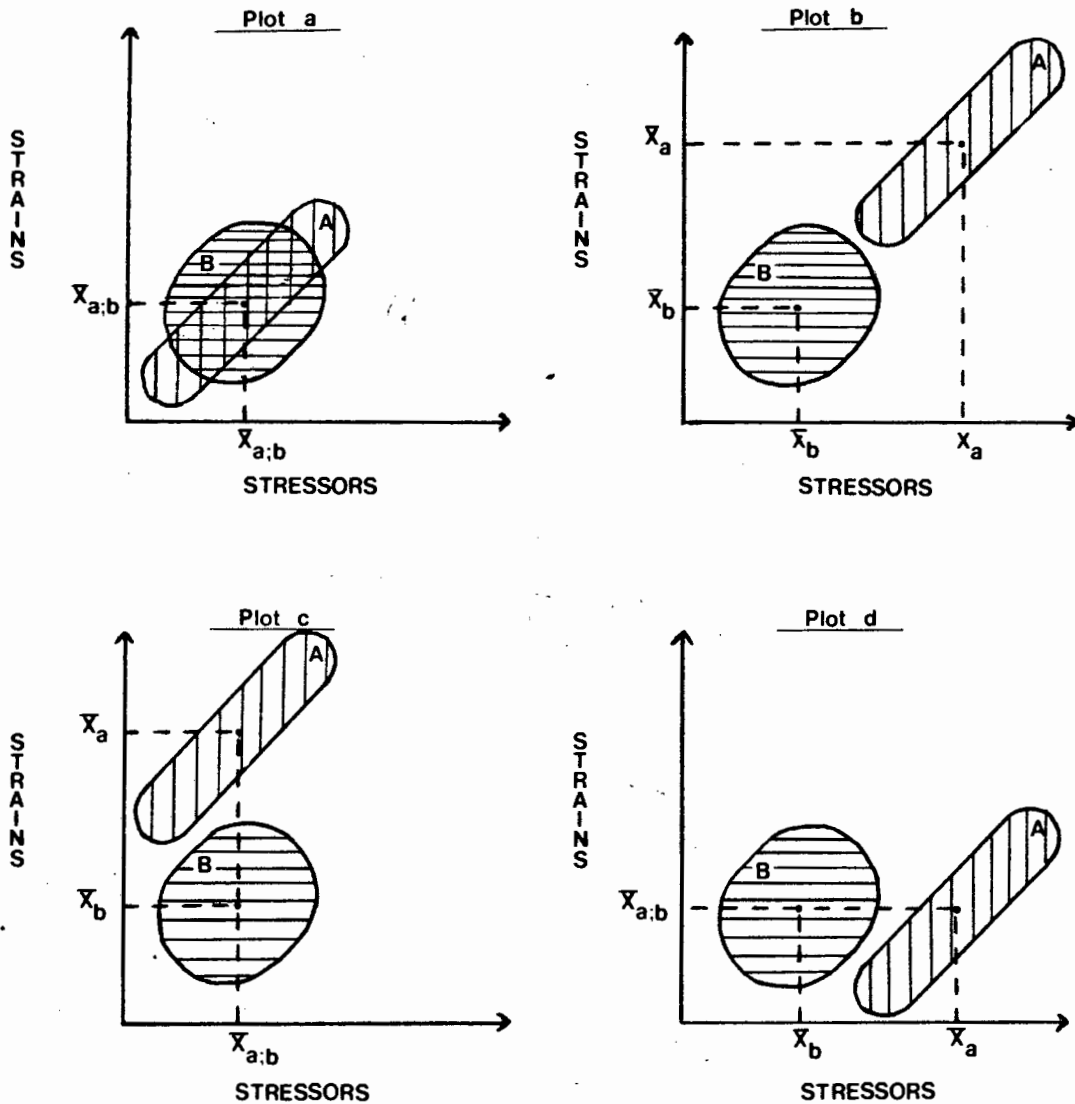


Figure 1.8: SOME POSSIBLE, DIFFERENTIAL RELATIONSHIPS FOR THE TYPE A AND B GROUPS

In all plots, the relationships between stressors and strains are stronger for the Type A group than for the Type B group, reflecting Caplan and Jones' result. The differences between the plots reflect differences in mean levels of stressors and strains across the A and B groups.

- Plot a : no differences
- Plot b : higher levels of stressors and strains for A group
- Plot c : higher levels of strains for A group
- Plot d : higher levels of stressors for A group

Assuming a relationship between the measures of strains and CHD, it is clear that only plots b and c suggest the nature of the relationship between Type A behaviour and CHD. This is because it is only in these plots that Type A individuals display higher levels of strain than Type B individuals, while in all plots the moderating effects of Type A behaviour are identical. Caplan and Jones do not report differences in stressors and/or strains across the behaviour pattern groups. Thus, it is uncertain which of the plots best reflects their data. Irrespective of this point, the crux of the argument is that the moderating effects of the Type A variable are quite unrelated to any conclusions regarding the Type A/CHD link. The presence of Type A moderating effects simply means that Type A individuals are more likely than Type B individuals to suffer from CHD (or mental and physical ill-health in general) as a result of overload, rather than as a result of other sources of stress. This is not what Caplan and Jones set out to demonstrate and leads to the conclusion that their interpretation of results in terms of the increased risks for mental and physical ill-health in Type A individuals, following exposure to stressors, is not justified. Thus, it is emphasized that research into the status of Type A behaviour as a moderating variable does not have direct implications for the link between Type A behaviour and CHD. Consideration of this link is an independent undertaking and involves comparisons of levels of strain in the A and B groups, as previously described.

1.5 THE CURRENT STUDY

1.5.1 Research Topics

As is clear by now, this research involves an examination of the relationships between role demands and psychological health and the role of Type A behaviour in moderating these relationships. The role demands hypothesized as stressors in Section 1.2.4 are role conflict, ambiguity, overload and underload. The indices of strain to be used as criteria for evaluating the aversive nature of the role demands are, as described in Section 1.3.4, work-related anxiety/tension, general anxiety/tension, work-related depression, general depression, work-related self-esteem, general self-esteem, job dissatisfaction, hostility, fatigue and absenteeism. It is pointed out that, in the role dimensions questionnaire, items were written to tap each of the role conflict, ambiguity, overload and underload constructs. However, the potential for consideration of any one of these depends upon its identification as an interpretable factor in the factor analysis of responses to this questionnaire. Considering that each of these dimensions has some degree of conceptual independence, it is expected that factors closely paralleling these dimensions will be extracted. Thus, conflict, ambiguity, overload and underload may be described as hypothesized groups of hypothesized stressors.

The orientation of this study is towards determination of the need for improved work design and redesign, with respect to the role-based variables examined here. (The term "work" is used broadly here, referring to any

aspect of the individual's working situation which is relevant to role demands upon him.) Suspecting that Type A individuals will exhibit stronger relationships between stressors and strains than Type B individuals, it is necessary to study the relationships between independent and dependent variables separately for these groups, to avoid a possible "masking" effect by Type A behaviour (a hypothesized "third" variable). If Type A behaviour is found to have moderating effects, and depending upon the nature of these effects, it may be that a need for individualized work design, in terms of this variable, exists. Lawler (1974 a, b) has discussed, in general terms, the importance of such design. On the other hand, if no moderating effects are found, it is clear that work design and redesign, if determined to be necessary, will be able to disregard individual differences in Type A behaviour, at least as far as the role dimensions studied here are concerned (the possible importance of other individual differences should not be overlooked, of course).

This research includes a constructive replication of aspects of Caplan and Jones' (1975) and Keenan and McBain's (1979) work, notably those aspects pertaining to the moderating effects of Type A behaviour on the relationships between role demands and indices of psychological health. Lykken (1968) has suggested that, in constructive replication, "one deliberately avoids imitation of the first author's methods" (p.155-6). Consequently, if a constructive replication is successful, the study extends the generalizeability of the research after which it was modelled. Thus, Lykken strongly advocates multiple corroboration and particularly constructive replication in psychological research. This is because

correlations are typically low in relation to errors of measurement and shared method variance (Campbell and Fiske, 1959). "In the social, clinical and personality areas especially, we must expect that the size of the correlations, differences or effects which might reasonably be predicted from our theories will typically not be very large relative to the ambient noise level of correlations and effects due solely to the 'all-of-a-pieceness of things'" (p.154) (the latter point refers to heightened correlations between IVs and DVs as a result of response set formation in simultaneous measurement. Simultaneous measurement is common in stress research, presumably for reasons of expediency. The possibility of spuriously high correlations between IVs and DVs in this study, because of response-set formation, is minimized by having temporally staggered measurements of these sets of variables [see Section 2.2]).

Caplan and Jones included measures of subjective, quantitative work load, role ambiguity, Type A behaviour, anxiety/tension and depression while Keenan and McBain included measures of role conflict, ambiguity, overload, Type A behaviour, job dissatisfaction and anxiety/tension at work. Caplan and Jones used three-item indices, developed by Caplan (1971), of the role variables and Vickers' (1973) four-item scale for Type A behaviour. Keenan and McBain used Rizzo et al's (1970) scales for role conflict and ambiguity and constructed a six-item scale for role overload. Vickers' four items and a further five items devised by Keenan and McBain were used to tap Type A behaviour. Various measures developed at the ISR were used to measure psychological health in both studies. Thus, in constructive replication of their work, this study includes generally

different measures of the same variables (again, consideration of a particular role dimension depends upon the results of the factor analysis). An exception to the use of different measures is the scale for work-related anxiety/tension, for which variable only one suitable measure appears to have been developed — the scale used by both Caplan and Jones and Keenan and McBain. Hence, this scale was used in the current study. Replication of the work with respect to this criterion measure involves elements of literal, as well as constructive, replication, in Lykken's (1968) terms. Alternative work-related anxiety/tension scales are listed by, for example, Cook, Hepworth, Wall and Warr (1981). However, these (Kahn et al, 1964; Lyons, 1971) include items regarding being bothered by unclear responsibility, unclear evaluation by supervisor, etc. As Kasl (1978) notes, the correlations between such scales and role demands are "as illuminating as correlating 'how often do you have a headache?' with 'how often are you bothered by headaches'" (p.14).

In Section 1.2.4 two questions, arising from the selective investigation in this study of role conflict, ambiguity, overload and underload, were posed. The first question concerns the reasons for the focus of this study on these hypothesized sources of stress, rather than a broader selection of the suggested stressors. Kahn et al (1964) report that 48% of their sample experienced intersender conflict, 45% experienced person-role conflict and the same percentage experienced too heavy a workload, while 35% experienced lack of clarity of behavioural requirements and 31% experienced lack of predictability of outcomes. French and Caplan (1972) report percentages of 60, 67, 73 and 54 for ambiguity, conflict,

quantitative overload and qualitative overload, respectively. Thus, it is clear that ambiguity, conflict and overload are prevalent in organizational roles. Further, research by Adams (1981) suggests that components of work closely related to the above hypothesized stressors are considered to be among the most aversive conditions experienced by organizational employees. Adams asked his 446 subjects to identify which work conditions they experienced as most aversive, from a long list he provided. Changes in instructions, policies and procedures, increases in activity level, too much work, conflict between time at work and others' demands for time, etc. emerged as the most aversive conditions experienced by respondents. The importance of one or more of these conditions as potential potent sources of stress in organizations is also suggested by a number of other authors (e.g. Bateman, 1981; Howard et al, 1977; Strumpfer, 1983 a). Underload is a relatively under-researched source of occupational stress, presumably because it is thought to be an unlikely component of the experience of managers/executives, upon which group much of stress research has focused. However, Handy (1981) points out that delegation, when first practised, may create feelings of underload in managerial staff. Further, he expresses a belief that underload is "the most insidious, but most ignored, perverter of organizational efficiency" (p.60), particularly for individuals at lower organizational levels. Considering this, in relation to the high proportion of clerical employees in the current sample, it appears that role underload may be a highly relevant potential source of stress in this study. More importantly, it is necessary to examine empirically the status of role underload as a source of stress. For the reasons advanced above, it is the opinion of this author

that role conflict, ambiguity, overload and underload constitute important variables for study. Thus, the research was limited to these variables to enable a more detailed examination of each than would reasonably be possible with a larger number of suggested stressors.

The second question posed in Section 1.2.4 concerns the implications of this selective investigation for expected statistical results. Though the variables to be examined here are thought to be important sources of stress, it is clear that many other likely sources of occupational stress exist (some of these have been discussed in Section 1.2). Hence, it cannot be supposed that role conflict, ambiguity, overload and underload will account for all of the variance in aversive personal outcomes, even if these sets of variables are related. Further, there are a number of likely sources of stress which emerge and exist outside of the occupational environment and which are also likely to determine level of psychological health (some of these are discussed in Section 1.2.2.4). Quite obviously, therefore, the exclusive concern of this study with a subset of potential sources of occupational stress implies that relationships between hypothesized stressors and indices of strain are likely to be of low magnitude, even if they are significant. This, together with the value of multiple corroboration in testing general models (Lykken, 1968), should be borne in mind when results of this study are evaluated.

Several researchers have pointed to the need for more research aimed at elucidating the effects of individual differences on the perception of, and response to, the experience of stress (e.g. House, 1974; Organ, 1978).

The focus of this research on the moderating effects of Type A behaviour represents a response to this need. However, a question may be posed concerning the reason for particularly studying Type A behaviour as a moderator variable, rather than any one or number of the other variables suggested as important bases of individual differences (in Section 1.4).

The Type A behaviour pattern was selected for study because it presents as a likely "third" variable, masking relationships between stressors and strains, while previous research has failed to obtain consistent results. The two studies that examined its moderating effects in the context of role dimensions and psychological health have overlapped to the extent of finding some moderating effects. However, the details of these effects differed across the two studies. Hence, constructive replication of these studies is necessary to achieve greater clarity regarding the status of Type A behaviour as a moderator variable. Gibson, Ivancevich and Donnelly (1982) provided the impetus for this research when they concluded: "Of all the moderators that could or should be included in a stress model TABP (Type A Behaviour Pattern) seems one of the most promising for additional consideration" (p.162)

With regard to other suggested moderator variables, very large samples become necessary for the meaningful statistical treatment of many variables, as the number of contrasts increases exponentially with the addition of new (dichotomous) variables (2, 4, 8, 16, 32, etc.). At this stage of knowledge concerning the effects of Type A behaviour, it seems more appropriate to research this variable with single moderator models.

Should it become firmly established as an important moderator variable, the next step would be to design large-scale studies to test what may be called multiple moderator models.

In addition to the major research topics outlined above, two further questions are of tangential interest. The first concerns Van Dijkhuizen's Sequential Model of Strain (Section 1.3.1) and the second concerns the nature of the relationship between Type A behaviour and CHD (Section 1.4.3).

Van Dijkhuizen (1980) originally specified a linear, sequential model of strain (see Figure 1.6) in which work stressors were seen as leading to job-related strains, which in turn led to psychosomatic complaints and so on, through to physiological strain. His findings that work stressors correlated similarly with job-related strains and general psychological affects caused him to revise the linear sequence model and posit an empirically based general sequence model (see Figure 1.7). In the revised model, job-related strains and general psychological affects are seen to be temporally coincident, i.e. job-related strain does not mediate the relationship between work stressors and general psychological affects. To the extent that Van Dijkhuizen's notion that measures of association between two concepts or classes that are nearer to each other in the model are likely to be higher than those between classes that are more distant, has validity, the examination of relationships between classes of variables in this study may have implications for his model. More specifically, comparison of the relationships between role dimensions and work-related indices of strain

with those between role dimensions and general indices of strain will enable some conclusions with regard to the temporal coincidence versus sequentiality of these classes of strain. Also of interest are the associations between role dimensions and absenteeism. Since these variables are distant in the model, it is presumed in terms of Van Dijkhuizen's reasoning that the magnitude of correlations between these variables will be lower than those between role dimensions and work-related and general indices of strain. It cannot be denied, of course, that such findings may equally well reflect the notoriously low reliability of absenteeism as an index of strain (cf. Aldridge, 1970) and the typically weak association between subjective and objective indices of strain (cf. French and Caplan, 1972).

The nature of the relationship between Type A behaviour and CHD is elusive. Associated with the suggestion that Type A individuals may experience more stress in their jobs, is the speculation that they will exhibit higher levels of strain than Type B individuals (Plot b in Figure 8). Alternatively, or in addition, it is possible that Type As simply respond more aversively than Type Bs to objectively similar environments (Plot c). Given the association between, on the one hand, overload and indices of psychological strain and, on the other, risk factors for, and actual, CHD, higher levels of overload or strain in Type A individuals would suggest the nature of the Type A/CHD link. Therefore, examination of differences between the A and B groups in levels of role dimensions and indices of strain is an interesting, additional component of this study. Pictorially, this amounts to determining to which of the scatterplots in Figure 8 Type

A-B differences most closely conform (ignoring the moderating effects and assuming that Type Bs do not have higher levels of these variables than Type As).

Finally, the current sample includes both men and women and whites and coloureds (for convenience "official" terminology is used to refer to racial groups in this report). This reflects the need for research with generalizability to the population at large. To quote House (1974): "populations studied should increasingly include previously neglected groups [e.g. women and blacks]" (p.12). Though differences between the races and sexes constitute interesting topics for stress research, extensive exploration of these variables is beyond the scope of this study. Rather, where possible, the effects of race and sex, as well as other demographic and organizational variables such as age, company tenure and level in the organization, are partialled out.

1.5.2 The Importance of Stress Research

The experience of stress is thought to have various undesirable individual and organizational consequences, in the forms of physiological, behavioural and psychological strains (discussed in Section 1.3). In addition to the suggested outcomes listed earlier, there are a number of other aversive outcomes. For example, stress has been linked to predisposition to sports injuries (Schomer, 1982) and is emerging as an important risk factor in the development of the Acquired Immune Deficiency Syndrome (Monitor, July

1983). Clearly, the apparent effects of the experience of stress are far-reaching. In support of this, the American Academy of Family Physicians has estimated that two thirds of visits to general practitioners are promoted by stress-related symptoms (Time, 6 June 1983).

Many figures are available which indicate the staggering costs associated with mental and physical illness. Other figures suggest that the incidence of these illnesses is increasing. What these do not reveal, of course, are the various costs to individuals afflicted by such illness.

For the United States, Colacino and Cohen (1981) report that the direct cost of CHD to business is \$3 billion/year, while indirect costs amount to \$30 billion/year. This does not include costs associated with recruiting and training replacements, which are estimated at \$700 million/year. All cardiovascular disease is reported to account for 12% of the total amount of lost time in the U.S. (Felton and Cole, 1963). Backache is costed at \$225 million/year in treatment and \$1 billion/year in workman's compensation (Colacino and Cohen, 1981). Cooper and Arbose (1984) estimate that all stress-related illnesses cost an amount equal to 3% of the GNP. Lau and Jelinek (1984) report that estimates of productivity loss arising from job-related stress run as high as \$60 billion/year. Serious emotional problems linked to work stress are reported to cost the U.S. about \$75 billion/year (Financial Mail, 15 July 1983).

Figures provided by the Canadian Department of Manpower and Immigration indicate that up to 30% of that country's workforce has

serious emotional problems linked to work stress (ibid.). These problems are estimated to cost Canada around \$12 billion/year.

For Britain, the Office of Population and Censuses and Surveys (1975) has revealed that 37 million working days are lost each year through psychological/neurotic disorder, nervous debility, headaches, etc. (Cox, 1978). An earlier report by the Department of Health and Social Security estimated days lost from similar complaints at 22,8 million (Aldridge, 1970). This indicates a large increase in absence attributable to these causes over a five year period. These figures do not include absence diagnosed in terms of physical disorders which may be signs of man under stress, e.g. dyspepsia, skin complaints, CHD, bronchial asthma, etc. (Cox, 1978). Warr and Wall (1975) report figures published by the National Association for Mental Health in 1971 showing that there had been a 22% rise over the previous 15 years in absence from work attributable to physical disease. During the same period, however, there were increases of 152% for men and 302% for women, in absence due to neurosis and psychosis. Similar estimates of 208% for men and 370% for women are reported by Melhuish (1981) for the 20 year period ending 1980. Melhuish also records that mental illness caused three times more time lost from work than industrial action. In this connection, Cooper and Arbose (1984) write of studies in Western countries (other than the U.S.) which have shown that between five and ten times more work days are lost from stress-related ailments than from industrial action. As Cox (1978) has pointed out, it would be a mistake to place too much trust in the above statistics, which may be interpreted as evidence of considerable increases

in the incidence of mental illness, because there are three factors which caution their interpretation. Firstly, views on the social acceptability of absence from work due to mental illness have changed. Secondly, there have been associated changes in diagnostic practice. Thirdly, there may have been changes in propensity to stay away from work. All these could combine to produce larger apparent changes in the magnitude of mental health problems than in physical health problems. However, Cox considers it unlikely that a contrast of such size could be without some real foundation.

It is a well known fact that white and Asian South African males have the highest CHD rates in the world (Sunday Times, 25 September 1983; Financial Mail, 15 July 1983). It is suspected that the reason for this involves the shortage of high level human resources in this country (Strumpfer, 1983c). Sadie has determined that the ratio of executive to worker is 1:52 in S.A., reaching 1:76 by the end of the century, in comparison with ratios between 1:10 and 1:17 in developed countries (Financial Mail, 15 July 1983). The apparent shortage of high level human resources implies that many individuals are placed in situations which they are not suitably equipped to manage and suffer from CHD as a result (ibid.). The high rate of CHD in South Africa obviously costs the country a great deal of money. Further, the Financial Mail reports that stress is costing local firms R300 million/year in absenteeism, while other consequences of stress such as lower productivity, reduced efficiency, accidents, decreased purchasing power, alcohol abuse and emotional problems may cost considerably more. The S.A. National Council for

Mental Health reports that treatment of mental illness cost South Africa R2,5 million/day in 1982 (ibid). Sick pay is estimated to cost R600 000/day and 21 000 industrial accidents are thought to result from mental problems (ibid.).

To the extent that stress is implicated in the etiology of mental and physical illness, the above figures highlight the importance of research aimed at developing a better understanding of the causes of the experience of stress. Only when some certainty exists regarding the organizational antecedents of this experience, will work design experts and management consultants be able to affect substantial decreases in harmful stress arising from the work environment.

1.5.3 Literature Review

In this section, relevant literature is reported separately for each of the hypothesized role dimensions (Sections 1.5.3.1 - 1.5.3.4) and for Type A behaviour as a moderator variable (Section 1.5.3.5). Given the concern of this research with whether role demands have aversive consequences, findings are also reported for indices of strain other than those examined in this study.

1.5.3.1 Role Conflict

Firstly, psychological indices of strain: significant, positive relationships between conflict and anxiety/tension were obtained by Beehr et al (1976);

Brief and Aldag (1976); Brief, Aldag, Van Sell and Melone (1979); Caplan et al (1975b); French and Caplan (1972); Gross et al (1958); Hamner and Tosi (1974); House and Rizzo (1972) (job-induced anxiety and somatic tension); Kahn et al (1964); Kraut (1965); Miles (1975, 1976); Olivier and Brief (1977-1978); Schuler et al (1977) (for one sample); Tosi (1971) and Van Dijkhuizen (1980). Abdel-Halim (1978) reports an insignificant relationship between conflict and state anxiety, with other insignificant results having been obtained for job-related threat and anxiety (Tosi and Tosi, 1970), work-related tension (Keenan and McBain, 1979) and anxiety/tension (Schuler et al, 1977) (for one sample). Significant associations between role conflict and depression, as well as job-related threat, are reported by Caplan et al (1975b) and Van Dijkhuizen (1980).

Much research has been conducted on the relationships between role conflict and general, and components of, job satisfaction. Negative relationships between conflict and general job satisfaction were found by Abdel-Halim (1978); Beehr et al (1976); Brief et al (1979); Caplan (1971); Caplan et al (1975b); Gavin and Axlerod (1977); Gross et al (1958); House and Rizzo (1972); Kahn et al (1964); Kraut (1965); Miles (1975, 1976 a); Olivier and Brief (1977-1978); Rizzo et al (1970); Schuler (1975, 1980); Szilagyi, Sims and Keller (1976); Tosi (1971) and Tosi and Tosi (1970). With reference to components of job satisfaction, significant negative associations were obtained for satisfaction with work (Brief and Aldag, 1976; Schuler et al, 1977), supervision (Brief and Aldag, 1976; Keller, 1975; Schuler et al, 1977), pay (Keller, 1975; Schuler et al, 1977), promotion (Keller, 1975) and coworkers and prospects (Schuler et al, 1977)

(findings for Schuler et al (1977) are based on the medians for six samples). In addition, French and Caplan (1972) report a positive relationship between conflict and dissatisfaction with subordinates. Insignificant correlations for general job satisfaction are reported by Hamner and Tosi (1974); Keenan and McBain (1979) and Van Dijkhuizen (1980). For different types of role conflict, Johnson and Stinson (1975) obtained significant negative correlations for person-role, but not for inter-sender, conflict and intrinsic and overall job satisfaction.

Several other psychological variables have been examined in relation to role conflict. Significant positive associations with role conflict were found for fatigue (Beehr et al, 1976), general fatigue and uneasiness (House and Rizzo, 1972), irritation (Caplan et al, 1975b; Van Dijkhuizen, 1980), somatic complaints (Caplan et al, 1975b), poor relationships with peer groups (French and Caplan, 1972), lower commitment to the organization (Baird, 1969) and less confidence in the organization (Kahn et al, 1964). Insignificant relationships were obtained for role conflict and self-esteem (Van Dijkhuizen, 1980).

Secondly, behavioural indices of strain: propensity to leave the organization has been found to correlate significantly and positively with role conflict by some researchers (Brief and Aldag, 1976; House and Rizzo, 1972; Lyons, 1971; Schuler et al, 1977 [for one sample]) but not by others (Hamner and Tosi, 1974; House and Rizzo, 1972 [with two measures of propensity to leave]; Schuler et al, 1977 [for another sample]). Actual termination (or turnover) has been causally related to

role conflict (Johnson and Graen, 1973), while Lyons (1971) and Gross et al (1958) found positive correlations between these variables. On the other hand, Schuler et al (1977) found insignificant relationships between role conflict and turnover. Absenteeism has been little researched in relation to role dimensions and the two studies, to the knowledge of this author, which report correlations between absenteeism and role conflict have yielded inconsistent results. Gross et al (1958) found a significant, positive association between these variables, while Van Dijkhuizen (1980) found an insignificant relationship. Parasuraman and Alutto (1984) found no association between interunit conflict and performance and Schuler et al (1977) (for five of their six samples) and Brief and Aldag (1976) obtained insignificant correlations between conflict and various measures of performance. However, Brief and Aldag (1976); House and Rizzo (1972); Schuler (1975) and Schuler et al (1977) (for one sample) found significant, negative relationships between conflict and self-ratings of performance. Liddell and Slocum (1976) report a positive association between slower and less accurate group performance and role conflict. For other behavioural variables, Van Dijkhuizen (1980) found no association between conflict and smoking and Tosi (1971) obtained an insignificant correlation between group effectiveness and role conflict.

With regard to physiological variables, French and Caplan (1972) report a significant, positive correlation between mean heart rate and conflict in an intensive, small-sample NASA study, but this was not replicated in a subsequent, larger NASA study. Caplan and Jones (1975) also found a significant correlation between heart rate and conflict. Van

Dijkhuizen (1980) found no association between role conflict and diastolic blood pressure, cholesterol level, heart rate and obesity, but obtained a significant result for systolic blood pressure (as noted in Section 1.3.2.3).

1.5.3.2 Role Ambiguity

Firstly, psychological indices of strain: significant, positive correlations between ambiguity and anxiety/tension were obtained by Abdel-Halim (1978); Beehr et al (1976); Brief and Aldag (1976); Caplan (1971); Caplan and Jones (1975); Kahn et al (1964); Keenan and McBain (1979); Lyons (1971); Miles (1975); Organ and Greene (1974); Schuler et al (1977) (for one sample) and Van Dijkhuizen (1980). Insignificant relationships have been found for job-induced anxiety and somatic tension (House and Rizzo, 1972), job threat and anxiety (Tosi, 1971; Tosi and Tosi, 1970) and anxiety-stress (Schuler et al, 1977) (for one sample). Significant, positive associations between role ambiguity and depression are reported by Beehr (1976); Margolis et al (1974); Van Dijkhuizen (1980) and Van Sell, Brief and Schuler (1981), while Caplan (1971) and Van Dijkhuizen (1980) found significant positive relationships between job-related threat to mental and physical well-being and ambiguity.

Much research has also been conducted on the relationships between role ambiguity and general, and components of, job satisfaction. Negative relationships between ambiguity and general job satisfaction were found by Abdel-Halim (1978); Beehr (1976); Beehr et al (1976); Caplan (1971); Caplan et al (1975a); Greene (1972); Hamner and Tosi (1974); Johnson and Stinson (1975); Kahn et al (1964); Keenan and McBain (1979); Keller

(1975); Lyons (1971); Margolis et al (1974); Paul (1974); Posner and Randolph (1979); Rizzo et al (1970); Schuler (1975; 1980); Szilagyi et al (1976) and Van Dijkhuizen (1980). However, insignificant relationships have also been found (Ivancevich and Donnelly, 1974; Organ and Greene, 1974; Tosi, 1971; Tosi and Tosi, 1970). With regard to components of job satisfaction, Schuler et al (1977) report significant negative associations between ambiguity and satisfaction with work, pay, coworkers, supervision and promotions (medians of six samples), and House and Rizzo (1972) found significant negative correlations between ambiguity and satisfaction with advancement, autonomy, intrinsic job, job security, pay, recognition, social environment and adequacy of authority. Abdel-Halim (1980) also found significant relationships between satisfaction with work and intrinsic satisfaction and ambiguity. On the other hand, some researchers have found insignificant relationships between ambiguity and satisfaction with work (Brief and Aldag, 1976; Organ and Greene, 1974) and satisfaction with supervision (Brief and Aldag, 1976). For elements of role ambiguity, Johnson and Stinson (1973) found significant, negative correlations between lack of clarity of behavioural requirements/task and lack of predictability of outcomes/feedback and intrinsic and overall satisfaction.

Several other psychological variables have been studied in relation to role ambiguity. Significant positive associations with role ambiguity have been found for fatigue (Beehr et al, 1976), general fatigue and uneasiness (House and Rizzo, 1972), life dissatisfaction (very weak relationships) (Beehr, 1976; Margolis et al, 1974), low self-esteem (Beehr, 1976; Margolis et al, 1974; Van Dijkhuizen, 1980), irritation (Van Dijkhuizen,

1980), a sense of futility and lower self-confidence (Kahn et al, 1964) and low motivation to work (Margolis et al, 1974). Abdel-Halim (1978; 1980) obtained significant negative correlations between job involvement and role ambiguity.

Secondly, behavioural indices of strain: propensity to leave the organization has been found to correlate significantly and positively with role ambiguity by some researchers (Brief and Aldag, 1976; House and Rizzo, 1972; Ivancevich and Donnelly, 1974; Lyons, 1971; Margolis et al, 1974; Schuler et al, 1977 [for one sample] and Sorensen and Sorensen, 1974) but not by others (Abdel-Halim, 1980; Hamner and Tosi, 1974; Schuler et al, 1977 [for one sample]). Turnover has been causally related to role ambiguity (Johnson and Graen, 1973), while Brief and Aldag (1976); Gross et al (1958); Lyons (1971) and Schuler et al (1977) (for the single sample for which they collected turnover data) found positive correlations between these variables. Similarly to findings for role conflict, role ambiguity has been found to relate positively to absenteeism in one study (Gross et al, 1958) but not in another (Van Dijkhuizen, 1980). Schuler et al (1977) obtained significant, negative correlations between ambiguity and various measures of performance for three of their six samples, but not for the remainder. Brief and Aldag (1976) found a significant negative relationship between ambiguity and perceived work quality, but no association between ambiguity and supervisor ratings of performance. Tosi (1971) also reports an insignificant correlation between effectiveness and ambiguity for managers, while Szilagyi et al (1976) found no relationship between these variables for paramedical workers. However, Greene (1972)

and Posner and Randolph (1979) found significant negative associations between performance and ambiguity. Smoking was found by Van Dijkhuizen (1980) to be unrelated to role ambiguity.

With regard to physiological strains, Van Dijkhuizen (1980) found no significant associations between role ambiguity and systolic and diastolic blood pressure, cholesterol level, heart rate or obesity.

1.5.3.3 Role Overload

Firstly, psychological indices of strain: significant, positive correlations between overload and anxiety/tension were found by Abdel-Halim (1978); Beehr et al (1976); Caplan and Jones (1975); Keenan and McBain (1979); Van Dijkhuizen (1980) and are also reported by French and Caplan (1972). Beehr et al (1976); French and Caplan (1972) and Van Dijkhuizen (1980) report significant, negative relationships between general job satisfaction and overload, while insignificant associations were found by Abdel-Halim (1978) and Keenan and McBain, (1979). For components of job satisfaction, Bateman (under review) obtained significant, negative correlations for overload and satisfaction with work, pay and supervision, but not for satisfaction with promotions and coworkers. Overload has been positively related to low self-esteem (French and Caplan, 1972; French, Tupper and Mueller, 1965 [for professors]. Margolis et al, 1974; Van Dijkhuizen 1980). For university administrators, French et al (1965) found an insignificant relationship between overload and self-esteem. Additional, significant covariates of overload are job-related threat (French and Caplan, 1972; Van Dijkhuizen, 1980), depression and irritation (Van Dijkhuizen, 1980), low motivation to work (Margolis et al, 1974) and fatigue (Beehr et al, 1976).

Secondly, behavioural indices of strain: Margolis et al (1974) obtained a positive correlation between overload and absenteeism, while Van Dijkhuizen (1980) found no association between these variables. Caplan et al (1975a) found that quitting smoking is negatively related to quantitative work load and French and Caplan (1970) report a positive association between quantitative work load and number of cigarettes smoked. However, Van Dijkhuizen (1980) determined smoking to be unrelated to overload. Research by Beehr et al (1976) indicates that overload is positively related to self-rated effort towards quantity but not effort towards quality. In an experimental study, Sales (1970) found that overload led to more reported attempts to increase productivity and higher actual productivity, but also more errors (in performing anagram tasks). Thus, it seems that there is some evidence to suggest that overload affects quantity positively and quality negatively. Margolis et al (1974) found significant positive associations between overload and escapist drinking and an absence of suggestions to employers.

In Section 1.4.3, a number of studies were listed that show positive relationships between overload and risk factors for, and actual, CHD. These studies include such physiological strains as catecholamine and cholesterol levels, heart rate, blood pressure and obesity, amongst others, and will not be further described. However, to place these findings in perspective, it is necessary to present some other results which question the view of overload as a consistent, potent source of physiological strain. Caplan (1971) found no association between overload and heart rate and cholesterol level. Van Dijkhuizen (1980) obtained the same results for

these variables and, further, reports insignificant correlations between overload and diastolic and systolic blood pressure and obesity. When anxiety/tension was partialled out, Caplan and Jones (1975) also found no association between heart rate and role overload.

1.5.3.4 Role Underload

Role underload is a little researched variable and the supportive evidence for the hypothesis of underload as a stressor comes from only three studies, all of which have primarily been concerned with behavioural and physiological, rather than psychological, outcomes.

Brook (1973) discussed case studies which illustrate that underpromotion (not being given responsibility commensurate with ability level) (as well as overpromotion — discussed in Section 1.2.2.2) may result in behavioural and physiological disorders, such as palpitations and avoidance behaviour. Sales (1969) studies the effects of objective and subjective workload (underload and overload) on cholesterol level, in a 2 x 2 factorial design. Cholesterol increased in all treatment conditions other than the objective underload/subjective overload condition. Hence, objective overload always resulted in mean increases in cholesterol, as did subjective underload. Additional support for the view of underload as a stressor comes from a study by Frankenhaeuser et al (1971). Frankenhaeuser and her colleagues found that participation in their vigilance task (described as a condition of underload) resulted in a rapid decline in performance over time. Further, secretions of catecholamines (adrenalin and noradrenalin) were higher in the understimulation condition

than in a control condition where subjects were exposed to medium levels of stimulation. Interestingly, underloaded subjects displayed a decrease in heart rate over time. Self-estimates of unpleasantness, boredom and irritation showed increases over time, while concentration decreased. In combination with physiological data, these latter findings present support for Bexton, Heron and Scott's (1954) suggestion that underload is likely to be stressful because of its presumably boring and uninteresting characteristics.

In general terms, Sales' and Frankenhaeuser et al's studies also show that overload is a potentially more aversive source of stress than underload. In Sales' study, the largest increase in cholesterol level occurred in the objective overload/subjective overload condition (+10,57 mg of cholesterol/100 ml of blood). The next largest increase occurred in the objective underload/subjective underload condition (+7,44 mg/100 ml), followed by the objective overload/subjective underload condition (+2,05 mg/100 ml). However, a mean decrease in cholesterol occurred in the objective underload/subjective overload condition (-13,43 mg/100 ml). Hence, it is only where a situation of objective overload is perceived to represent overload, that this is a potentially more aversive source of stress than underload. The analysis of additional data from this study (Sales, 1970) provides further support for the view that overload is a potentially more aversive source of stress than underload. Subjects in an objective overload condition reported significantly more feelings of tension and anger and lower self-esteem than subjects in an objective underload condition. For subjective load, a similar result was obtained for feelings of tension

and anger but self-esteem did not differ across the two conditions. Interestingly, subjectively overloaded subjects enjoyed the anagram task more than subjectively underloaded subjects. This was not the case for objective load, where no differences between the conditions emerged. Unfortunately, Sales (1970) does not report results for these variables in a 2 x 2 factorial design, as he did for cholesterol level. Hence, similar treatment combination contrasts are not possible. Frankenhaeuser et al's results indicate that the secretion of catecholamines and heart rate is greater during overstimulation than during understimulation.

Finally, overstimulation and understimulation present as sources of stress that have qualitatively different effects for, though the conditions contributed to identical self-ratings of unpleasantness, subjects rated themselves as having lower levels of concentration and more boredom during understimulation than during overstimulation, while subjects rated themselves as more irritated during overstimulation conditions (Frankenhaeuser et al, 1971).

1.5.3.5 Type A Behaviour as a Moderator Variable

Caplan et al (1975a) studied Type A behaviour as a moderator of the relationship between stressors and quitting smoking. They hypothesized that the Type A smoker would "show the greatest propensity for being unable to quit under high levels of stress" (p. 212). Two hundred administrators, engineers and scientists from NASA completed questionnaires concerning perceived work stressors, personality and smoking behaviour. Smokers had higher scores on the Type A behaviour measure,

but the effects of stressors on quitting smoking were the same for the A and B groups. Hence, Type A behaviour was not found to moderate the relationships between stressors and quitting smoking.

Sales (1969) studied the effects of Type A behaviour and objective and subjective workload (underload and overload — discussed in the previous section) on serum cholesterol level. Forty-three subjects were exposed to conditions of objective overload or underload and blood samples, which were analysed for cholesterol, were taken at the beginning and end of a one hour session of anagram decoding. Measures of Type A behaviour were obtained three to five weeks before the experiment. "There was no consistent tendency for Type A subjects..... to respond to the experimental conditions with changes in serum cholesterol which differed from those exhibited by Type B subjects" (p. 353). Hence, Type A behaviour was not found to moderate the relationships between work load and cholesterol level.

French and Caplan (1972) report results from the Goddard study which provide some empirical support for Type A behaviour as a moderator variable. In this study, 205 male, volunteer administrators, engineers and scientists at Goddard Space Flight Center completed questionnaires tapping potential sources of occupational stress, indices of strain and personality variables. Blood samples, blood pressure and heart rate were also obtained. In general, individuals scoring high on measures of Involved Striving, Positive Attitude Towards Pressure, Environmental Overburdening and Leadership (dimensions of the Type A behaviour pattern) showed

relationships between work demands and outcomes, while individuals scoring low on these variables appeared to be unaffected by these demands. For example, individuals high on involved striving showed increases in cholesterol and diastolic blood pressure as the percentage of their work time involving responsibility for others' futures increased. Individuals low on involved striving did not appear to be affected by such responsibility.

Caplan and Jones (1975) studied Type A behaviour as a moderator of the relationships between quantitative work load and role ambiguity (potential sources of stress) and anxiety, depression, resentment and heart rate (indices of strain). Practically identical measures of these variables were obtained from 73 computer users on two separate occasions: shortly before a long computer shutdown (described as likely to involve overload and ambiguity) (Time 1) and several months later during a period "chosen for its relatively low levels of stress" (p. 715) (Time 2). Mean levels of quantitative workload, anxiety, depression, resentment and heart rate, but not role ambiguity, decreased from Time 1 to Time 2. The correlations between changes in subjective workload and changes in anxiety/tension were 0,54 for the Type A group but only 0,27 for the Type B group (significantly different regression slopes; $p < 0,05$). Results are not reported for the other indices of strain and it is therefore assumed that there were no significant differences in relationships between subjective workload and these variables across the A and B groups. This study provides limited support for Type A behaviour as a moderator of stressor/psychological strain relationships.

Keenan and McBain (1979) investigated the relationships between role conflict, ambiguity and overload (potential sources of stress) and tension at work and job satisfaction (indices of strain), as well as the effects of Type A behaviour, intolerance of ambiguity and locus of control in moderating these relationships. Ninety administrative, middle managers in a large public organization completed self-report questionnaires tapping the above variables during an in-company training course. Contrary to Caplan and Jones' (1975) findings, Type A behaviour was not found to have moderating effects on the relationship between role overload and work-related tension. Further, there was an absence of such effects for relationships between overload and job satisfaction, conflict and job satisfaction, conflict and work-related tension, and ambiguity and work-related tension. However, Type A behaviour did moderate the relationship between role ambiguity and job satisfaction. These variables correlated $-0,70$ for the Type A group and $-0,26$ for the group classified as Type B (significant difference on Fischer's Z test: $p < 0,05$). This set of findings also represents only mild empirical support for Type A behaviour as a moderator of stressor/psychological strain relationships.

1.5.4 Research Hypotheses

Based on the preceding presentation of theoretical and research material pertaining to occupational stress, the following hypotheses were formulated for examination in this study:

1. It was hypothesized that role conflict, ambiguity, overload and underload constitute meaningfully independent research variables, i.e. that interpretable factors closely paralleling the defined role constructs would be extracted in a factor analysis of responses to the role dimensions questionnaire, i.e. that items written to tap each of these role dimensions would cluster in conceptually homogenous groups.
2. In turn, it was hypothesized that the hypothesized role dimensions constitute social-psychological stressors, i.e. that role conflict, ambiguity, overload and underload have aversive consequences for individuals and organizations in terms of psychological and behavioural strain, i.e. that the hypothesized role dimensions would be significantly and positively related to all indices of strain included in this study other than general and work-related self-esteem, for which variables the relationships with the role dimensions would be significant and negative. (The question of cause and effect will be discussed later.)
3. It was hypothesized that Type A behaviour acts as a third variable, masking relationships between role dimensions and psychological and behavioural strains, i.e. that, in general, Type A individuals would show stronger relationships between role dimensions and indices of strain than Type B individuals.

The high job involvement and needs for control of Type A individuals are argued to enhance their sensitivity to role conflict, ambiguity and overload, particularly in so far as the presence of such demands makes it more difficult for the Type A individual to carry out his job successfully. Hence, hypotheses regarding the effects of Type A behaviour on relationships between these variables and indices of strain are reasonably straightforward. However, it was less easy to make predictions regarding the effects of Type A behaviour on relationships between underload and indices of strain. It may be suggested that the orientation of Type As towards achievement striving is likely to result in greater sensitivity to situations of underload, as these situations may be perceived as having implications for underachievement. Alternatively, it may equally be suggested that underload implies the perception of control of the environment and does not make it more difficult for the Type A individual to carry out his job successfully (quite obviously, the contrary). Consequently, it is unlikely to be aversive for Type As. Therefore, with reference to these views, and in the absence of previous research, no specific predictions were made with regard to the effects of Type A behaviour on relationships between underload and indices of strain. Consideration of these effects constitutes exploratory research.

The above reflect expectations held regarding the principal concerns of this study. As discussed in Section 1.5.1, two further issues are of

tangential interest: (a) Van Dijkhuizen's Sequential Model of Strain, and (b) the nature of the relationship between Type A behaviour and CHD.

- (a) 4. Theory suggests that the relationships between hypothesized role stressors and general psychological affects are mediated by work-related strains. However, Van Dijkhuizen's (1980) statistics do not support such a view. Thus, no specific predictions were made with respect to the magnitude of relationships between hypothesized role stressors and work-related, in comparison with general, indices of strain.
5. It was hypothesized that the relationships between hypothesized role stressors and behavioural strain are mediated by general and work-related psychological strains, i.e. that the relationships with hypothesized role stressors are greater for general and work-related indices of strain than for absenteeism.
- (b) 6. It was hypothesized that Type A individuals would perceive more overload than Type B individuals. It was also thought that Type As might perceive more conflict and ambiguity, and less underload, than Type Bs. The latter are tentative suggestions as previous work has not found differences in conflict and ambiguity across Types A and B, while underload has not been studied in this context. In contrast, the link between overload and Type A behaviour has frequently been demonstrated (see Section 1.4.3).

7. Given the expectation that Type As would perceive higher levels of role demands than Type Bs, in conjunction with the hypothesis that role dimensions are related to indices of strain (in 2. above), it follows that there is an associated expectation that Type As will exhibit higher levels of strain than Type Bs. In the absence of empirical support, this suggestion is also tentative.

CHAPTER 2**METHOD****2.1 SUBJECTS**

Subjects were obtained from the Head Office of an equal-opportunity, medium-sized life insurance society. From a total staff complement (on initial enquiry) of 258 (from clerical staff upwards), complete data were obtained for 234 volunteers (91% sample), with incomplete data for a further ten individuals. Incomplete data arose from eight employees resigning, and two withdrawing, before all data were collected. The remainder (14) is made up by those who left between initial sample formulation and the commencement of testing (4) and those who failed to volunteer (10). The 234 employees for whom complete data were obtained constitute the sample in this study. The frequency structure of the sample according to race, sex and level in the organization is as follows, with summary data for age and company tenure included:

		Male		Female		
		Coloured	White	Coloured	White	
MANAGERS	Frequency		N = 20			N = 20
	Tenure		11,05(8,33)			11,05
	Age		38,5			38,5
SUPERINTENDENTS	Frequency	N = 1	N = 2			N = 22
	Tenure	10,5 (0,0)	9,40(11,30)			9,45
	Age	37,0	36,5			36,5
HEADS OF DEPARTMENTS	Frequency	N = 6	N = 13		N = 5	N = 24
	Tenure	11,42(2,20)	8,43 (9,65)		8,70 (5,24)	9,23
	Age	35,5	34,5		46,5	37,3
SENIOR CLERKS	Frequency	N = 9	N = 12	N = 6	N = 15	N = 42
	Tenure	8,60 (6,50)	7,98(10,87)	3,74 (1,99)	7,07 (5,77)	7,18
	Age	29,0	29,5	24,2	37,0	31,3
CLERKS	Frequency	N = 53	N = 6	N = 33	N = 34	N = 126
	Tenure	4,88 (4,69)	0,92 (0,72)	1,75 (1,02)	4,08 (6,57)	3,66
	Age	25,7	21,5	22,5	31,3	26,2
Frequency		N = 69	N = 72	N = 39	N = 54	N = 234
Tenure		6,02	8,74	2,06	5,34	= X Tenure = 5,99 (7,14)
Age		27,1	34,3	22,8	34,3	= X Age = 30,06

Table 2.1.1: STRUCTURE OF THE SAMPLE ACCORDING TO RACE, SEX, ORGANIZATIONAL LEVEL, TENURE AND AGE

Note 1: Subjects who filled technical and specialist positions (e.g. actuaries, programmers), rather than line positions, were assigned to particular levels in accordance with organizational status, established through consultation with a Society personnel specialist, and with reference to the Index of Status Characteristics (Warner, Meeker and Eells, 1949) (N = 25).

Note 2: Mean ages are estimated from the original categorical data, to facilitate interpretation. Therefore, measures of variation for age are inappropriate. Standard deviations for tenure are given in brackets.

2.2 MEASURES

2.2.1 Role Demands

Lichtman and Hunt (1973) propose that the hypothesized role stressors occur as objective characteristics of the role as well as perceptual reactions of the role incumbent, which may or may not correspond with objective characteristics. Following this, measures of role stressors could be concerned with both objective and subjective indices and with the relationships between the two. Some investigators have gone through the exhaustive procedure necessary to develop these measures (e.g. Gross et al, 1958; Kahn et al, 1964). However, most research has been based on the perceptions of the role incumbent alone. In fact, in terms of the stress model outlined previously it is essential to consider role perceptions in studies of stress, notwithstanding issues of expediency.

To explore incumbents' perceptions of role, self-report questionnaires have generally been used (e.g. Caplan et al, 1975b; French and Caplan, 1972; House and Rizzo, 1972). Approximately half of these studies are based on self-report instruments developed by their authors while, aside from some laboratory experiments (e.g. Manning, in press; Sales, 1969, 1970), most of the remaining investigations have used the general self-report questionnaire constructed by Rizzo et al (1970) to determine role ambiguity and role conflict (Van Sell et al, 1981). These scales will be briefly discussed.

An initial pool of 30 items (one was duplicated owing to a clerical error — therefore 29 different items) was administered to 290 managerial and technical employees. Items were written to tap the categories of ambiguity and conflict specified by Gross et al (1958) and Kahn et al (1964) (in Section 1.2.4). Factor analysis and item analyses led to the establishment of a six item role ambiguity scale and an eight item conflict scale. Responses are indicated on a seven-point dimension and a mean is calculated, such that a high score indicates high ambiguity or high conflict. Internal consistency reliability coefficients for these scales have been widely reported (see Cook et al, 1981 for summary) and are generally high. A psychometric evaluation of this instrument by Schuler et al (1977), involving an examination of factor structure, coefficients of congruency, internal reliabilities and test-retest reliabilities, suggests that its continued use appears to be warranted. Considering the increased dependence on the Rizzo et al scale, it might seem appropriate to use this instrument to explore role conflict and ambiguity in this study. However, subsequent work by Tracy and Johnson (1981), to be discussed later, suggests problems with the validity of these scales, at least in some senses. Further, it is one of the aims of this study to examine the independence of conflict and ambiguity, as well as overload and underload and, should relative independence be found, to develop measures for each. Considering this, in relation to the fact that few items were written to tap overload and underload by Rizzo et al, and recalling the doubtful validity of their scales, their final instrument was not used in this study. Rather, a set of items tapping each of the above dimensions, and including their items, was assembled and subjected to factor analysis.

Rizzo et al's 29 items formed the basis for this assemblage, with nine items being added to complement the underload and overload sets. The resulting 38 items were mixed with 20 filler-items dealing with many aspects of organizational life, leadership style and age (mostly drawn from Hofstede [1980]. Items were randomly ordered and respondents selected one alternative on a seven-point, Likert-type Agree/Disagree Scale, with the exception of the leadership style and age items (see Questionnaire 2, Appendix A). Items, indicating associated role dimension and source, are listed below. Item numbers correspond to those in the questionnaire and, for interest's sake, items contributing to Rizzo et al's final scales are indicated with an asterisk.

Item	Items	Source
	<u>Ambiguity</u>	
3*	I know that I divide my time properly	Rizzo et al (1970)
4	I feel certain how I will be evaluated for a raise or promotion.	"
7*	I know exactly what is expected of me on my job.	"
8	I am told how well I am doing my job.	"
10	I have to "feel my way" in performing my duties.	"
24	There is a lack of policies and guidelines to help me in my work.	"
26	I have to work under vague directives or instructions.	"
27	I am uncertain as to how my job is linked to overall organizational functioning.	

Item	Items	Source
29*	I feel certain about how much authority I have.	"
30	I do not know if my work will be acceptable to my boss.	"
37*	There are clear, planned goals and objectives for my job.	"
39	I am corrected or rewarded when I really don't expect it.	"
42*	I know what my responsibilities are.	"
45*	What has to be done is clearly explained to me.	"
	<u>Conflict</u>	"
11*	I receive incompatible requests from two or more people in my job.	Rizzo et al (1970) "
14	I perform work that suits my values.	"
17*	I do things that are apt to be accepted by one person and not accepted by others.	"
20*	I work on unnecessary things.	"
22	I am able to act the same at work, regardless of the group I am with.	"
25*	I have to do things that I think should be done in a different way.	"
44	I work under incompatible policies and guidelines.	"
48*	I have to buck a rule or policy in order to carry out an assignment.	"
54*	I work with two or more groups who operate quite differently.	"

Item	Items	Source
	<u>Underload</u>	"
32	I perform tasks that are too easy or boring.	Rizzo et al (1970)
51	My work often seems too easy.	This Researcher
	<u>Overload</u>	"
2	I frequently struggle to meet deadlines.	This Researcher
5	On my present job, the amount of work seems to interfere with how well I can do the job.	Abdel-Halim (1978)
12	The performance standards on my job are often too high.	Beehr et al (1976)
13*	I receive an assignment without adequate resources and materials to execute it.	Rizzo et al (1970)
15	I have tasks to complete which seem too difficult.	This Researcher
21	I have just the right amount of work to do.	Rizzo et al (1970)
23	I have enough time to complete my work.	"
33	I am given enough time to do what is expected of me on my job.	Beehr et al (1976)
38*	I receive an assignment without the manpower to complete it.	Rizzo et al (1970)
46	I receive assignments that are within my training and capability.	"
47	It often seems that I have too much work to do.	Beehr et al (1976)
52	I often notice too great an increase in my workload.	Abdel-Halim (1978)
55	I often feel that too much is expected of me.	This Researcher also (Note 1)

An important issue involves the suitability of items designed in the North American context for use in South Africa. This applies to all measuring instruments but is discussed here, considering Coldwell's (1979 a, b) comment with reference to role dimension scales, "The different economic, cultural and politico-industrial situation there would render it [them] unsuitable in the South African situation" (1979 b, p.103). Coldwell studied Black industrial workers, and was largely interested in culturally induced role conflict. It is not immediately clear whether he intended this statement to apply equally to studies of urbanized White and Coloured white-collar South African employees. (It is interesting that Veldsman [1978], in his study of role conflict and ambiguity in Black mineworkers, used some items very similar to the original Rizzo et al items.) Irrespective of the intended meaning of the above quotation, this is a point which requires discussion. It is the opinion of this author that the situational and cultural differences between North American and local, urban, white-collar work environments are not sufficiently dissimilar to warrant the development of entirely different measuring instruments. Clearly, however, it is desirable to examine racial differences as well as differences between overall scores and those obtained in overseas, standardization work (to limit the scope of this study, the principle is followed of examining differences for the total sample but of partialling out the effects of race).

2.2.2 Psychological and Behavioural Strain

As previously described, the indices of strain in this study are general and work-related anxiety/tension, general and work-related depression, general and work-related self-esteem, fatigue, job dissatisfaction, hostility and absenteeism.

The rationale in terms of which the above strains were selected as measures of psychological "ill health" or "lack of well being" in this study is similar to that employed by Kornhauser (1965), summarised in his own terms as follows: "Our search is not for any peculiarly crucial key measures of mental health but for useful indicators chosen from innumerable possible ones..... the indexes were chosen as ones possessing 'face validity' in reference to mental health" (p. 17-25). The usefulness of the present study as a replication of Caplan and Jones' (1975) and Keenan and McBain's (1979) studies depended upon the inclusion of measures of anxiety/tension and job dissatisfaction. This was another reason for the inclusion of these variables. The inclusion of general and work-related measures enabled testing of aspects of Van Dijkhuizen's (1980) sequential model and enabled conclusions to be made with regard to the generality versus specificity of the effects of role demands.

A degree of overlap can be expected to exist between the indices of strain incorporated in the present study. There is, for example, some theoretical support for conceptualising anxiety as being fundamental to all the other psychological strains e.g. in terms of psychoanalytic thinking

(Kleinmuntz, 1974). Van Dijkhuizen's work reflects this view — he describes depression and hostility as expressions of tension. Further, low self-esteem and fatigue may be seen as aspects of depression (McLean, 1981). In terms of these arguments, it could be argued that a general measure of psychological strain should be obtained from a combination of the individual strains measured in the present study. However, there exist no guidelines as to how such a combination ought to be effected e.g. as to whether the combination ought to be additive or multiplicative and whether the different indices ought to be weighted differently in relation to each other. Therefore, such a general measure was not employed in this study.

In addition to absenteeism, it would have been desirable to have obtained other "hard" measures, such as physiological measures and additional behavioural indices, e.g. performance. However, the gathering of these data for a sample of this size requires resources of equipment and time beyond the scope of a single researcher, and is not without considerable problems. Not the least of the problems with performance data concerns the setting of criteria of effectiveness for different positions, as well as the objective determination of any individual's position with respect to the criteria. In addition, performance data obtained from supervisor ratings would necessarily have been incomplete, as the most senior managerial and professional employees are not in a position to be rated by supervisors. An alternative would have been to collect self-ratings of performance but these are generally unreliable (Aldridge, 1970). Finally, of course, neither of these rating measures is objective and the original purpose in obtaining them is therefore lost. For these reasons,

physiological and performance data were not collected. Thus, the emphasis is on psychological strain, with absenteeism the only index of behavioural strain. Absenteeism data were readily obtainable from employee files.

Details of each of the measures are given below. Items from the scales were randomly ordered and presented in Questionnaire 3 (see Appendix B). Item numbers given below correspond to item numbers in this questionnaire.

General Anxiety/tension: General manifest (state) anxiety/tension was assessed with a 50 item true/false scale developed by Taylor (1953). Selected items from this scale have been used in previous work (e.g. Brief and Aldag, 1976; House and Rizzo, 1972; Miles and Perrault, 1976; Parasuraman and Alutto, 1984; Turney, 1974), though this researcher is not aware of other stress studies which have used the full scale. Items are those in Questionnaire 3 not specified in the following sections. Scores reflect the total number of anxiety/tension-keyed responses checked by the respondent, with a possible range therefore of 0-50.

Work-related Anxiety/tension (1): Experienced anxiety/tension at work was assessed with an eight item scale, taken from Caplan and Jones (1975) and Keenan and McBain (1979). Items were originally drawn from the State-Trait Anxiety Inventory developed by Spielberger, Gorsuch and Lushene (1970). The essential qualities evaluated by the scale include feelings of tension, anxiety, nervousness, worry and preoccupation. Respondents were asked how often they had such feelings in connection with their work, and

answered on a five point scale varying from "never" to "very often". The anxiety/tension score was obtained by adding scores for the eight items and subtracting eight. The possible score range is therefore 0-32, with high scores indicating greater anxiety/tension at work. Keenan and McBain report Cronbach's alpha internal consistency reliability of 0,85 for their sample. The items (listed below) appear as item 85 in the questionnaire.

- a) I feel tense
- b) I feel anxious
- c) I feel nervous
- d) I feel worried
- e) I feel relaxed (reverse-scored)
- f) I feel calm (reverse-scored)
- g) I feel preoccupied with the day's problems
- h) I feel upset.

Work-related Anxiety/tension (2): In addition to the above scale, two items written by Beehr et al (1976) were included. These are:

- 35) I seldom feel tense on my job (reverse-scored)
- 55) I often feel nervous or jumpy on my job.

Responses are given on a seven-point agree/disagree scale and item scores are totalled to yield an index of anxiety/tension. Beehr et al cite reliability of 0,73. Though a short scale of this type has doubtful validity, these items were included with a view to considering the presence of response sets and/or the fluctuations in feelings of strain over time. To elaborate, two of the items listed by Hofstede (1980) are almost identical to those given above, and were included in Questionnaire 2 as filler-items, serving an additional purpose. These are:

16) I have little tension and stress on the job (reverse scored)

35) I often feel nervous or tense at work

Comparison of relationships between each of these scales and the role dimensions will have implications for the above issues of response sets and fluctuations in strain.

General Depression: In the opinion of this author, most general depression scales are really only suitable for clinical populations, including as they do many items with content inappropriate for most "normal", employed individuals. Therefore, a standard depression scale could not be used. Rather, suitable items were taken from the IPAT Depression Scale (Krug and Laughlin, 1976), omitting those more clinical in orientation and selecting particularly those relevant for employed people. The selection process resulted in the formation of a 22 item scale, including items 1 (42), 3 (79), 6 (37), 7 (54), 8 (31), 10 (74), 11 (15), 15 (33), 17 (87), 20 (92), 21 (78), 22 (44), 23 (46), 24 (10), 26 (40), 27 (68), 30 (57), 31 (97), 33 (47), 36 (16), 37 (34) and 40 (20) from the original 40 item set. Numbers in brackets correspond to items in Questionnaire 3. Each item has three response alternatives, which vary from item to item depending on content. Alternatives are keyed with 0, 1 or 2 points for depression, total scores having a possible range of 0-44, with higher scores indicating more depressed mood. Reliability estimates (computed in various ways) are reported in the manual and range from 0,85 to 0,95 for various groups (Krug and Laughlin, 1976). These estimates are based on the full scale. Therefore, reliability is expected to be lower for the short form used here, at least theoretically. Estimation of this reliability, based on formula

17.23 (Guilford, 1965) yields a coefficient of 0,61, which is deemed satisfactory in that it exceeds Nunnally's (1967) criterion for sufficiency of reliability (0,5 to 0,6) of instruments in formative stages. Items included in the scale are as follows:

- 42) My energy for work is great.
- 79) I get into moods when I feel low and depressed.
- 37) My mind works quickly and well these days.
- 54) I feel my health is run down and I should see a doctor soon.
- 31) I have the feeling that most people who know me really and truly like me.
- 74) I make up my mind easily and quickly, and seldom have reason to change.
- 15) I seem to blame myself for everything that goes wrong, and I'm always critical of myself.
- 33) There are times when I think I'm no good for anything at all.
- 87) I feel self-confident and relaxed.
- 92) If acquaintances treat me badly and show they dislike me:
- 78) I hardly ever feel sad and gloomy.
- 44) I feel worn out and can't get enough rest.
- 46) Sometimes a dark mood of depression comes over me for no reason.
- 10) I hardly ever feel under such strain that it's too much effort to cope with things.
- 40) I almost never feel that life is a burden.
- 68) Sometimes I feel that my nerves are going to pieces.
- 57) I hardly ever feel that I've failed in my duties.
- 97) I have fears that no one really loves me.

- 47) I am confident that I can face and handle most emergencies that come up.
- 16) I rate myself as a happy, contented person in spite of troubles here and there.
- 34) I rarely lie awake at night wondering what will happen because of wrong things that I've done.
- 20) If I were called in by my boss, I'd:

Work-related Depression: Depressed mood in a job-related context was assessed with a ten item index taken from Quinn and Shepard's Quality of Employment Survey (1974). Respondents were asked to indicate how often at work they experienced the feelings and states described below. Responses were given on a five-point scale ranging from "very often" to "never", scored from five to one respectively, and with six items reverse-scored. Item scores were totalled and ten subtracted to yield an index of work-related depression with a possible range of 0-40, higher scores indicating more depressed mood. Quinn and Shepard report a coefficient alpha of 0,77 (N = 1496) and Beehr (1976), in his study of situational moderators of the relationship between role ambiguity and role strain, a Spearman-Brown internal consistency reliability estimate of 0,71 (N = 651). Items were presented as item 14 in the questionnaire and are given below.

- 1) I feel downhearted and blue.
- 2) I get tired for no reason.
- 3) I find myself restless and can't keep still.
- 4) I find it easy to do the things I used to do (reverse-scored).
- 5) My mind is as clear as it used to be (reverse-scored).
- 6) I feel hopeful about the future (reverse-scored).

- 7) I find it easy to make decisions (reverse-scored).
- 8) I am more irritable than usual.
- 9) I still enjoy the things I used to (reverse-scored).
- 10) I feel that I am useful and needed (reverse-scored).

General Self-esteem: General self-esteem was assessed with seven items drawn from the Mental Health interview measure designed by Kornhauser (1965) for use with employed individuals. Subsequent work has used this measure in questionnaire form (e.g. Frost and Jamal, 1979; Gechman and Wiener, 1975; Jamal and Mitchell, 1980; Ronan et al, 1974) and indications are that it translates into the written word satisfactorily (ibid.). Subjects responded to items on five-point semantic differential scales, labelled at points one, three and five. Response alternatives were keyed for self-esteem and item scores were totalled (and seven subtracted) to yield an index of general self-esteem, with a possible range of 0-28. High scores are indicative of greater self-esteem. Analysis of variance reliability was 0,83 (see Appendix C for method). Items are as follows:

- 44) I blame myself and feel bad over things that I've done.
- 48) Do you feel that you can make your future what you want it to be?
- 56) How do you expect things to turn out for you in the future?
- 83) How do you see your chances for getting ahead?
- 86) How much do you feel that you are accomplishing the sorts of things that you would like to in your life?
- 91) On the whole, how do you feel about your life and the way it is working out?
- 95) Do people often hurt your feelings?

Work-related Self-esteem: This variable was measured by a three item subset of Quinn and Shepard's (1974) seven-point semantic differential scale, items selected by Beehr (1976). Subjects indicated their position on a five-point scale (labelled at points one, three and five), in response to the question, "How do you see yourself in your work?" Anchors were "successful-unsuccessful" (Item 67), "important-not important" (Item 93) and "doing my best-not doing my best" (Item 49). Items were reverse-scored and totalled (and 3 subtracted) to yield an index of work-related self-esteem (possible score range 0-12), higher scores indicating greater self-esteem. Beehr (1976) cites a reliability estimate of 0,68, obtained by application of the Spearman-Brown prophecy formula to the median interitem correlation.

Fatigue: Fatigue was measured by a three item set taken from Quinn and Shepard (1974), items selected by Beehr et al (1976). Respondents rated each of the items on a seven-point agree/disagree scale and the final index was obtained by totalling the three item scores (and subtracting three). The resulting scale has a possible score range of 0-18, with higher scores indicating greater fatigue. Beehr et al (1976) report reliability of 0,66. Items are as follows:

- 13) I feel completely worn out at the end of the working day.
- 51) I become tired in a short time.
- 71) I find it difficult to get up in the morning.

Job Dissatisfaction: Job dissatisfaction was measured by a four item subset of Quinn and Staines' (1979) five item "facet-free" job satisfaction

measure, items selected by Beehr (1976). Respondents selected one of three or four alternatives for each item, with each response alternative keyed with 0, 1, 2 or 3 points for job dissatisfaction. Item scores were summed to yield an index with a possible score range of 0-9. Beehr (1976) reports reliability of 0,80 for the scale, estimated by application of the Spearman-Brown formula to the median interitem correlation. Items and response alternatives, with scoring keys, are given below.

- 6) Knowing what you know now, if you had to decide all over again whether to take the job you now have, what would you decide?
- Would you
- a) take the same job without any hesitation? (0)
 - b) have some second thoughts? (1)
 - c) definitely not take the same job? (2)
- 65) All in all, how satisfied are you with your job?
- a) very satisfied (0)
 - b) somewhat satisfied (1)
 - c) not too satisfied (2)
 - d) not at all satisfied (3)
- 80) In general, how well would you say that your job measures up to the sort of job you wanted when you took it? Would you say it is
- a) very much like (0)
 - b) somewhat like (1)
 - c) not very much like (2)
- the job you wanted when you took it?
- 90) If a good friend of yours told you that he/she was interested in working in a job like yours, would you
- a) strongly recommend the job? (0)

- b) have doubts about recommending it? (1)
- c) strongly advise him/her against this sort of job? (2)

Hostility: As was the general self-esteem measure, the hostility scale was taken from Kornhauser's Mental Health instrument (1965). Respondents indicated for six statements how often they experienced the feelings and situations described. Responses were given on a five-point scale ranging from "very often" to "never", scored from five to one respectively, and with one item reverse scored. Item scores were totalled and six subtracted to yield an index of hostility with a possible range of 0-24. Higher scores indicate more hostility. Analysis of variance internal consistency reliability of 0,68 was calculated. Items are as follows:

- 1) I have to tell people to mind their own business.
- 7) People get on my nerves.
- 25) I think that most people can be trusted (reverse-scored).
- 28) I boil inside without letting people know about it.
- 45) How often do you feel like smashing things for no good reason.
- 64) How often do you find that people are so unreasonable that it is hard to talk to them?

Absenteeism: The measuring of absence presents a number of practical difficulties which are well discussed by Van der Merwe and Miller (1976) e.g. what should be measured? The methods used to quantify absenteeism in this study are based on their work of a number of years. At the outset, it is necessary to define absenteeism, which, for the purposes of this study, is described as "non-attendance when an employee is scheduled

to work" (p.9). Thus, absenteeism in this study does not reflect authorised absence such as vacation leave, military service, block release leave, suspension and the like. In the terms of Hill and Trist (1962) (discussed in Section 1.3.3), this study is concerned with involuntary and voluntary unsanctioned and sanctioned absence, the latter excluding the types of authorized absence described above. This is consistent with the discussion of absenteeism as an index of strain, discussed in Section 1.3.3

When quantifying absence, two methods are used. In terms of the definition, the ratio of number of days absent to the number of scheduled work days is useful. Alternatively, or in addition, the ratio of number of occasions absent (irrespective of the number of days in each) to the number of scheduled work days may be computed. Of course, absenteeism figures, when seen as measures of strain, may be confounded by non stress-related factors (if these exist), as noted earlier. Scores probably do not always reflect stress alone therefore and, as a consequence, absenteeism measures often have poor validity, when used in this context (see Section 1.2.2). Of the two methods described earlier, the second measure involving number of occasions absent is likely to be a more valid and reliable indication of strain, as it is not seriously skewed by lengthy absences resulting from operations, for example. Further, the typical absence pattern reflecting strain is a number of isolated days off work (Van der Merwe and Miller, 1976). Therefore, though the days ratio is still useful, the occasions ratio is more important in the context of stress.

For this study, absenteeism was quantified in both the above ways, raw data being taken from company attendance records. Where possible, data were gathered for the three months preceding and following testing, as well as for the three months during which testing took place. For those who were not employed at the company for the full nine month period, data were gathered for as much of this time as possible. Clearly, these subjects do not affect the issue, as ratios were computed. Further, computation was not limited to the simple ratios described above. Following the computation of these, means were obtained for both measures. The final absenteeism indices were computed as the ratio of each individual's ratio to the mean ratio. Thus, the mean for both measures is one and absence exceeding average levels is indicated by scores exceeding unity, while below average absenteeism is indicated by scores less than unity.

2.2.3 Type A Behaviour

Several measures of the Type A behaviour pattern have been developed. These include the structured interview (Rosenman et al, 1964, 1975), the Jenkins Activity Survey (Jenkins, Rosenman and Friedman, 1967; Jenkins, Rosenman and Zyzanski, 1965, 1974; Jenkins, Zyzanski and Rosenman, 1971, 1979), the Framingham Type A scale (Haynes, Feinleib, Levine, Scotch and Kannel, 1978; Haynes et al, 1980), the Bortner Rating Scale (Bortner, 1969), the Bortner Test Battery (Bortner and Rosenman, 1967), Sales' (1969) Type A measure, Vickers' (1973) adaptation of the Sales'

measure and, in turn, Keenan and McBains' (1979) adaptation of Vickers' measure, as well as others by Glazer (1978), Hinckle (1972), Matteson and Ivancevich (1982) and Wardwell and Bahnson (1973). In addition, assessments of speech stylistics have been used to classify individuals (Friedman, Brown and Rosenman, 1969; Scherwitz, Berton and Leventhal, 1977; Schucker and Jacobs, 1977). Though the first four measures have been related to the incidence of coronary heart disease, this is not the case for the remainder. Thus, at present, these may not be seen as measures of coronary-prone behaviour and were not considered for use in this study. Of those which have proven predictability, the JAS represents a most convenient and yet well standardized measure, and was adopted for assessment of the Type A behaviour pattern in this study.

The JAS was specifically designed to classify individuals on Type A/B dimensions and was developed from an item pool derived from the structured interview protocol (Rosenman et al, 1964), as well as from clinical experience. Items that discriminated significantly between individuals classified by the interview as Type A and Type B, in the Western Collaborative Group Study (Jenkins et al, 1971a), were utilized in developing the questionnaire, which went through several revisions (1966, 1969, 1972). The latest edition, Form C (1979) is that used here. (As copyright subsists for this edition (Psychological Corporation, 1979), a copy of the questionnaire is not included in this report. However, the face sheet of Questionnaire 1 and the subsequent page on which information regarding organizational level and company tenure were indicated, are provided in Appendix D.)

Form C is a 52 item, multiple choice, self-report, machine-scored questionnaire. It provides both a composite Type A score, as well as scores for three factorially independent components of the broader construct: Speed and Impatience (Factor S), Job Involvement (Factor J) and Hard-Driving and Competitive (Factor H) (Zyzanski and Jenkins, 1970). None of these factorial scales has been related prospectively to coronary heart disease (Jenkins et al, 1974), while the manual reports retrospective differences in Factor H between CHD victims and those unaffected, in the expected direction (Jenkins et al, 1979). As JAS scores were normally distributed in the WCGS validation sample, a linear transformation was applied so that the mean of the A-B scores was 0 with a standard deviation of 10. Positive scores indicate Type A and negative scores indicate Type B. Similar transformations were applied to the raw scores for the factor scales, yielding standard scores with a similar normal distribution. Factor scales are not used in this study.

The JAS is considered to be reliable. Internal consistency reliability estimates of 0,85 and 0,83 (for different methods), and test-retest reliability estimates varying from 0,76 over 4-6 months to 0,64 over four years, are reported in the manual (Jenkins et al, 1979). The validity of the JAS for assessment of the behaviour pattern is based upon agreement between its scores and ratings made by the structured interview, as well as its ability to predict new cases of CHD and reinfarction. In the WCGS, ratings made by the structured interview and JAS scores correspond 73% of the time, when only those subjects who were given the same interview ratings both at intake and at the first follow-up examination 12-20 months

later were examined (Jenkins, 1978). However, the degree of correspondence was less (approximately 65%) when comparison was made between JAS scores and the single behaviour ratings made only from the interviews given at intake (Zyzanski and Jenkins, 1970). Clearly, the validity of the JAS improves as scores approach the extremes of the distribution (90% overlap with the structured interview for scores more than one standard deviation from the mean). This has implications for the method to be employed in partitioning the sample into A and B types, to be discussed later.

In addition to the comparison made in the WCGS, 70% agreement was found between JAS and interview ratings in the Belgian Multi-factorial Heart Disease Prevention Project (Kittel, Dornitzer, Zyzanski, Jenkins, Rustin and Degre, 1978), with similar agreement in the study in Rotterdam, Holland (Appels, Jenkins, Rosenman and Esterman, in press). However, other studies have found a lower rate of agreement (Chesney, Fuerstein, Rosenman, Colligan and Chadwick, 1978; Chesney, Black Chadwick and Rosenman, 1981; Rahe, Hervig and Rosenman, 1978; Rosenman, 1978). Notwithstanding these findings, the JAS has proven its validity through successful prospective and retrospective prediction (in the scientific sense) of new CHD and reinfarction, as well as atherosclerosis (e.g. Cohen, 1974; Glass, 1977; Hiland, 1977; Jenkins et al, 1971a, 1974; Jenkins, Zyzanski and Rosenman, 1976; Kenigsberg, Zyzanski, Jenkins, Wardwell and Licciardello, 1974; Shekelle, Schoenberger and Stamler, 1976; Stokols, 1973; Zyzanski, Jenkins, Ryan, Flessas and Everist, 1976; Zyzanski, Wrzesniewski and Jenkins, 1978).

Though the validity of the JAS is well established, it is important to note that compared to the structured interview, the JAS is a weaker predictor of the incidence of CHD (Brand, Rosenman, Jenkins, Sholtz and Zyzanski, 1978) and of severity of coronary atherosclerosis (Blumenthal, Williams, Kong, Schanberg and Thompson, 1978). The ratios of annual incidence rates of As relative to Bs are 2,2 Type A/Type B for the structured interview and 1,8 Type A (>5,0)/Type B (<-5,0) for the JAS (Matthews, 1982). It has been suggested that the relative strength of the interview compared to that of the questionnaire may be that the interview is based upon more direct observation of the behaviour pattern than upon the content of answers to questions (Rosenman and Chesney, 1980; 1982). Keith, Lown and Stare (1965), however, have raised the possibility of bias, from having knowledge of medical diagnosis while rating behaviour patterns, in Friedman and Rosenman's (1959) early work. Irrespective of the truth of this matter, Rosenman and Chesney (1980) emphasize the need for caution in the use of questionnaires for behaviour pattern assessment, where highly accurate assessment is required. On the other hand, they see little difficulty with using psychometric questionnaires for screening purposes where large samples are being studied. As this study is concerned with the formation of two groups and therefore makes use of questionnaire scores for a rough trichotomization of the sample, there seems little doubt but that the use of the Jenkins Activity Survey (Form C) is justified.

To enable comparison of Type A scores obtained in this study with equivalent groups elsewhere, some appropriate comparative means are provided below.

Population	N	Type A Mean
<u>United States</u>		
NASA executives - Washington	84	5,3
Chicago - many levels - mainly blue collar	5 347	-2,2
Detroit - managerial and professional staff	180	0,3
Male employees - various levels - 5 industries	943	0,6
<u>Non-United States</u>		
Netherlands - various levels - oil company	125	-2,0
English 12 towns study	442	-1,3
Canada - males at various levels	718	-0,4
Belgium - males at various levels	7 059	-4,7
New Zealand - random male sample	100	0,5
<u>South Africa</u>		
Employees - supervisory to managerial	204	7,0
Middle to top managers - business and industry	163	7,7
Middle to top managers - retail company	157	7,8
Middle to top managers - retail (mainly Afrikaans)	30	8,7
Managers - various companies (Female)	96	9,2

(from Jenkins et al, 1979; Strumpfer, 1983 c)

Table 2.3.3.1: MEAN JAS TYPE A SCORES FOR VARIOUS SAMPLES

This table indicates that mean JAS Type A scores for non-U.S. samples are generally in the Type B direction, while those for South African samples imply levels of coronary-prone behaviour far higher in South Africa than in U.S. samples. Unfortunately, little Type A data has been collected for lower organizational levels, or for Coloureds, in South Africa. So, though the above figures will be useful in establishing the position of managerial employees in this study in relation to other South African and overseas groups, data for lower levels will need to be considered in isolation and constitutes initial exploration of the Type A construct in these groups in South Africa.

2.3 PROCEDURE

A medium-sized life insurance society was approached and permission was granted to assess head office personnel over a three month period. Prior to the commencement of testing, all staff were informed by circular of the proposed study by a senior society employee (Appendix E). Participation was requested and confidentiality assured. Subsequently, department heads were visited by this researcher, to secure their cooperation in the distribution of schedules detailing the assessment venue and session times. Each employee received one of these schedules a week in advance of each assessment session, with separate schedules being compiled for each department (see Appendix F for an example). Prospective subjects were assigned to one of 14 forty-five minute sessions over two days for the first and second questionnaires and to one of 14 one hour sessions over three days for the third questionnaire, as the final questionnaire was slightly longer than the previous ones. In assigning individuals to sessions, care was taken to minimize disruption of departmental functioning by an approximately uniform allocation of departmental members to sessions. Provision was made for individuals to exchange times where this was more convenient.

The three questionnaires were administered a month apart from each other, to reduce the possibility of correlated error variance by response-set formation. Further, the sessions were held at the same time of the month in each case, to ensure as similar a work environment across the three administrations as possible.

Sessions were held in the society training room, a comfortable, centrally-heated room separated from most work areas. On arrival at the venue, subjects sat down with a blank questionnaire, pencil and rubber on the table in front of them. Instructions were then given verbally (Verbatim instructions to subjects are given in Appendix G). As soon as subjects had completed the questionnaires, they returned to work, taking a leaflet thanking them for their participation and asking for its continuation (see Appendix H). Questionnaires were checked for completion in the subjects' presence and blank pages and items pointed out. Blank pages were always completed, though subjects were not always prepared to respond to particular items. In these cases, the score corresponding to the midpoint of the item scale was assigned. Thus, no subjects were rejected due to incomplete data.

All prospective subjects were assigned test numbers to enhance confidentiality, these being the only form of identification on completed questionnaires. As these numbers were given on departmental-specific test schedules, they serve to ensure confidentiality only beyond departmental limits. Subjects seemed satisfied with this arrangement.

Where individuals were unable to attend any of the sessions for a particular questionnaire, as a result of illness, business trip, leave, etc., the relevant questionnaire was given to the subject on return, for completion in his/her own time and for collection in two days. As the number of subjects involved was small (approximately 20), this is not considered problematic.

On completion of the data-gathering phase, the measures of strain were hand scored, the JAS was computer scored with a customised programme (based on Instructions for Hand Scoring of the JAS produced by the Psychological Corporation) and responses to the role stressor items were factor analysed. Scores for positively (or comfort) worded items were reflected before factor analysis (i.e. 7 to 1, 6 to 2, etc.). Thus, high scores on all items are associated with high levels of conflict, ambiguity, etc. With respect to JAS scores, both raw and standard scores were obtained for this measure, raw scores being used in subsequent correlational analysis, while standard scores were used to effect the Type A/B split as well as for feedback and descriptive statistics. The reason for the use of raw scores, rather than standard scores, in the correlational analysis is that the standardization sample was drawn from the population of the United States, rather than from this country. Though there are not pressing reasons to believe differences between the structures of the standardization sample and the sample obtained here, it is clearly safer to adopt this approach.

When the proposed study was originally discussed with Society management, this researcher offered to write a report on results of the study, from the practical, organizational perspective, rather than the theoretical. This report was compiled and presented in March 1984 and is attached. Two points need to be made with respect to differences between the Society report and this write-up.

Firstly, the role dimensions scores are based on slightly different combinations of items to those used here. Further, both Clarity of Behavioural Requirements and Predictability of Outcomes were discussed as separate and identifiable ambiguity constructs, where only clarity of Behavioural Requirements is identified and discussed here. The reason for these differences involves the progressive learning of factor analysis which was experienced by this researcher, as well as pressures to present the organizational report. Thus, the organizational report is based on preliminary interpretation skills, while this write-up reflects subsequent, additional learning. It should be emphasized, however, that the scales developed for the organizational report cannot be seen as incorrect, simply less optimal than those developed later. As Gold (1984) has pointed out, there are many "correct" solutions to a factor analysis.

Secondly, the absenteeism figures also differ, though they are both based on the same raw data. The difference is that actual numbers of days/occasions absent per month (X 10) are given in the report, whereas the ratios of number of days/occasions absent to number of days that should have been worked, with subsequent transformations based on the means are reported here. The reason for this is that the former method gives figures more useful for practical consideration by society management than the latter, as artificiality is minimized.

Feedback on an individual basis was also arranged, for those who were interested. On completion of the third questionnaire, subjects were invited to fill in a form requesting feedback (see Appendix I). Two

feedback options were made available: a written report or a written report and a private interview. The written report consisted of an introduction to the research problem, individual scores on some of the variables, with department and society means, and several pages of discussion of these (see Appendix J). Reports were presented to 165 subjects and private discussions were subsequently held with 84 of these, to clarify issues raised in the reports and to respond to additional queries.

CHAPTER 3

RESULTS

3.1 DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES

With a view to understanding the structure of the sample better, the intercorrelations between the demographic and organizational variables used to describe the sample earlier are provided below. The coding of the Race, Sex and Organizational Level variables is as follows:

Race	:	1 - White
		2 - Coloured
Sex	:	1 - Male
		2 - Female
Organizational Level	:	1 - Clerks
		2 - Senior Clerks
		3 - Heads of Department
		4 - Superintendents
		5 - Managers

Note that Pearson Product Moment Correlation Coefficients are employed throughout this analysis, with the exception of the correlation between sex and race, for which a phi coefficient was computed. Application of Pearson's r to dichotomous/continuous data reduces to a point-biserial coefficient automatically (this is relevant for correlations involving race and sex) (Guilford, 1965). With the exception of the single

phi coefficient, all correlations were computed with BMDP programme 6R (BMDP, 1981).

	Sex	Race	Level	Tenure	Age
Sex	1				
Race	-0,069	1			
Level	-0,391**	-0,518**	1		
Tenure	-0,226**	-0,198**	0,370**	1	
Age	-0,067	-0,473**	0,496**	0,653**	1

** p<0,01

Table 3.1.1: INTERCORRELATIONS BETWEEN DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES (N = 234)

This table reveals certain relationships and differences which are expected on the basis of the summary statistics presented in Table 2.1.1. The two racial groups differ in organizational level, as do the sexes, with whites occupying generally higher levels than Coloureds, and men occupying generally higher levels than women. Further, Coloureds differ from whites in average company tenure and age, with Whites being older, and employed by the company longer, than Coloureds. The latter finding clearly reflects the obviously strong relationship between age and tenure. Men and women also differ in tenure, but do not differ in age. Thus, the lower average tenure of women than men probably reflects differing family commitments across these groups. The correlation between sex and race is relatively meaningless, while the positive correlations between tenure and occupational level and age and occupational level are to be expected.

3.2 ROLE DEMANDS

3.2.1 Factor Analysis

Factor analysis is "the formal mathematical tool which is employed to group and identify common clusters of variables" (Gold, 1984, p. 251). The responses of subjects to the role demand items (Questionnaire 2) were factor analysed using the principal components method of factor extraction and oblique rotation (BMDP, 1981). BMDP 4M was selected considering availability and the advantages of this programme over SPSS, pointed out by MacCallum (1983). Oblique rotation was used, as it seems more appropriate to extract moderately related factors, considering the relationships that have been found between the different role dimensions, rather than independent factors, which are obtained when orthogonal rotation is used. The use of factor analysis in testing hypotheses about factor structure, which is the current usage, is called confirmatory factor analysis (Gold, 1984).

Item statistics (means and standard deviations) are presented in Table 3.2.1.1, while the unrotated and sorted, rotated factor loadings are presented in Tables 3.2.1.2 and 3.2.1.3, respectively. The columns appear in decreasing order of variance explained by the factors in both tables. In the sorted matrix, however, only loadings greater than 0,3 are shown (following Rizzo et al, 1970) and items are grouped according to the defined role dimensions. For clarity, it is pointed out that item numbers in these tables correspond to the item numbers in the original

questionnaire (Appendix A). The intercorrelations between the rotated factors are displayed in Table 3.2.1.4.

Using the criterion for extraction of a factor as an eigen value greater than one, 11 factors were extracted. These factors account for 61,5% of the total variance of the 38 item set.

Factor 1 is named role overload as, with the exception of a complex, negatively-loading, conflict item, it contains items drawn from the role overload definition (both quantitative and qualitative). This factor accounts for 30,1% of the common variance. Factor 2 (13,3% of common variance) contains items drawn from the ambiguity, conflict and overload definitions and, as such, is uninterpretable in terms of these distinct dimensions. However, it is a characteristic of principal components factor analysis that a general factor, if it is present, is likely to appear in the factor extracted second. It appears, therefore, that a general role demands factor is present here. This view is supported by the generally positive correlations between the items* and between the factors (see Table 3.2.1.4). The presence of this general factor suggests that generally positive relationships between the scales being developed here are likely to be found.

Factor 3 (10,7% of common variance) is named role underload and is clearly defined by the large loadings of the two underload items (32 and 51). Item 20 ("I work on unnecessary things") also loads on this factor.

* Considering the size of this matrix, the intercorrelations between the items are not provided here, but are available on request.

Item Number	Mean	Standard Deviation	
3	2,78	1,33	
4	3,54	1,63	
7	2,16	1,26	A
8	4,00	1,84	M
10	3,57	1,82	B
24	3,59	1,72	I
26	3,46	1,66	G
27	2,60	1,52	U
29	3,36	1,74	I
30	2,75	1,53	T
37	3,47	1,55	Y
39	3,50	1,53	
42	2,05	0,96	
45	3,21	1,60	
11	3,63	1,74	
14	3,74	1,82	C
17	3,68	1,84	O
20	2,98	1,55	N
22	3,04	1,62	F
25	3,87	1,58	L
44	3,35	1,59	I
48	3,56	1,52	C
54	4,33	1,69	T
2	3,05	1,61	
5	3,53	1,88	
12	3,11	1,47	
13	3,29	1,67	O
15	2,41	1,32	V
21	4,69	1,50	E
23	3,63	1,75	R
33	3,32	1,68	L
38	3,30	1,58	O
46	2,43	1,32	A
47	4,27	1,65	D
52	3,89	1,52	
55	3,50	1,66	
32	3,81	1,83	U N L D O
51	4,25	1,68	E A R D

Table 3.2.1.1: ROLE ITEM MEANS AND STANDARD DEVIATIONS

FACTORS

	1	2	3	4	5	6	7	8	9	10	11	
3	178	- 73	-401	51	12	500	- 42	303	11	-175	-298)
4	137	284	-181	314	388	4	160	-438	57	-104	-239)
7	412	426	-482	-143	160	- 29	78	- 29	98	- 23	- 19)
8	290	300	-151	174	210	-180	-163	-104	-129	367	-387	) A
10	341	20	49	-384	223	291	9	- 22	-118	427	123	) M
24	615	163	- 27	- 72	- 92	-255	-295	20	83	- 25	-203	) B
26	627	308	59	-227	-200	8	-254	108	- 54	- 37	-166	) I
27	137	418	222	3	204	-223	- 37	250	301	290	186	> G
29	293	475	-199	156	285	104	- 85	-140	- 27	- 72	327	) U
30	444	330	165	-121	301	- 73	27	-121	-251	-333	131	) I
37	335	285	-278	190	96	93	- 24	385	292	-273	- 60	) T
39	- 14	26	140	-394	159	327	439	- 98	192	-171	- 98	) Y
42	341	372	-409	-162	223	- 56	95	73	80	154	183)
45	632	174	-258	- 80	-259	144	-178	- 29	-179	47	-135)
11	498	- 16	319	-110	- 68	320	180	-278	108	- 52	38)
14	43	406	33	424	-362	231	- 30	- 51	286	73	145	) C
17	472	94	120	-127	- 16	-257	338	-131	42	- 19	- 75	) O
20	486	281	46	- 35	- 23	- 34	142	205	-322	151	9	) N
22	312	170	-352	22	- 81	98	290	5	-163	- 82	- 69	> F
25	381	157	264	- 8	-208	-227	315	29	297	125	- 4	) L
44	455	294	353	0	- 10	-120	- 99	35	-185	-226	43	) I
48	518	- 74	82	- 78	-213	112	135	-288	- 44	190	- 68	) C
54	347	3	- 20	-223	-347	-228	263	- 30	-248	-161	162	) T
2	330	-354	- 77	-175	345	152	169	294	- 95	129	259)
5	414	-385	45	68	361	-149	- 38	157	123	- 87	21)
12	385	- 11	395	-133	163	53	-280	-193	376	- 68	- 7	) O
13	612	65	108	-334	-262	25	-176	53	144	- 65	- 34	) V
15	432	-238	199	-203	38	395	- 14	- 1	93	162	-134	) E
21	357	-152	-282	428	-153	49	348	- 90	164	71	43	) R
23	614	-426	-270	216	-161	- 51	86	60	- 15	46	18	> L
33	643	-365	-211	175	-149	-116	- 21	11	66	186	165	) O
38	569	-199	63	- 91	- 46	-165	81	243	155	-229	33	) A
46	387	128	8	298	139	279	-340	-197	- 91	- 91	447	) D
47	563	-530	68	274	116	- 13	42	52	- 87	- 6	- 20)
52	526	-334	297	290	173	83	- 38	70	-201	- 48	- 34)
55	608	-266	248	281	245	-138	- 48	-169	- 22	- 25	-117)
32	26	404	502	370	- 64	176	234	228	- 66	112	-102	U N L D O
51	-112	375	574	274	24	145	133	275	-160	20	- 72	E A R D

Table 3.2.1.2: UNROTATED FACTOR LOADINGS
(DECIMAL POINTS ARE OMITTED TO CONSERVE SPACE --- x 1000)

FACTORS

	1	2	3	4	5	6	7	8	9	10	11	
3						742			793)
4						323		337)
7						655)
8										-322		) A
10											743	) M
24		693										) B
26		759										) I
27								696				> G
29				609								) U
30				354			-464					) I
37								350	595			) T
39										730		) Y
42								500)
45		549)
11										525)
14	-313			384			499					) C
17												) O
20			303		424							) N
22					443							> F
25							362	330				) L
44		376										) I
48							306					) C
54					613							) T
2	456									440)
5	688)
12		355			-512					308		) O
13		686										) V
15										434		) E
21							601					) R
23	525						387					> L
33	467						423					) O
38	446	306										) A
46				821								) D
47	787)
52	726)
55	715)
32			843									U
51			832									N L
												D O
												E A
												R D

Table 3.2.1.3: SORTED, ROTATED FACTOR LOADINGS (x 1000)

FACTORS

	1	2	3	4	5	6	7	8	9	10	11
1	1										
2	,265**	1									
3	-,075	,064	1								
4	,113	,239**	,104	1							
5	,094	,185**	-,067	,114	1						
6	,006	,088	,039	,193**	,120	1					
7	,131	,129	-,024	,093	,107	,031	1				
8	,031	,149	,049	,105	,125	,150	-,046	1			
9	-,007	-,052	-,142	,094	,086	,084	,054	,051	1		
10	,144	,161	,037	,062	,080	,001	,019	,065	-,057	1	
11	,175**	,173**	-,066	,063	,081	,020	,012	,007	,071	,112	1

** p < 0.01

Table 3.2.1.4: INTERCORRELATIONS BETWEEN ROTATED FACTORS

This item is written to tap conflict between an individual's internal standards or values and defined role behaviour (Rizzo et al, 1970), and clearly involves underload as well.

Factor 4 (8,1% of common variance), like Factor 2, is uninterpretable in terms of distinct role dimensions, as it reflects items drawn from the ambiguity, conflict and overload definitions. Considering this, in relation to the positive correlations between this factor and the others, and in the absence of an alternative formulation based on item content, it seems that Factor 4 also reflects a general role demands factor.

Factor 5 (6,9% of common variance) contains four items with loadings greater than 0,3 and largely reflects role conflict. Three of these items

are drawn from the conflict definition (items 20, 22 and 54), while the remaining item (12) loads negatively and is written to tap qualitative role overload. This negative loading is a surprising result, considering the description of overload as a specific form of conflict.

Factor 6 (6% of common variance) contains three items (4, 7, 8) drawn from the ambiguity definition. This factor is therefore called ambiguity.

Factor 7 (5,9% of common variance) contains items with absolute loadings greater than 0,3 from the ambiguity, conflict and overload item pools. As the single ambiguity item loads negatively, it is clear that this factor reflects some combination of conflict and overload, rather than a general role demands factor. Theoretically, this factor is defensible. However, considering the small percentage of common variation that it accounts for, it does not justify the combination of overload, underload and purer conflict items into a single conflict scale when seen in relation to the powerful, clearly identifiable factors of overload and underload extracted before.

Factor 8 (5,2% of common variance) reflects five items with loadings greater than 0,3. Four of these (7, 27, 37, 42) are drawn from the ambiguity definition, while the remaining item (25) is written to tap conflict between an individual's internal standards or values and defined role behaviour (Rizzo et al, 1970). As this item loads relatively weakly, it seems that this factor can also be labelled ambiguity, in addition to Factor

6. As there are no striking differences between the items involved in these factors, it is surprising that they load on separate factors (item 7, of course, is common). Similar comments apply to Factor 9 (4,9% of common variance) which reflects a further two items (3, 37) drawn from the ambiguity item pool (here, item 37 is common to Factors 8 and 9). A likely explanation is that several of the ambiguity items are relatively specific (e.g. items 3 and 27), which leads to the extraction of several, relatively specific factors, thereby confusing the overall ambiguity factor structure.

Factor 10 (4,4% of common variance) appears to be another general factor, this interpretation being supported by the generally positive correlations between this factor and the others. Factor 11 (4,4% of common variance) is a specific factor reflecting ambiguity item 10.

Overall, clear factors of overload and underload were extracted, with less clear, but identifiable, factors of ambiguity and conflict. In other words, with the exception of the general factors, items drawn from the different role dimensions definitions generally load on factors in combination with other items from the same dimension item pool, or are specific. As the factor structure is so complex for the ambiguity and conflict items, however, the formulation of scales to measure these variables on the basis of this factor matrix would have been a hazardous, difficult undertaking. Considering the highly sensitive, unstable characteristics of factor loadings, in relation to the clear presence of specific and complex items, it was therefore appropriate and desirable to

"clean" the data set (see Note 2). By eliminating specific and complex items and then re-factor-analysing the reduced data matrix, a clearer factor structure was expected to emerge, thereby facilitating the formulation of appropriate scales. What has to be particularly guarded against in the cleaning of this data set was the elimination of items or subjects (whichever was applicable) in accordance with desired outcomes. For this reason, clear criteria for elimination were defined and rigorously applied.

As the factors are generally positively intercorrelated with a general role demands factor present, it was expected that the loadings of valid items on factors would be positive. So, the first criterion for elimination of an item was an appreciable negative loading on any factor. Following the standard employed to this point, an appreciable negative loading was considered as one less than -0.3 . Application of this criterion led to the elimination of items which may be considered complex. In practice, this resulted in the elimination of items 8, 12, 14 and 30.

A useful method for consideration of the specificity of items is an examination of the squared multiple correlations (SMCs) (Note 2) of each item with all other items. These are as follows:

ITEM NO.	SMC	ELIMINATION CRITERIA			ELIMINATIONS
		Negative Loadings	SMC<0,3	Lesser Factor Loading	
3	0,27		X)
4	0,29		X)
7	0,49				) A
8	0,27	X			) M
10	0,28		X		) B
24	0,49				) I
26	0,46				> G
27	0,30				) U
29	0,38				) I
30	0,42	X			) T
37	0,35				) Y
39	0,20		X)
42	0,44)
45	0,54)
11	0,43			X	) C
14	0,32	X			) O
17	0,33				) N
20	0,35				) F
22	0,26		X		> L
25	0,32				) I
44	0,38				) C
48	0,34				) T
54	0,31)
2	0,35)
5	0,37)
12	0,37	X)
13	0,54				) O
15	0,41			X	) V
21	0,39				) E
23	0,64				> R
33	0,63				) L
38	0,43				) O
46	0,35				) A
47	0,59				) D
52	0,54)
55	0,58)
32	0,50				U
51	0,52				N L D O E A R D

Table 3.2.1.5: SQUARED MULTIPLE CORRELATIONS (SMCs) OF EACH ITEM WITH ALL OTHER ITEMS AND SUMMARY OF ITEM ELIMINATION PROCESS

Should a SMC for a particular item be large, it implies a strong relationship between this item and all the other items. More accurately, the larger the SMC, the greater the proportion of variation in this item accounted for by the other items. Conversely, the smaller the SMC, the less variation accounted for by the other items. Logically, this implies degrees of specificity. Considering the general role demands factor, as well as the content and construct overlap of items, these SMCs were expected to be large. Following the critical standard of 0,3 employed here, it was determined that a SMC less than 0,3 implied an item with a greater degree of specificity than was desirable (Note 2). So, the second criterion for elimination of an item was an item with SMC less than 0,3. Application of this criterion led to the elimination of additional items (3, 4, 10, 39, 22).

The third and final criterion for elimination of items involved the percentage of common variance accounted for by a factor, in relation to the factor loading patterns of the items (Note 2). More specifically, where a factor accounts for relatively little common variance, and an item loads only on this factor and relatively weakly, there is clearly little advantage in retaining the particular item. In fact, if retained, such items are likely to lead to the extraction of specific factors to account for their variation, or to be lower-loading complex items. Here, items 11 and 15 fall into this category. Both items load only on Factor 10, a general factor accounting for only 4,4% of the common variance. With the elimination of other items loading on this factor (8, 39, 12), it was clear that these two remaining single-factor-loading items would contribute little

of importance in a reduced analysis. Therefore, applying a lesser-factor-loading elimination criterion, items 11 and 15 were eliminated. The elimination criteria and final eliminations are summarised in Table 3.2.1.5.

Results of the factor analysis of the remaining 27 items are presented in the following three tables:

- 3.2.1.6 Unrotated Factor Loadings
- 3.2.1.7 Sorted, Rotated Factor Loadings
- 3.2.1.8 Intercorrelations between the Factors

FACTORS

Item	1	2	3	4	5	6	7	
7	399	405	-511	187	-112	91	- 10	) A
24	625	215	- 48	-157	20	-271	156	) M
26	611	415	- 19	-234	102	-244	- 25	) B
27	116	441	197	167	-408	-139	270	) I
29	269	418	-174	439	120	- 50	2	> G
37	343	282	-205	417	-113	13	134	) U
42	335	378	-476	294	-239	117	-233	) I
45	629	207	-246	-120	334	-106	- 82	) T
								) Y
17	469	136	79	-173	-260	357	-307	) C
20	486	320	98	21	- 28	112	-341	) O
25	378	212	274	-226	-185	405	433	) N
44	437	353	353	- 88	44	-252	60	) F
48	510	- 23	47	-205	151	146	-353	> L
54	369	55	- 52	-451	- 17	295	-112	) I
								) C
								T
2	326	329	- 48	145	-404	-100	- 83)
5	438	-373	98	186	-342	-221	- 33)
13	597	176	- 21	-423	- 29	-233	185	) O
21	399	-237	- 88	250	247	485	356	) V
23	676	-435	-137	65	119	160	32	) E
33	694	-347	-134	67	86	106	61	> R
38	589	-121	83	-137	-233	21	224	) L
46	373	111	41	223	568	-118	109	) O
47	593	-524	218	163	- 2	- 43	- 60	) A
52	526	-324	406	226	78	-161	-103	) D
55	600	-273	344	128	- 58	-104	-108)
32	- 9	402	635	201	82	270	- 6	U
51	-142	403	661	207	57	90	-161	N
								L
								D
								O
								E
								A
								R
								D

Table 3.2.1.6: UNROTATED FACTOR LOADINGS (REDUCED ANALYSIS) (x 1000)

FACTORS

Item	1	2	3	4	5	6	7	
7 24 26 27 29 37 42 45		671 710 301 463	720 618 610 797	303			-430 394	) A) M) B) I > G) U) I) T) Y
17 20 25 44 48 54		593			652 460 562 554	611	-367	C) O) N > F) L) I) C T
2 5 13 21 23 .33 38 46 47 52 55	574 723 451 432 331 753 709 678	774 335				775 374 346	598	) ) O) V) E) R > L) O) A) D))
32 51				826 830				U N L D O E A R D

Table 3.2.1.7: SORTED, ROTATED FACTOR LOADINGS (REDUCED ANALYSIS) (x 1000)

FACTORS

		1	2	3	4	5	6	7
F A C T O R S	1							
	2	0,213**	1					
	3	0,089	0,259**	1				
	4	-0,063	0,122	0,027	1			
	5	0,181**	0,274**	0,099	-0,068	1		
	6	0,234**	0,212**	0,087	-0,038	0,183**		
	7	0,071	0,043	0,034	-0,011	0,044	0,075	1

** $p < 0,01$

Table 3.2.1.8: INTERCORRELATIONS BETWEEN ROTATED FACTORS (REDUCED ANALYSIS)

In the reduced factor analysis, seven factors were extracted which account for 58,9% of the total variance of the 27 item set. Labels assigned to these factors, as well as the percentages of common variance accounted for by them, are presented in the following table.

FACTOR NUMBER	LABEL	% OF COMMON VARIANCE
1	Role Overload	38,0
2	General Role Dimension	17,5
3	Role Ambiguity	13,2
4	Role Underload	9,3
5	Role Conflict	8,2
6	Role Overload?	7,3
7	Specific (item 46)	6,5
		100 %

Table 3.2.1.9: FACTOR LABELS AND PERCENTAGES OF COMMON VARIANCE (REDUCED ANALYSIS)

For clarification, Factor 6 is labelled overload as it reflects items mainly drawn from the overload item pool, but with a single conflict item (25). What decides this label, however, is the significant positive correlation ($p < 0,01$) between Factor 1 and this factor, as well as the common overload items (23, 33). The loading of item 25 is surprising but, as it loads negatively on Factor 7, is probably complex.

3.2.2 Scale Development

For scale development, the above factor structure presented few problems and suggested the formulation of scales for role conflict, role ambiguity, role overload and role underload. Thus, the computed factor structure supports expectations in this regard. At the outset, certain items were

eliminated as potential scale items. Considering their negative loadings on Factor 7, items 27 and 25 were eliminated. Further, item 46 was eliminated as it appeared to be specific in this reduced analysis.

In formulating a scale for role overload, items 2, 5, 47, 52 and 55 are clearly basic. Items 23 and 33 were also included, notwithstanding their loading on Factor 6, as this factor clearly involves overload and is significantly positively correlated with Factor 1 ($p < 0,01$). Some problems were presented by items 13 and 38, which load on the general role dimension factor (2). In general, items loading on a general factor were included in a factor scale if the particular and general factors are significantly correlated, and if the items under consideration correlate positively (minimum $r > 0,1$) with all items already included in the scale (Note 2). This takes account of issues of reliability and validity. Items 13 and 38 both meet these criteria and were included in the overload scale, as is item 21 for similar reasons. The role overload scale was therefore made up of ten items, as follows:

- 2) I frequently struggle to meet deadlines.
- 5) On my present job, the amount of work seems to interfere with how well I can do the job.
- 13) I receive an assignment without adequate resources and materials to execute it.
- 21) I have just the right amount of work to do.
- 23) I have enough time to complete my work.
- 33) I am given enough time to do what is expected of me on my job.
- 38) I receive an assignment without the manpower to complete it.
- 47) It often seems that I have too much work to do.

52) I often notice too great an increase in my workload.

55) I often feel that too much is expected of me.

The role ambiguity scale consists of four basic items (7, 29, 37, 42). Applying the inclusion criteria for items loading on general factors, it was noted that the correlation between Factors 2 and 3 is significant ($r = 0,259$; $p < 0.01$) and that items 24, 26 and 45 all correlate positively with the items already included (minimum $r = 0,157$). Therefore, these items were combined with the others to yield a seven item ambiguity scale. It is noteworthy that these items are all drawn from the dimension of ambiguity reflecting the existence or clarity of behavioural requirements, and that all items written to tap the predictability of outcomes dimension were eliminated before the reduced analysis. Therefore, results based on this ambiguity scale reflect a more limited view of ambiguity than is commonly defined. It should be pointed out that Rizzo et al obtained an identical result in their factor analysis. Hence, research employing the Rizzo et al scales has also focused only on the clarity of behavioural requirements component, while other studies (e.g. Lyons, 1971) have set out to examine this variable alone. This stems from the importance attached to clarity of behavioural requirements, rather than predictability of outcomes (ibid.). The scale is as follows:

- 7) I know exactly what is expected of me on my job.
- 24) There is a lack of policies and guidelines to help me in my work.
- 26) I have to work under vague directives or instructions.
- 29) I feel certain about how much authority I have.
- 37) There are clear, planned goals and objectives for my job.
- 42) I know what my responsibilities are.

45) What has to be done is clearly explained to me.

The underload scale is clearly given by items 32 and 51. These are as follows:

32) I perform tasks that are too easy or boring.

51) My work often seems too easy.

Note that these items tap qualitative underload only — recall previous comments with respect to this.

The role conflict scale has four clear, basic items (17, 20, 48, 54). However, the status of item 44 required consideration. As the correlation between Factors 2 and 5 is positive and significant ($r = 0,274$; $p < 0,01$) and the correlations between this item and the items already included are all positive (minimum $r = 0,174$), item 44 was also included. Therefore, the role conflict scale has five items, as follows:

17) I do things that are apt to be accepted by one person and not accepted by others.

20) I work on unnecessary things.

44) I work under incompatible policies and guidelines.

48) I have to buck a rule or policy in order to carry out an assignment.

54) I work with two or more groups who operate quite differently.

3.2.3 Reliability and Validity

Having found the hypothesized factor structure and having developed measuring instruments for the hypothesized role stressor variables, it is necessary to consider the crucial issues of their reliability and validity for, as Kerlinger (1964) points out, "If one does not know the reliability and validity of one's data, little faith can be put in the results obtained and the conclusions drawn from the results" (p. 429).

3.2.3.1 Reliability

Reliability may be defined as the proportion of "true" variance to the total obtained variance of the data yielded by a measuring instrument (Kerlinger, 1964). Thus, reliability may be estimated by analysis of variance. Though these estimates may be seen as measures of the internal consistency of a test, rather than "real" reliability, it can be demonstrated that they are very similar to split half estimates, corrected with the Spearman-Brown formula (ibid.) Therefore, analysis of variance estimates are used here. Reliability coefficients for the role dimension scales are as follows (see Appendix C for details):

	RELIABILITY	PROBABILITY LEVEL
Role Ambiguity	0,72	p < 0,01
Role Conflict	0,60	p < 0,01
Role Overload	0,83	p < 0,01
Role Underload	0,74	p < 0,01

Table 3.2.3.1: RELIABILITY COEFFICIENTS FOR ROLE DIMENSIONS SCALES

Reliability coefficients for the scales are all highly significant and exceed Nunnally's (1967) criterion of 0,5 to 0,6 for instruments in early stages of development. This means that the scales are reliable, in three senses. Firstly, the proportion of "true" variance in each of the scales is significantly large. Secondly, the scales yield stable scores (this is a test-retest interpretation, Kerlinger, 1964). Thirdly, the scales have internal consistency, implying homogeneity of item content. All three interpretations reduce to one conclusion, the scales are accurate (ibid.). This, of course, does not imply that what each of the scales "accurately" measures is that which is intended to be measured. The consideration of this question is the domain of validation studies.

3.2.3.2 Validity

With regard to the validity of the scales, it has been suggested that, ideally, four principle types of validity need to be demonstrated (Cronbach and Meehl, 1955). These are content, predictive, concurrent and construct validity. Clearly, construct validity is the most important and, not surprisingly, the most difficult to demonstrate. These validity types are considered below. Considering the high correlations between the scales derived here and those developed by Rizzo et al (1970) (see section 3.2.7 below), it is appropriate to use some of the information relating to the validity of their scales in this examination.

Content validity appears to be adequate. As the constructs of role conflict and role ambiguity have arisen out of classical organization theory (see section 1.2.4) and role theory, there is relative certainty about the

domain of both. Following Kahn et al's (1964) specification of person-role, inter-role, intersender and intrasender conflict, as well as Gross et al's (1958) division of conflict into intrarole and interrole, Rizzo et al (1970) wrote items to tap incompatibility or incongruity in each of these general, and more specific, categories. Similarly, items constructed to measure ambiguity reflect the clarity of behavioural requirements and predictability of outcomes components. Thus, to the extent that these items tap the defined theoretical dimensions, which it appears that they do, the conflict and ambiguity scales have content validity. It should be noted that the ambiguity scale developed here, like Rizzo et al's, only has content validity as a measure of clarity of behavioural requirements. As far as the role overload and underload scales are concerned, content validity also appears adequate. Items included in the overload scale clearly relate to perceptions of quantitative and qualitative overload, while the underload items explore perceptions of underutilization of ability (i.e. qualitative underload). Though it is possible to define different elements of overload or underload in many situations, the perception of overwork or underwork is superordinate. Therefore, though the scales do not tap many aspects of the same dimension, content validity is probably acceptable as the items constitute samples from the universe of items exploring the superordinate perceptions of underload or overload. Clearly, with only two items, the underload scale does not represent a particularly satisfactory sample of items. Thus, the content validity of this scale might be questioned. However, as an exploratory finding, the clarity of the underload dimension argues for its use here.

Predictive and concurrent validity are much alike as, with few exceptions, they differ only in the time dimension (Kerlinger, 1964). As the validity issues relating to concurrent prediction (in the scientific sense) and future prediction are substantially similar, then, they will be considered together. Here the concern is with the practical value of the measure, not with the how and why. So, the problem is to determine the practical value, by prediction to an outside criterion, and by checking a measuring instrument, either now or in the future, against some outcome (ibid.). Data that have been accumulated suggest that measures of role dimensions are useful in explaining certain outcomes. The degree to which these measures relate to indices of psychological strain, to be reported later, also has implications for their predictive and concurrent validity. Thus, predictive validity is thought to be adequate. In fact, this study may be seen as an examination of the predictive validity of these scales.

Finally, construct validity must be considered. In addition to role conflict and ambiguity, Rizzo et al gathered data for variables falling into the categories of satisfaction, leadership, organizational practice, anxiety and propensity to leave, as well as demographic variables. In most cases, the scales correlate with leadership variables (the frequency with which the respondent perceives his boss to engage in given behaviours e.g. persuasion, role abdication, teamwork facilitation) and varied organizational practices (the degree to which certain organizational or management practices are perceived to exist e.g. Conflict and Inconsistency, formalization, adaptability to change) in a pattern one would predict from classical theory and role theory. With respect to the leadership variables,

correlations between these and role conflict and ambiguity are generally significant and negative. There are, however, certain differences in these relationships which relate to the construct validity of scales. For instance, the frequency with which a superior is seen as engaging in "structure and standards setting" correlates significantly with both conflict and ambiguity, but positively with the former and negatively with the latter.

Relationships between the organizational practices variables and role conflict and ambiguity are generally in the same direction, but the direction differs from variable to variable, much in line with theoretical considerations. Whereas the relationship between conflict and inconsistency and role conflict, for example, is significant and positive, that between Goal Concensus and Clarity and role ambiguity is significant and negative. Results such as these are suggestive of some degree of construct validity for Rizzo et al's scales and, by extension, for these conflict and ambiguity scales.

Factor analysis is considered to be one of the most important of the construct validity tools (Kerlinger, 1964). As such, the extraction of factors closely paralleling the defined role dimensions is a powerful indication of the construct validity of the derived scales. The results of the factor analysis represent the only evidence for the construct validity of the overload and underload scales, as they include new items and previous work cannot, therefore, be used in the validation process. The clarity of the relevant factors, however, is seen as adequate support for a conclusion of acceptable construct validity. With regard to the conflict

and ambiguity scales, the factors extracted are also suggestive of the acceptable construct validity of these scales. Particularly following the factor analysis of Rizzo et al, which resulted in the extraction of two factors named ambiguity and conflict, as well as the analyses of Schuler et al (1977) and Szilagyi et al (1976) on the 14 scale items, which also divided the items into the two expected factors, there appears to be adequate justification for this conclusion. However, later work by Tracy and Johnson (1981) seriously questions this conclusion.

Examination by Tracy and Johnson of the standard scales revealed that the eight role conflict items are all worded to represent unpleasant or stressful (i.e. conflict laden) characteristics of the role, whereas the six role ambiguity items are all worded to represent pleasant or comfortable (i.e. unambiguous) characteristics of the role. They contended that the intended meaning of the scales (conflict/ambiguity) is confounded by the wording difference (stress/comfort) and that it cannot be assumed that people are more likely to respond to the conflict/ambiguity difference than to the stress/comfort difference. Employing analysis of variance techniques, the effects of intended meaning and wording on the factor loadings of Factor 1 (named role conflict) and Factor 2 (named role ambiguity) were examined. For Rizzo et al's (1970) Factor 1, the main effect for wording was significant while the main effect for intended meaning was not. For Factor 2, both main effects were significant. Thus, Factor 1 should be interpreted as a general stress factor, not as role conflict, and Factor 2 could be said to represent both role clarity and role comfort, but not role clarity alone.

Tracy and Johnson suggest that the difference between the factors may be more a result of respondents' attributions of a different meaning to a negative statement about their role than to the absence of a positive statement, though this does not have clear practical significance. Alternatively, or in addition, there is some suggestion that the scales might be contaminated by attribution of the source of stress to self or other, as most of the conflict items refer to other people as the source of conflict, whereas most of the ambiguity items do not refer to an external source. This possible contaminant cannot be tested, however, as the attribution of some of the items is ambiguous.

Tracy and Johnson's findings, then, cast considerable doubt on the construct validity of Rizzo et al's scales, though it cannot be concluded that the standard scales definitely fail to discriminate between role conflict and role ambiguity. Clearly, however, the factor analyses of Schuler et al and Szilagyi et al, carried out as they were on the 14 scale items, do not contribute meaningfully to the construct validity question. In fact, these analyses may serve to merely reinforce a myth of construct validity.

It is interesting that the findings of Rizzo et al, reported earlier as indicative of construct validity, may be interpreted as readily in terms of stress/comfort differences as in terms of conflict/ambiguity differences. More specifically, and particularly amongst the organizational practice variables, those dealing with negative components generally correlate more highly with role conflict, whereas those dealing with positive components

generally correlate more highly with role ambiguity. Notwithstanding these points, and considering the content validity of the scales, it is unlikely that responses relate only to the wording component. Rather, it is safer and more realistic to assume that responses involve some combination of this and intended meaning. So, while the preceding discussion has raised problems with respect to the construct validity of Rizzo et al's scales, it is felt that not all of the evidence should be discarded. Thus, to the extent that the evidence for validity presented above is uncontaminated, there is some evidence for the construct validity of the scales developed here.

Having highlighted the serious wording confound present in earlier work however, it is essential to test for the presence of such a confound in the current scales, especially as the ambiguity and conflict items used here are the same as those implicated before. To this end, the rotated factor loadings for the reduced analysis (Table 3.2.1.7) were sorted according to intended item meaning (conflict, ambiguity, underload and overload) and wording differences (stress and comfort). As all reverse-scored conflict items (i.e. comfort conflict) had been removed in the item elimination process and no underload items were expressed in this form, blank cells in a 2 x 4 factorial design occurred. This meant that two way analyses of variance for each factor were inappropriate. Rather, and considering the small cell sizes, the non-parametric, Kruskal-Wallis H statistic was computed for differences in factor loadings across intended meaning and across wording differences for each factor (Siegel, 1956). Summary statistics (means and standard deviations), test statistics and probability levels are displayed in Table 3.2.3.2.

FAC- TOR	INTENDED MEANING						WORDING				\bar{X}	S
	CONF.	AMB	UNDER	OVER	H ^a	PROB.	STRESS	COMFORT	H	PROB.		
1	^b ,04	,00	-,04	,44	12,51	p < 0,01	,23	,09	1,79	p > 0,10	,18	,29
2	,21	,28	-,08	,12	5,06	p > 0,10	,23	,07	1,92	p > 0,10	,17	,27
3	,03	,44	-,02	,02	12,84	p < 0,01	,03	,38	9,84	p < 0,01	14	26
4	,16	-,01	,83	-,05	10,04	p < 0,025	,15	-,07	4,89	p < 0,05	,07	,28
5	,39	,03	,07	,04	6,47	p < 0,10	,15	,06	0,21	p > 0,10	,12	,22
6	,11	,01	,14	,19	4,74	p > 0,10	,07	,20	2,23	p > 0,10	,11	,21
7	-,06	,03	,01	,08	1,01	p > 0,10	-,05	,19	4,67	p < 0,05	,03	,23

a .- H refers to the Kruskal-Wallis H statistic --- compared with χ^2 critical values with k-1 df. (from Siegel, 1956)

b - Mean loadings of items on factors

Table 3.2.3.2: STATISTICS PERTAINING TO DIFFERENCES ACROSS INTENDED MEANING AND WORDING

For Factor 1, differences between the loadings of items from the role definitions are significant, but are not significant for wording. Considering the mean loadings across item types, Factor 1 is appropriately named role overload. Meaning and wording differences are insignificant for Factor 2. This supports the idea of this as a general role demands factor, drawing from several role constructs. Factor 3 (named role ambiguity) gives rise to significant differences across meaning, as well as across wording. This was also found by Tracy and Johnson and suggests that this

factor represents both role ambiguity and role discomfort (when reverse-scored). For Factor 4 (named role underload), differences between intended meaning and wording are both significant. However, as the meaning difference is significant at a higher probability level than the wording difference and the mean loading for the underload items is larger, there is some suggestion that this factor is more representative of underload than of a general stress component. Further, as the underload items are stress-worded and therefore contribute to this dimension as well, it is likely that the wording difference is an artefact arising out of an untapped interaction effect. Factor 5 is probably appropriately named as role conflict, considering the borderline significance of the meaning differences and the insignificant wording difference. Factor 6, which was tentatively named role overload, does not include differences in intended meaning or wording, though the mean factor loading for the overload items is higher than those for the other item pools. At first sight, this result suggests that there is little point in including items that load appreciably on this factor in any scale. However, items loading on this factor have been used, and justifiably, considering the independent criteria employed earlier. Factor 7, which was labelled a specific factor on item 46, turns out to reflect significant differences in wording and no differences in intended meaning. Thus, items loading only on this factor are of little use. As it happens, three of the four items loading appreciably on this factor were excluded from the scales, for independent reasons. The remaining item (45) was included in the ambiguity scale due to its meeting the criteria for inclusion (item correlations and relevant factor correlations). This probably contributed to the significant wording difference found for the ambiguity item loadings.

Overall, it appears that wording contamination is present in some of the role dimensions scales, though this is far less serious than that in Rizzo et al's work. Specifically, the role ambiguity and role underload scales appear to be confounded, ambiguity including elements of role discomfort and underload including elements of a general stress factor. In the absence of a test for interaction of the underload loadings, it is impossible to be certain but it seems likely that the apparent confound in this scale is, in fact, no confound at all. In concluding this examination of the construct validity of the scales derived here, it may be stated that high construct validity is by no means established and that at least one confound is known to be present. However, the relatively clear factor analysis, in combination with the research findings presented earlier, contribute to the suggestion of some construct validity of acceptable magnitude.

Though the foregoing discussion has raised certain problems with the construct validity of some of the scales, the evidence from all validity types suggests that the scales are reasonably valid. Thus, they measure to a reasonable extent what they should measure, though they are contaminated in some cases. This suggests that a fair degree of confidence may be placed in results obtained from these measures.

3.2.4 Summary Statistics

3.2.4.1 Means and Standard Deviations

Means and standard deviations for the role dimensions, across race, sex and organizational level are presented in the following table:

	MALE		FEMALE		VARIABLE	TOTAL
	COLOURED	WHITE	COLOURED	WHITE		
Managers		3,54 (0,96) 4,03 (0,96) 2,38 (1,13) 4,25 (1,02)			Ambiguity Conflict Underload Overload	3,54 4,03 2,38 4,25
Super-intendents	+	3,30 (1,05) 3,85 (0,95) 3,57 (1,28) 3,75 (0,94)			Ambiguity Conflict Underload Overload	3,30 3,85* 3,57 3,75
Heads of Department	3,05 (0,84) 4,08 (1,05) 3,17 (1,75) 3,53 (1,02)	3,24 (0,99) 3,25 (0,63) 3,50 (1,83) 3,63 (0,95)		2,54 (1,41) 3,64 (0,92) 2,80 (0,97) 3,74 (1,35)	Ambiguity Conflict Underload Overload	3,05 3,54 3,27 3,63
Senior Clerks	2,72 (0,91) 3,96 (0,92) 4,30 (1,79) 3,52 (1,32)	2,69 (0,86) 3,23 (1,13) 3,63 (1,45) 3,54 (0,98)	2,73 (0,68) 2,71 (0,64) 3,86 (1,31) 3,93 (0,91)	2,68 (0,72) 3,55 (1,12) 4,28 (1,62) 3,51 (1,12)	Ambiguity Conflict Underload Overload	2,70 3,43 4,05 3,58
Clerks	2,82 (0,71) 3,50 (1,07) 4,54 (1,40) 3,71 (1,02)	2,70 (1,05) 3,93 (0,85) 4,75 (1,13) 4,25 (0,96)	2,75 (0,83) 3,44 (0,91) 4,28 (1,60) 3,49 (0,85)	2,79 (0,93) 3,36 (1,01) 4,52 (1,20) 3,15 (1,03)	Ambiguity Conflict Underload Overload	2,79 3,47 4,48 3,53
Total	2,83 3,61 4,39 * 3,67	3,20 3,70 3,34 3,87	2,75 3,33 4,22 3,56	2,74 3,44 4,29 3,30	Ambiguity Conflict Underload Overload	2,91 (0,90) 3,55 (1,00) 4,01*(1,53) 3,63 (1,02)

Table 3.2.4.1: ROLE DIMENSIONS ACROSS RACE, SEX AND ORGANIZATIONAL LEVEL (STANDARD DEVIATIONS IN BRACKETS)

+ Omitted for confidentiality

* With single subject cell data omitted.

3.2.4.2 Correlations with Demographic and Organizational Variables

To consider more fully the differences which the above table (3.2.4.1) reveals, the correlations between the role dimensions and race, sex and organizational level are given below, with the continuous variables of age and tenure included.

	AMBIGUITY	CONFLICT	UNDERLOAD	OVERLOAD
Race	-0,104	-0,043	0,188**	-0,004
Sex	-0,161*	-0,131*	0,130*	-0,168*
Organizational Level	0,272**	0,173**	-0,406**	0,162*
Age	0,138*	0,104	-0,183**	0,040
Tenure	0,027	0,025	-0,163	0,089

* p < 0,05

** p < 0,01

Table 3.2.4.2: CORRELATIONS BETWEEN ROLE DIMENSIONS AND DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES

Not surprisingly, significant correlations between each of the role dimensions and level in the organization were found. Considering the relationships between organizational level and the other demographic and organizational variables (see Table 3.1.1), it is likely that the remaining significant relationships reflect the confounding effects of organizational level. However, as directionality and cause/effect of the relationships

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cannot be assumed, it is clearly necessary to control for the effects of all the demographic and organizational variables in the examination of relationships between the role dimensions and other variables.

3.2.5 Comparative Data

To enable comparison of role dimension means obtained in this study with those obtained in others, some means and standard deviations (where appropriate) are provided below. Previous studies have not employed single-item questionnaire measures of underload. Therefore, no comparative statistics for this variable are listed.

SAMPLE	N	CONFLICT	AMBIGUITY	OVERLOAD	SOURCE
1 Nurses	374	3,26 (1,05)	2,60 (0,96)		Schuler, Aldag & Brief (1977)
2 Manufacturing	362	3,79 (1,21)	3,36 (1,26)		
3 Public Utility 1	399	4,07 (0,81)	3,22 (1,03)		
4 Public Utility 2	272	3,99 (0,94)	3,50 (1,02)		
5 Hospital Workers	99	3,57 (1,23)	1,41 (1,18)		
6 Nursing Aids	70	3,14 (1,19)	1,23 (1,04)		
7 Managerial & Technical	199	4,19 (1,21)	3,79 (1,08)		Rizzo, House & Lirtzman (1970)
8 Research & Engineering	91	3,86 (1,27)	4,03 (1,15)		
9 Middle Managers	90	3,94	3,17	5,18 *	Keenan & McBain (1979)
10 Midwestern Employed	651		3,36		* Beehr (1976)
11 White-collar Union	143		2,95 (1,25)	3,45 (1,33)	Beehr, Walsh & Taber (1976)

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SAMPLE	N	CONFLICT	AMBIGUITY	OVERLOAD	SOURCE
12 Military Officers	92	4,23	2,93		* Johnson & Stinson (1975)
13 Lower-level Manuf.	76	2,54	4,02		* Schuler (1975)
14 Middle " "	157	3,08	3,42		
15 Higher " "	98	3,08	3,60		
16 Students	122		3,08	4,97	* Caplan & Jones (1975)
17 Therapists	31	4,67 (1,13)	2,69 (1,04)		Randolph & Posner (1981)
18 Intensive Care Nurses	61	3,92 (1,31)	2,28 (0,77)		
19 General Care Nurses	59	4,28 (1,21)	2,38 (0,77)		
20 Top Level Civil Administrators	102	3,84	3,00		* Rogers & Molnar (1976)
21 Snr. Hosp. Admin.	53	3,89 (1,00)	3,53 (1,38)		Szilagyf, Sims & Keller (1976)
22 Service Employees	240	3,95 (1,03)	2,78 (0,91)		
23 Managers	93	3,84 (0,54)	2,85 (1,03)		
24 Foremen	33	4,13 (0,35)	2,37 (0,77)		
25 Computer Programmers	159	4,09	3,44		* Bartol (1979)
26 Manual	75	3,02 (1,36)	2,79 (1,35)		Morris & Koch (1979)
27 Clerical	129	3,52 (1,44)	3,04 (1,28)		
28 Professional, Non-academic University Employees	55	3,87 (1,37)	3,24 (1,41)		
29 Administrators	58			5,18	* Caplan (1971)
30 Engineers	94			4,76	
31 Scientists				4,34	

Table 3.2.5: SOME COMPARATIVE STATISTICS FOR THE ROLE DIMENSIONS

These figures reflect many different scales and scoring procedures (where scoring procedures differ, reported means have been transformed to an equivalent seven-point scale — thus, reported standard deviations are inappropriate and are not provided here — these studies are indicated with an asterisk). Therefore, the means reported above have limited value as direct comparative data. However, they do enable some general conclusions to be drawn regarding the relative presence/absence of role demands in the host company. In general, this organization compares favourably with other groups, in terms of frequently lower conflict, ambiguity and overload. However, the overall means conceal the large fluctuations in these variables across race, sex and organizational level, which were discussed earlier. Thus, some subgroups have mean scores which compare less favourably to comparative figures, while others are better placed. This discussion also highlights in more practical terms the importance of controlling for the effects of the demographic and organizational variables.

3.2.6 Intercorrelations between Role Dimensions

Intercorrelations between the extracted factors were presented earlier. However, the computation of correlations between factors differs from the computation of correlations between derived scales (this involves the use of all items and associated factor loadings for each factor in the former, as opposed to selected items and actual item scores in the latter). The different methods of computation result in intercorrelations between

factors differing from intercorrelations between derived scales. This explains how Rizzo et al (1970), for example, extracted independent factors labelled Ambiguity and Conflict and yet obtained a correlation of 0,25 between the scales they developed to tap these constructs (for one of their samples). Intercorrelations (with the linear effects of the demographic and organizational variables partialled out) between the role dimensions are as follows:

	Ambiguity	Conflict	Underload	Overload
Ambiguity	1			
Conflict	0,470 **	1		
Underload	0,150 *	0,207 **	1	
Overload	0,333 **	0,432 **	-0,069	1

* p < 0,05

** p < 0.01

Table 3.2.6.1: INTERCORRELATIONS (PARTIAL) BETWEEN DERIVED SCALES

This table indicates that, with the exception of the relationship between overload and underload, the role dimensions are significantly intercorrelated. These findings were largely expected, on the basis of

previous research (given below), theoretical considerations (also discussed below) and the presence of a general role demands factor in the factor analysis.

With the emphasis of previous research on conflict and ambiguity, little data is available for the relationships between these and the additional variables developed here as well as between the additional variables themselves. Further, some researchers (e.g. Caplan and Jones, 1975) have not reported the relevant statistics. Thus, only comparative correlation coefficients for some of the variable combinations are given below.

RELATIONSHIP	CORRELATION	SOURCE
Ambiguity - Conflict	0,22	Keenan & McBain (1979)
	0,29	Arsenault & Dolan (1983)
	0,46	Schuler (1975)
	0,31	"
	0,33	"
	0,39	Seybolt & Pavett (1979)
	0,47	Morris, Steers & Koch (1979)
	0,25	Rizzo, House & Lirtzman (1970)
	0,01	" " "
	0,18 to	Schuler, Aldag & Brief (1977)
	0,50	
	(Median 0,35) (6 samples)	
Ambiguity - Overload	0,05	Keenan & McBain (1979)
	0,19	Beehr, Walsh & Taber (1976)
Conflict - Overload	0,01	Keenan & McBain (1979)

Table 3.2.6.2: COMPARATIVE RELATIONSHIPS BETWEEN ROLE STRESSOR VARIABLES

It is clear that the role dimensions tend to intercorrelate higher in this study than in previous ones. This may be accounted for, to some degree, by the use of oblique rotation in the factor analysis and by the possible presence of more pervasive response-sets than in other studies, though the latter suggestion is speculative and is not amenable to quantification.

It is important to consider the theoretical and practical significance of these relationships. Though the role dimensions may be independently defined within the broad conceptual frameworks of classical organizational and role theory, with the partial exceptions of overload and underload as specific types of conflict and the possibility of ambiguity sometimes arising from a type of inter-sender conflict (see section 1.2.4), it is unlikely that they emerge totally independently of each other in organizational settings. It is more likely that excessive role demand involves elements of some or all role dimensions, rather than one alone (though this is possible, of course). Therefore, in both practical and general theoretical terms, moderate positive relationships between these variables are expected. Similar views are expressed by Kahn et al (1964) and Schuler (1982), amongst others.

The relationship between overload and underload presents as a separate issue and needs to be considered in relation to the item content of the two scales as well as figure 1.5. The underload scale reflects qualitative underload and the overload scale focuses primarily on quantitative overload. Recalling Figure 1.5, overload and underload in this

study should not be seen as lying on a single, bipolar continuum of load — rather, as two conceptually independent variables. So, there is no particular reason to expect a negative relationship between the two variables, as would be expected if the scales tapped opposite ends of the same quantitative or qualitative continuum. Further, and more importantly, the nature of the variables is such that a positive relationship is also not expected. The perception of too much work may well be related to the work being objectively too difficult. Similarly, the perception of too little work may relate to the work being objectively too easy. However, it is easy to conceive of situations where an individual experiences too much, easy, boring work or where the work is difficult and yet not excessive in quantity. In essence, then, the exact scenario is an individually-based phenomenon, dependent upon ability. Thus, the absence of a positive relationship between the two variables is not surprising. Similarly, of course, a significant negative relationship was also not expected. Clearly, underload and overload, in relation to each other, present an interaction quite dissimilar to those between the other dimensions and to those between themselves and the other dimensions.

Given that most of the interrelationships between the role dimensions are significant, attention should be given to the relative magnitude of these correlation coefficients, which is small. Even the strongest relationship (conflict-ambiguity: $r = 0,47$) indicates only 22% common variance, while the weakest significant relationship (underload-ambiguity: $r = 0,15$) indicates only 2% common variance. Therefore, though the preceding discussion has indicated some clear, not unexpected relationships

between the role dimensions, these are of such a magnitude that each variable has a substantial specific component as well. Thus, each variable has a theoretical and statistical identity sufficiently independent to warrant the continued individual treatment of each variable.

The interrelationships do, however, have implications for later interpretation. Should a significant relationship between an index of strain and a role dimension be found, it will be impossible to say what proportion of the common variance is attributable to the role dimension being considered and what proportion to the other role dimensions, bearing the overlap between these variables in mind. This is an argument in favour of partialling out the effects of all role dimensions other than the one being considered. Pursuing this to its logical conclusion, it would be necessary to partial out the effects of all non-involved indices of strain as well. However, in the opinion of this author, such a rigorous statistical procedure has limited practical value for the simple reason that, as has been indicated, the role dimensions are interrelated in practice, as are the indices of strain. Thus, though a "pure" measure of the relationship between a hypothesized stressor and an index of strain might be obtained, it is questionable what this implies for work design (which implications it is one of the aims of this study to discuss). This is because remedial efforts are concerned with the realities of the situation, which include interrelated role dimensions and overlapping components of strain. For this reason, the linear effects of non-involved role dimensions and indices of strain will not be partialled out when the relationship between a particular role dimension and a particular index of strain is explored, only the

demographic and organizational variables (which are not the particular concern of this study). Recalling the above comments with respect to the obtained results, interpretation will clearly need to take account of this.

Finally, multiple regressions of each index of strain on the role stressors are reported later in consideration of the composite effects of the role dimensions on each index of strain. These procedures involve the combination of the unique effects of each independent variable. Thus, the interrelationships between the role dimensions are taken into account but tangentially to the main analysis. It is important to note that the demographic and organizational variables are not controlled for in these regressions. Therefore, the statistics reported are confounded and should only be seen as interesting, additional material, rather than as crucial to the central arguments.

3.2.7 Current Scales in Relation to those Developed by Rizzo, House and Lirtzman

As all of Rizzo et al's items were used in this study, additional ambiguity and conflict scores were computed from the items contributing to their final scales (indicated in Section 2.2.1). Prior to a consideration of the reliability of their scales in the present data set and the relationships between these and the scales developed here, it is important to know the differences in items between them. Rizzo et al's ambiguity measure included six items (numbers 3, 7, 29, 37, 42, 45, in this study), whereas

this study led to the formation of a seven-item ambiguity scale (numbers 7, 24, 26, 29, 37, 42, 45). With five common items, the two scales show considerable overlap. Rizzo et al's conflict scale included eight items (numbers 11, 13, 17, 29, 25, 38, 48, 54), while only five items contribute to the conflict score in this study (numbers 17, 20, 44, 48, 54). With four out of these five items being common to Rizzo et al's scale, this scale is largely a subset of theirs.

Reliabilities for the Rizzo et al scales and correlations with those developed for this study are presented below:

	RELIABILITY	CONFLICT	AMBIGUITY	UNDERLOAD	OVERLOAD
R. H. & L. Conflict	0,64	0,889 **	0,501 **	0,209 **	0,574 **
R. H. & L. Ambiguity	0,67	0,311 **	0,787 **	0,093	0,256 **

** p < 0,01

Table 3.2.7: RELIABILITIES FOR RIZZO ET AL'S (1970) SCALES AND CORRELATIONS WITH PRESENT SCALES

The reliability of the present ambiguity scale (0,72) exceeds that of Rizzo et al's item formulation, while the reliability of the present conflict scale (0,60) is less than that computed from Rizzo et al's items. The latter finding may be accounted for by the difference in number of items contributing to the scales (five for the present scale and eight for Rizzo et al's) as, generally, reliability of a scale increases with the addition of

items (Kerlinger, 1964). Clearly, the present scales maintain comparable reliability, while not being as affected by the wording confound discussed earlier.

The correlations between the different conflict and ambiguity scales are probably spuriously high, due to common items, as is the correlation between Rizzo et al's conflict measure and the present overload scale (items 13 and 38 are common here). For the rest, associations are similar to those between the present scales, this similarity also being enhanced by common items. These correlations do not contribute much and are presented largely for interest's sake.

3.3 INDICES OF STRAIN

3.3.1 Summary Statistics

3.3.1.1 Means and Standard Deviations

Means and standard deviations for the indices of strain, across race, sex and organizational level, are presented in the following tables. To facilitate presentation, data for general anxiety/tension, work-related anxiety/tension, general depression, work-related depression, job dissatisfaction and hostility are presented in Table 3.3.1.1a and data for the remainder in Table 3.3.1.1b.

	MALE		FEMALE		VARIABLE	TOTAL	
	COLOURED	WHITE	COLOURED	WHITE			
Managers		16,20 (6,20) 15,45 (4,33)			Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	16,20 15,45 13,45 13,15 2,15 8,15	
Superintendents	+	12,38 (8,92) 11,95 (5,71)			Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	12,38 11,95 11,29 11,71 2,90 9,10	
Heads of Department		15,33(13,11) 13,50 (8,41)	13,77(10,22) 12,77 (3,72)	18,60(10,29) 11,00 (3,30)	Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	15,17 12,58 13,17 11,12 2,50 7,62	
Senior Clerks		19,20 (7,01) 11,80 (0,84)	9,25 (3,65) 9,17 (3,38)	16,29 (7,63) 12,14 (4,14)	15,31 (8,48) 10,75 (3,92)	Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	14,15 10,65 12,35 11,53 2,85 8,88
Clerks		17,04 (7,92) 11,58 (4,11)	14,50 (7,45) 11,83 (3,13)	20,81 (9,42) 12,09 (4,79)	17,67 (7,92) 10,85 (3,23)	Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	18,03 11,53 15,42 13,85 4,02 10,37
		17,05 11,77	13,35 12,60	20,00 12,10	17,06 10,83	Gen Anx/Tens Work-Related Anx/Tens Gen Deprssn Wrk-Rltd Dpr Job Dsstsftn Hostility	11,86(4,40) 11,86(4,40) 14,12(6,46)* 12,92(4,83) 3,40(2,20) 9,53(3,05)
		14,51 *	12,31	16,13	14,59		
		13,22	12,19	13,70	12,94		
		4,41	2,71	3,69	2,85		
		10,45	8,46	10,69	8,95		

+ Omitted for confidentiality

* With single subject cell data omitted

**Table 3.3.1.1a: INDICES OF STRAIN ACROSS RACE, SEX AND ORGANIZATIONAL LEVEL
(STANDARD DEVIATIONS IN BRACKETS)**

	MALE		FEMALE		VARIABLE	TOTAL
	COLOURED	WHITE	COLOURED	WHITE		
Managers		9,50 (1,36) 17,60 (3,27) 5,60 (1,82) 0,36 (0,60) 0,31 (0,86)			Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	9,50 17,60 5,60 0,36 0,31
Superintendents	+	8,48 (2,44) 18,14 (4,91) 6,05 (2,84) 0,48 (0,89) 0,44 (1,37)			Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	8,48 18,14 6,05 0,48 0,44
Heads of Department	9,17 (1,94) 17,33 (4,27) 6,00 (3,35) 0,38 (0,55) 0,43 (1,32)	8,62 (1,57) 16,23 (2,49) 5,38 (2,63) 0,76 (1,35) 0,76 (1,08)		9,00 (2,00) 15,00 (4,24) 7,00 (3,54) 0,55 (0,79) 1,55 (2,84)	Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	8,84 16,25 5,87 0,62 0,84
Senior Clerks	8,60 (1,34) 16,00 (3,67) 5,80 (2,95) 1,10 (1,95) 0,83 (1,46)	8,58 (1,24) 17,42 (3,75) 5,25 (2,49) 0,64 (0,81) 0,66 (1,98)	9,43 (1,81) 14,71 (3,55) 7,29 (2,21) 0,65 (0,70) 0,45 (0,53)	8,50 (1,67) 16,88 (3,12) 6,19 (3,12) 1,12 (1,86) 0,77 (1,52)	Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	8,70 16,55 6,05 0,89 0,69
Clerks	7,35 (2,45) 15,61 (3,89) 6,28 (3,08) 1,21 (2,01) 1,07 (1,87)	6,33 (2,42) 17,17 (2,64) 8,00 (1,67) 0,78 (1,30) 0,66 (2,06)	8,09 (1,86) 15,25 (3,94) 7,06 (3,22) 1,29 (2,08) 1,16 (1,67)	7,30 (2,11) 14,55 (3,80) 7,06 (2,57) 1,52 (2,10) 2,08 (3,95)	Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	7,48 15,32 6,76 1,29 1,33
	7,62 15,79 6,22 * 1,13 1,00	8,63 17,44 5,83 0,55 0,52	8,33 15,15 7,10 1,07 1,03	7,81 15,28 6,80 1,31 1,64	Wrk-Rltd Slf Esteem Gen Slf Estm Fatigue Abs Occasns Abs Days	8,10(2,15) 16,09(3,87) 6,41(2,84)* 1,00(1,26) 1,00(1,98)

+ Omitted for confidentiality

* With single subject cell data omitted

Table 3.3.1.1b: INDICES OF STRAIN ACROSS RACE, SEX AND ORGANIZATIONAL LEVEL
(STANDARD DEVIATIONS IN BRACKETS)

3.3.1.2 Correlations with Demographic and Organizational Variables

To consider the differences in the above table more fully, the correlations between the indices of strain and race, sex and organizational level are given below, with the continuous variables of age and tenure included:

	RACE	SEX	ORG. LEVEL	AGE	TENURE
General Anxiety/Tension	0,186**	0,180**	-0,156*	-0,117	-0,031
Work-Related Anxiety/Tension	0,006	-0,093	0,204**	0,084	0,097
General Depression	0,139*	0,141*	-0,174**	-0,071	-0,008
Work-Related Depression	0,094	0,054	-0,127	-0,089	-0,063
Job Dissatisfaction	0,310**	-0,073	-0,287**	-0,230**	-0,123
Hostility	0,306**	0,039	-0,266**	-0,255**	-0,154*
General Self-Esteem	-0,091	-0,025	0,295**	0,112	0,126
Work-Related Self-Esteem	-0,120	-0,181**	0,233**	0,019	0,042
Fatigue	0,061	0,149*	-0,124	-0,179**	-0,081
Absent - Occasions	0,135*	0,212**	-0,352**	-0,113	-0,176**
Absent - Days	-0,001	0,264**	-0,301**	0,007	-0,111

* $p < 0,05$

** $p < 0,01$

Table 3.3.1.2: CORRELATIONS BETWEEN INDICES OF STRAIN AND DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES

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Full discussion of a correlation matrix like the above is a thesis in itself, while not being absolutely necessary for the current purposes. Rather, in general terms, many significant relationships emerge which make intuitive sense. It should be emphasised again that organisational level will be contributing to many of the relationships between the sets of variables, as discussed before. Further, and this is the point of this section, there is support for the partialling out of the demographic and organizational variables, as it is now clear that they correlate variously with the role dimensions and the indices of strain. If not controlled for, these variables would affect the computed levels of association between role dimensions and strain.

3.3.2 Comparative Data

Very few studies have used exactly the same scales and scoring procedures as this study. Therefore, very little data is available for comparison of means on the indices of strain in this sample with other groups. However, Taylor (1953) found a mean of 14,56 on her general anxiety/tension measure for introductory psychology students and a median of 34 for 103 neurotic and psychotic patients, in standardization work. Keenan and McBain (1979) obtained a mean of 11,8 on the work-related tension measure (with baseline corrections) and Caplan and Jones (1975) means of 13,76 (Time 1) and 8,85 (Time 2). Beehr et al (1976) obtained a mean of 7,08 (transformed for comparison) for fatigue in 143 white-collar union members, while Beehr alone (1976) obtained a mean of 4,85 (transformed

for comparison) for job dissatisfaction in 651 mid-western employed individuals. Overall, it does not seem that mean strain scores in the present study differ uniformly from comparative data — rather, generally small differences above and below comparative means emerge. Thus, it does not appear that the present sample exhibits levels of strain widely divergent from other groups. This implies a fairly typical work group/sample, with some support for the generaliseability of results, at least to groups of similar demographic and organizational structure. However, the lack of comparative data (particularly for this country) precludes the drawing of substantive conclusions in this regard.

3.3.3 Intercorrelations between the Indices of Strain

Intercorrelations between the indices of strain (with the linear effects of the demographic and organizational variables partialled out) are as follows:

	G ANX/TN	W-R ANX/TN	G DEPR	W-R DEPR	JOB DISTRN	HOS- TILITY	G S ESTM	W-R S ESTM	FAT- IGUE	ABS OCCAS
Gen Anxiety/Tensn	1									
W-R Anxiety/Tensn	** 0,568	1								
Gen Depression	** 0,758	** 0,574	1							
W-R Depression	** 0,603	** 0,486	** 0,726	1						
Job Dissatisfn	** 0,217	** 0,240	** 0,329	** 0,422	1					
Hostility	** 0,408	** 0,311	** 0,456	** 0,485	** 0,197	1				
Gen Self Esteem	** -0,472	** -0,416	** -0,616	** -0,526	** -0,364	** -0,377	1			
W-R Self Esteem	** -0,277	** -0,291	** -0,490	** -0,498	** -0,448	** -0,234	** 0,576	1		
Fatigue	** 0,410	** 0,243	** 0,484	** 0,446	** 0,242	** 0,291	** -0,249	** -0,288	1	
Absent Occasions	0,034	0,037	0,009	0,059	** 0,226	0,045	-0,068	-0,007	0,101	1
Absent Days	0,092	0,024	0,043	0,118	** 0,185	0,033	* -0,130	-0,045	0,110	** 0,655

* p < 0,05

** p < 0,01

Table 3.3.3: INTERCORRELATIONS (PARTIAL) BETWEEN INDICES OF STRAIN

Partial correlations between the indices of psychological strain are all highly significant ($p < 0,01$), while only job dissatisfaction correlates significantly with both indices of behavioural strain/absenteeism measures. General self-esteem correlates negatively and significantly, but weakly, with the days absent measure, but not with the occasions absent measure. Aside from job dissatisfaction and general self-esteem, the absenteeism measures seem independent of the psychological indices of strain.

Immediately, these findings raise important questions concerning:

1. the theoretical and practical independence of indices of psychological strain;
2. the operation of response sets; and
3. the validity of objective versus subjective measures of strain.

These will be discussed later. For now, it is sufficient to note the relative independence of the absenteeism measures with respect to the subjective measures and to consider the implications of the interrelatedness of the subjective indices for the interpretation of relationships between these and role dimensions. Clearly, a particular significant relationship will not suggest certainty regarding the specific outcome (assuming some degree of cause/effect), i.e. outcomes should be seen as composite variables reflecting interrelated components of mental health, but defined primarily in terms of the attached label. This is a similar statistical argument to that presented earlier, with regard to the interrelatedness of the role dimensions.

3.4 TYPE A BEHAVIOUR — JENKINS ACTIVITY SURVEY DATA

3.4.1 Summary Statistics

3.4.1.1 Distribution of Type A Scores

The first task is to consider the distribution of the Type A scores. The normative data published in the JAS manual (Jenkins et al, 1979) are based on the 1969 JAS scores of Western Collaborative Group Study participants (Rosenman, Friedman, Straus, Wurm, Kositchek, Hahn and Werthessen, 1970). The raw scores for these respondents were approximately normally distributed, with standard scores approximately normally distributed with mean 0 and standard deviation 10. With a mean score of 0,30 and standard deviation 8,14 in the current data set, it is necessary to test the hypothesis that the Type A standard scores in this work do, in fact, have a normal distribution with mean 0 and standard deviation 10, versus the alternative that they have some other distribution. This was tested with a χ^2 Goodness-of-fit test (see Appendix K for details). This procedure resulted in rejection of the null hypothesis ($p < 0,05$), with the conclusion that the Type A scores have some other distribution. As the largest distributional difference between the normative and current data involves the measure of variation, a further hypothesis was tested — that the data is normally distributed with mean 0 and standard deviation 8,14. A similar statistical procedure resulted in acceptance of the null hypothesis ($p > 0,05$). It therefore appears that, though the central tendency of scores in the sample being considered cannot reasonably be seen as differing from the WCGS data, that the variability is less in the current study. In fact,

this standard deviation of 8,14 is one of the smallest measures of variation reported in the literature, exceeding only marginally that of 57 attorneys in high ranking law firms in Virginia ($\bar{x} = 5,9$; $SD = 8,1$) (in Jenkins et al, 1979). Unfortunately, standard deviations for South African groups are not reported by Strumpfer (1983c). It may be that the South African population varies less in terms of this dimension than the American population. A more reasonable hypothesis, however, is that greater sample uniformity is obtained where individuals in the same organization and town are studied, rather than where sampling takes place across organizations and broader geographical locations. The figures reported above for attorneys support this hypothesis for, although sampling was carried out across law firms, there is little doubt but that attorneys represent a fairly homogenous group. The lower variability of this data set does not, of course, have great practical significance other than probably reducing the proportion of individuals whose Type A scores lie beyond the -5,0 and +5,0 critical points, upon which the predictability figures of the JAS for CHD are based.

3.4.1.2 Mean JAS Scores

The pattern of Type A scores across race, sex and organizational level is presented in the following table:

	MALE		FEMALE		
	COLOURED	WHITE	COLOURED	WHITE	
Managers		N = 20 8,7			N = 20 8,7
Superin- intendents	N = 1 -1,9	N = 21 2,1			N = 22 1,9
Heads of Department	N = 6 -2,4	N = 13 2,4		N = 5 8,2	N = 24 2,4
Senior Clerks	N = 9 5,2	N = 12 1,0	N = 6 0,7	N = 15 0,7	N = 42 1,8
Clerks	N = 53 -1,8	N = 6 -4,2	N = 33 -2,0	N = 34 -1,6	N = 126 -1,8
	N = 69 0,9	N = 72 3,3	N = 39 -1,6	N = 54 -0,1	N = 234 0,30

Table 3.4.1.2: PATTERN OF TYPE A SCORES ACROSS RACE, SEX AND ORGANIZATIONAL LEVEL

3.4.1.3 Correlations with Demographic and Organizational Variables

To consider more fully the differences which the above table reveals, the correlations between Type A behaviour and race, sex and organizational level are given below, with the continuous variables of age and tenure included.

	TYPE A	PROBABILITY
Race	-0,201	p < 0,01
Sex	-0,101	p > 0,05
Organizational Level	0,358	p < 0,01
Tenure	0,017	p > 0,05
Age	0,144	p < 0,05

Table 3.4.1.3: CORRELATIONS BETWEEN TYPE A BEHAVIOUR AND DEMOGRAPHIC AND ORGANIZATIONAL VARIABLES

The significant positive correlation between Type A behaviour and organizational level is expected, as most of the studies that have gathered occupational data have found a substantial positive association between these variables (e.g. Mettlin, 1976; Rosenman, Friedman, Jenkins, Straus, Wurm and Kositchek, 1966, 1970; Shekelle et al, 1976). In addition, the insignificant relationship between tenure and Type A behaviour is expected as there is little theoretical basis for the existence of such a relationship. The significant relationships between Type A behaviour and race and age are, however, contrary to expectations, particularly the age result. Generally, age has not been found to relate to Type A scores, where the subjects fall within a restricted but older age range (e.g. Rosenman et al, 1964; Zyzanski et al, 1978). However, when the age range is broadened to include persons as young as 20 to 25 years, modest negative relationships have been found (Mettlin, 1976; Rose, Jenkins and Hurst, 1978; Shekelle et al, 1976). The implication is that Type As "mellow" with age (Jenkins

et al, 1979). Thus, the positive relationship obtained here is unusual, but not really surprising as, when this is considered in relation to the association between organizational level and Type A behaviour, it seems likely that this unusual trend is a consequence of contamination by organizational level. Similar arguments apply to the race/Type A finding. To test this hypothesis, the partial correlations between race and age and Type A scores, with the effects of organizational level partialled out, were computed. With the effects of level removed, these correlations reduce to $-0,041$ for age and Type A, and $-0,024$ for race and Type A. Clearly, age is unrelated to Type A score, as previous research has found, when the confounding effects of organizational level are removed. Further, the partial correlation between race and coronary-prone behaviour is insignificant. Precisely this result was obtained by Shekelle et al (1976) when they controlled for occupational level in their consideration of race-specific differences.

The final relationship to be considered is that between sex and Type A scores. Previously, significant differences in Type A scores between men and women have not been found (Jenkins et al, 1979). However, it has sometimes been necessary to control for differences in occupational level in order to eliminate sex differences (e.g. Shekelle et al). Here, though there is a trend towards women scoring less Type A than men, this is not significant, even without the effects of level removed. When this variable is partialled out, the correlation decreases to almost zero. Therefore, findings with respect to sex and coronary-prone behaviour are consistent with previous work.

The foregoing discussion has indicated the complex nature of the interrelationships between Type A scores and the demographic and organizational variables. Though it appears that organizational level accounts for the unexpected relationships, the possibility that race and/or age "cause" organizational level cannot be ruled out. In fact, age almost certainly has some bearing on level. In other words, cause and effect cannot be clearly identified. Therefore, in considering the relationships between Type A scores and other variables, the linear effects of all the demographic and organizational variables need to be removed, rather than organizational level alone. This is accomplished through partial correlations, where the linear effects of one or a number of variables are removed (Gold, 1984). Partial correlations encourage certainty that findings are not consequences of confounding by partialled-out variables, though uncontrolled confounds may still be present.

3.4.2 Comparative Data

Mean JAS Type A scores for other populations were presented earlier (see Table 2.3.3.1). Comparison of these figures with those for this sample (Table 3.4.1.2) indicates that the overall sample mean of 0,30 is identical to that obtained in the Detroit study, where the sample consisted of managerial and professional employees in the automotive industry (in Jenkins et al, 1979). Inferring from this, it may be loosely argued that the South African population (across race, sex and organizational level) displays levels of coronary-prone behaviour similar to those characterizing

managerial and professional groups in the United States. Considering the association between the CPBP and organizational level, it seems that this sample supports the notion of high levels of coronary-prone behaviour in South Africa, as indicated by many studies (see Strumpfer, 1983c). When only the mean score for managers (8,7) is considered, it is possible to make direct comparisons between this sample and others (which have generally consisted only of managers). Clearly, this mean is far higher than those for U.S. and non-U.S. samples, other than the similar figures obtained for groups of South African male and female managers.

3.4.3 Intercorrelations between JAS Subscales

As has been pointed out before, the JAS measure of coronary-prone behaviour consistently factors into three major dimensions. To repeat, these are Speed and Impatience (Factor S), Job Involvement (Factor J) and Hard-driving and Competitive (Factor H). The question has been raised whether these factors measure related traits or truly independent ones. It has been found that, though each of the factor scores correlates positively with Type A score, the intercorrelations between the factor scales are low. As the JAS was administered to an unstandardized South African sample, it is important to consider the interscale correlations in this data set. These are as follows:

	TYPE A	FACTOR S	FACTOR J	FACTOR H
Type A	1	0,472**	0,248**	0,469**
Factor S	0,516	1	0,107	0,030
Factor J	0,407**	0,248**	1	0,179**
Factor H	0,412**	-0,015	0,129	1

** p < 0,01

Table 3.4.3.1: INTERSCALE CORRELATIONS FOR THE JAS (ENTRIES ABOVE THE DIAGONAL ARE THE PARTIAL CORRELATIONS FOR THE SAME DATA)

	TYPE A	FACTOR S	FACTOR J	FACTOR H
Type A	1			
Factor S	0,67**	1		
Factor J	0,42**	0,27**	1	
Factor H	0,58**	0,22**	0,19**	1

** p < 0,01

Table 3.4.3.2: INTERSCALE CORRELATIONS FOR THE 1969 JAS, ADMINISTERED IN THE WCGS (N = 2 588) (JENKINS, ZYZANSKI & ROSENMAN, 1979)

Though it has been established that it is preferable to remove the linear effects of the demographic and organizational variables when considering the correlations between Type A scores and other variables, the simple correlations are also given, as they provide a more meaningful basis for comparison of the relationships in this data set with those reported in the manual, where relevant effects were not removed. Interscale correlations are generally in the same direction as those reported in the manual, but of lesser magnitude. More importantly, the factor scales correlate more highly with the Type A scale than they do amongst themselves, which is also in line with previous findings. Moreover, these findings support the idea that the three factor scales of the JAS make relatively independent contributions to the assessment of Type A tendencies. Therefore, this sample probably has a similar factor structure to the standardization sample and, by extension, there is little reason to suppose that the meaning of the Type A scores obtained here differs substantially from the intended meaning.

3.4.4 Formation of Type A and Type B Subgroups

Various methods for partitioning samples into subgroups, in order to examine the moderating effects of the variable upon which the partitioning is based, appear in the literature. Median splits have been used by, for example, Tosi (1971) on role dimensions, Beehr (1976) on situational moderators and Posner and Randolph (1980) on degree of tolerance for conflict. On the other hand, Johnson and Stinson (1975), considering the

moderating effects of need for achievement and need for independence, and Beehr et al (1976), studying higher-order need strength, trichotomized their samples. With regard to coronary-prone behaviour, previous work has used median splits (Caplan and Jones, 1975; Keenan and McBain, 1979). However, measures other than the JAS were used in both these studies (Vickers' (1973) short scale in the former and an enlargement of this in the latter). The partitioning method used here therefore, need not be determined by methods employed previously, with a view to comparability of results.

Median splits are not desirable, as they result in small differences in the moderating variable leading to allocation to supposedly markedly different groups. This procedure is, unfortunately, common in small sample research. Trichotomization of the sample is therefore preferred, but may still be criticized as the relative magnitude of scores is not taken into account. Clearly, it is not desirable to compare results from studies where mean scores on the moderating variable differ meaningfully across samples. The nature of JAS standard scores, however, suggests a solution to both the above problems. As the predictability figures of the JAS for CHD are based on the critical points of standard score $\leq -5,0$ for Type B and standard score $\geq 5,0$ for Type A (originally selected as the points cutting off approximately the upper and lower thirds of the distribution in the WCGS), there is justification for partitioning the current sample in this way. Thus, as the standard scores are normally distributed with mean 0 and standard deviation 10 (in the WCGS), these points should cut off approximately 31% in each of the upper and lower tails of the distribution

(referring to Table of Areas under the Normal Curve), which is desirable in terms of effecting a meaningful split. Considering the theoretical and practical justification for partitioning based on these criteria, the sample was sorted accordingly. This resulted in 28,2% of the sample (N = 66) being classified as Type B and 29,1% (N = 68) being classified as Type A. Note that the percentages of the sample in each of these groups are lower than those based on normal theory applied to the standardization data, and reflect the lesser variation of scores in this data set (as discussed in Section 3.4.4).

The structures of these subgroups in terms of race, sex and organizational level are presented below. As those individuals who do not fall into either category, who may be called Type X (N = 100), form a group worthy of study in their own right, details for this group are also provided.

O R G L E V E L	CORONARY-PRONE BEHAVIOUR CLASSIFICATION											
	TYPE B				TYPE X				TYPE A			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
	COL'D	WHITE	COL'D	WHITE	COL'D	WHITE	COL'D	WHITE	COL'D	WHITE	COL'D	WHITE
M A N A G E R S						6				14		
S U P E R S		5			1	9				7		
H O D P T S	3	1		1	2	6			1	6		4
S E N C L R K S		3	2	4	3	4	3	7	2	5	2	5
C L E R K S	21	3	12	11	25	3	16	15	11		4	7
	24	12	14	16	31	28	19	22	14	32	6	16
	36		30		59		41		46		22	
	66				100				68			

Table 3.4.4: FREQUENCY STRUCTURE OF THE TYPE A, X AND B SUBGROUPS ACCORDING TO RACE, SEX AND ORGANIZATIONAL LEVEL

3.5 RELATIONSHIPS BETWEEN ROLE DIMENSIONS AND INDICES OF STRAIN

3.5.1 Partial Correlations between Role Dimensions and Indices of Strain

Correlations between the role dimensions and the indices of strain (with the linear effects of the demographic and organizational variables partialled out) are as follows:

	AMBIGUITY	CONFLICT	UNDERLOAD	OVERLOAD
General Anxiety/Tension	0,193**	0,245**	0,106	0,227**
W-R Anxiety/Tension	0,216**	0,210**	-0,032	0,354**
General Depression	0,284**	0,246**	0,160*	0,203**
W-R Depression	0,387**	0,263**	0,197**	0,140*
Job Dissatisfaction	0,281**	0,166*	0,503**	0,053
Hostility	0,226**	0,269**	0,100	0,189**
General Self-Esteem	-0,243**	-0,195**	-0,208**	-0,134*
W-R Self-Esteem	-0,331**	-0,186**	-0,275**	-0,010
Fatigue	0,182**	0,164*	0,116	0,128
Absent Occasions	0,018	0,026	0,131*	0,055
Absent Days	0,028	0,041	0,142*	0,040

* $p < 0,05$

** $p < 0,01$

Table 3.5.1: CORRELATIONS (PARTIAL) BETWEEN ROLE DIMENSIONS AND INDICES OF STRAIN

Role ambiguity correlates significantly with all psychological indices of strain ($p < 0,01$), but not with the behavioural measures. Role conflict displays a similar lack of association with the absenteeism measures, but relates significantly to the psychological indices of strain ($p < 0,01$), with the exceptions of job dissatisfaction and fatigue, for which the significance level is 5%. Role underload is significantly but weakly associated with both absenteeism measures ($p < 0,05$) but fails to correlate significantly with general anxiety/tension, work-related anxiety/tension, hostility and fatigue. Significant relationships with work-related depression, job dissatisfaction, general and work-related self-esteem (all $p < 0,01$) and general depression ($p < 0,05$) were found. Role overload relates significantly to general anxiety/tension, work-related tension, general depression, hostility (all $< 0,01$), work-related depression and general self-esteem (both $p < 0,05$), but does not display significant associations with job dissatisfaction, work-related self-esteem, fatigue and the absenteeism measures.

Significant correlations are in expected directions, i.e. negative with the self-esteem measures and positive with the rest (with the single exception of the small, negative association between underload and work-related anxiety/tension). Thus, at first sight, the above table provides considerable support for the relevant hypothesis (No. 2 in section 1.5.4). However, the magnitude of correlations is generally low, with few relationships indicating more than 10% common variance (r^2) (this was expected — see Section 1.5.4). Further, intercorrelations within the two sets of measures, as discussed before, mean that these findings are not

entirely independent of each other. Thus, the drawing of independent conclusions with respect to relationships between each role dimension and each index of strain is a risky undertaking. These points need to be borne in mind when support for hypotheses is evaluated.

3.5.2 Multiple Regressions of Indices of Strain on the Role Dimensions

To consider the relationships of the composite set of role dimensions with each index of strain, multiple regressions were carried out. The results of these analyses are presented below:

	R MULTIPLE CORRELATION COEFFICIENT	R ² COEFFICIENT OF DETERMINATION	% VARIANCE EXPLAINED	SIGNIFICANCE p LESS THAN
General Anxiety/Tension	0,266	0,071	7,1	0,002**
W-R Anxiety/Tension	0,410	0,168	16,8	0,000**
General Depression	0,316	0,100	10,0	0,000**
W-R Depression	0,400	0,160	16,0	0,000**
Job Dissatisfaction	0,574	0,329	32,9	0,000**
Hostility	0,285	0,081	8,1	0,001**
General Self-Esteem	0,320	0,103	10,3	0,000**
W-R Self-Esteem	0,433	0,188	18,8	0,000**
Fatigue	0,199	0,040	4,0	0,054
Absent Occasions	0,076	0,076	7,6	0,001**
Absent Days	0,256	0,066	6,6	0,004**

* p < 0,05

** p < 0,01

Table 3.5.2: MULTIPLE REGRESSIONS OF EACH INDEX OF STRAIN ON THE ROLE DIMENSIONS

For all indices of strain other than fatigue, multiple regressions are significant (p < 0,01). Thus, the role dimensions, taken as a set, account

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for significant proportions of variation in most of the indices of strain, and with the interrelatedness of these dimensions taken into account. This suggests additional support for the relevant hypothesis (No. 2). However, as before, the relative magnitude of the relationships should be considered. Clearly, job dissatisfaction presents as an important covariate of the role dimensions (with 32,9% of the variation in this variable being accounted for by the independent variables). Also to be considered noteworthy covariates are those variables for which 10% or more (arbitrarily set as the point at which the significance level is less than 0,1%) of their variance is explained by the role dimensions, i.e. work-related anxiety/tension, general and work-related depression, general and work-related self-esteem. General anxiety/tension, hostility and the absenteeism measures, though significantly related to the set of role dimensions have less than 10% of their variance accounted for. Clearly, conclusions with respect to these variables need to be more tentative. Finally, of course, the above findings need to be treated with caution, as they probably also reflect some degree of confounding by the demographic and organizational variables, which were not partialled out in these analyses.

3.5.3 General vs. Work-related Psychological Indices of Strain

With regard to work-related strain as a mediator in the relationships between role dimensions and general psychological strain, the following comparative table of percentages of variation in the general versus work-related indices of strain accounted for by the role dimensions, was compiled (from Table 3.5.2.1).

	GENERAL	WORK-RELATED
Anxiety/Tension	7,1	16,8
Depression	10,0	16,0
Self-esteem	10,3	18,8
Job Dissatisfaction		32,9
Hostility	8,1	
Fatigue	4,0	
	$\bar{x} = 7,9$	$\bar{x} = 21,1$

Table 3.5.3: COMPARISON OF GENERAL AND WORK-RELATED INDICES OF STRAIN IN PERCENTAGES OF VARIATION ACCOUNTED FOR BY THE SET OF ROLE DIMENSIONS

Clearly, the role dimensions account for substantially larger percentages of variation in the work-related indices than in the general indices. Following Van Dijkhuizen's reasoning, this may be seen as suggesting that the relationships between role dimensions and general psychological affects are mediated by work-related psychological strain. This has implications for Van Dijkhuizen's Empirical General Sequence Model of Strain (Section 1.3.1) and relates to the non-directional hypothesis a) 4 (Section 1.5.4).

3.5.4 Psychological vs. Behavioural Indices of Strain

To examine the mediating role of psychological strain in the relationships between role dimensions and behavioural strain, the percentages of variation in the absenteeism measures accounted for by the role dimensions were compared with the percentages accounted for in the psychological indices of strain, presented in the previous table. This relates to hypothesis a) 5 (Section 1.5.4), where it was hypothesized that the relationships between role dimensions and behavioural strain are mediated by psychological strain. The role dimensions account for 7,6% and 6,6% of the variation in the occasions absent and days absent measures, respectively. Comparison of these figures with the percentages in Table 3.5.3 above indicates that, generally, higher percentages of variation are explained in the psychological indices of strain than in absenteeism. Again, following Van Dijkhuizen's reasoning, this may be seen as representing partial support for the mediating role of psychological strain in role dimensions/behavioural strain relationships (and for hypothesis a) 5).

3.6 PARALLEL-FORM ANXIETY/TENSION SCALES

The two, short (two item) parallel-form anxiety/tension scales were included in Questionnaires 2 and 3. As discussed in Section 2.3.2, consideration of the relationships between these scales, and comparison of the relationships between each of these and the role dimensions, will have implications for the issues of fluctuations in strain and response sets. Statistics pertaining to these questions are presented below.

	AMB	CONF	UNDER	OVER	R	R ²	p LESS THAN
Ques. 3 measure	0,162*	0,122	-0,040	0,208**	0,266	0,071	0,002**
Ques. 2 measure	0,201**	0,261**	-0,121	0,470**	0,510	0,260	0,000**

* p < 0,05

** p < 0,01

Table 3.6.1: COMPARISON OF RELATIONSHIPS BETWEEN PARALLEL-FORM TENSION SCALES AND ROLE DIMENSIONS

With an interscale correlation of only 0,372, the possibility of unreliable responses by subjects is introduced. However, as mentioned earlier, short form scales like these have limited reliability. Therefore, the low interscale correlation should not be seen only as a reflection of inconsistent subjects — the possibility of unreliable measuring instruments also exists (to account for the apparent tautology in this argument, it needs to be pointed out that measuring instruments may be constructed

which, because of their poor expression, inadequate content validity and/or ambiguous response alternatives, make it difficult for subjects to respond consistently and validly — this may be the case for the scales being considered here). In addition, though the items are expressed in general terms, e.g. "I seldom have.....," it is unlikely that subjects respond only at this level. Rather, current circumstances and experiences will play an important part in influencing the degree of expressed anxiety/tension at work. Thus, the magnitude of the interscale correlation will also be influenced by fluctuations in subjective tension between administrations of the scales, provided that the fluctuation is not uniform across the sample, of course (which is unlikely).

Additional light may be shed on the question of whether or not fluctuations in strain occur, through a consideration of the relationships between the parallel-forms of the anxiety/tension scale and the indices of strain. These relationships are as follows (note that statistics for the absenteeism measures are not relevant here and are included only for interest's sake):

	QUES 2	QUES 3
General Anxiety/Tension	0,359	0,343
Work-Related Anxiety/Tension	0,444	0,524
General Depression	0,408	0,408
Work-Related Depression	0,285	0,371
Job Dissatisfaction	0,121	0,215
Hostility	0,238	0,200
General Self-Esteem	-0,275	-0,256
Work-Related Self-Esteem	-0,116	-0,247
Fatigue	0,142	0,213
Absent Occasions	0,016	-0,037
Absent Days	0,029	-0,020

Table 3.6.2: COMPARISON OF RELATIONSHIPS BETWEEN PARALLEL-FORM ANXIETY/TENSION SCALES AND INDICES OF STRAIN

Though it does not seem possible to separate the effects of response set and fluctuations in strain, it is interesting and informative that the work-related indices of strain are more strongly related to the tension at work scale included in Questionnaire 3 than to the scale included in Questionnaire 2, whereas the general measures relate very similarly to both scales. As response set would influence results fairly uniformly, the most likely explanation for the above findings is that tension at work fluctuates from time to time (presumably in association with the relative presence or absence of role dimensions). This conclusion has implications for the obtained relationships between role dimensions and strain and includes a criticism of the methodology employed in this study. This will be discussed more fully later.

Acceptance of the above conclusion with respect to fluctuations in strain implies that any conclusions with regard to response sets, based on the data in Table 3.6.1, are questionable. The substantially stronger relationships between the Questionnaire 2, rather than the Questionnaire 3, tension scale and role dimensions are amenable to at least two interpretations. Basically, the stronger relationships for the Questionnaire 2 scale could reflect the "true" state of affairs, in which case the lower relationships for the Questionnaire 3 scale are a result of fluctuations in strain, which fluctuations are hypothesized to be dependent upon concomitant fluctuations in role dimensions. Alternatively, the stronger relationships for the Questionnaire 2 scale could reflect questionnaire-consistent response sets, which alter subsequently, in which case the magnitude of relationships for the Questionnaire 3 scale reflect the "true"

level of relatedness of the variables. Both these interpretations assume the absence of the alternate formulation (i.e. response sets or fluctuations in strain). However, it is unlikely that either of these interpretations is completely accurate. Rather, there is almost certainly some degree of response set formation (mainly within questionnaires, but possibly also over both assessment sessions, though this is less likely considering the precaution of a temporal staggering of these sessions [see Section 2.3]), and fluctuations in strain almost certainly occur (as the above evidence indicates).

Unfortunately, it is not possible to quantify the extent of the effects of either. Notwithstanding the absence of quantification, controls in the research design suggest that the effects of fluctuations in strain are likely to be greater than the effects of durable response sets. Thus, it is possible to conclude that the actual degree of relatedness between the role dimensions and the indices of strain is probably somewhat greater than results suggest. However, in the absence of evidence to support this conclusion, it must be seen as speculative. It should be noted that the presence of durable response sets, based on personality factors which influence questionnaire-answering behaviour, would invalidate this conclusion. This will be discussed at a later stage.

3.7 MODERATING EFFECTS OF TYPE A BEHAVIOUR

3.7.1 Differences between Type A, X and B Subgroups

The formation of the Type A and Type B subgroups (and consequently the group labelled Type X) has been discussed and the frequency structure of these groups according to race, sex and level in the organization has been presented. As the first step in considering differences between these groups, means and standard deviations for the role dimensions and indices of strain are given below, for each group. To determine the significance of any differences, one-way analyses of variance were computed for each variable. Relevant statistics for these tests are also reported.

	TYPE A N = 68	TYPE X N = 100	TYPE B N = 66	F- RATIO	p LESS THAN	r
Ambiguity	3,18 (0,94)	2,84 (0,92)	2,76 (0,75)	4,50	0,012*	0,179**
Conflict	3,80 (1,00)	3,50 (0,99)	3,36 (1,00)	3,53	0,031*	0,168*
Underload	3,54 (1,51)	4,08 (1,54)	4,39 (1,44)	5,41	0,005**	-0,208**
Overload	4,00 (1,01)	3,51 (0,99)	3,43 (0,99)	6,72	0,002**	0,213**
Gen Anx/Tens	16,35 (9,16)	15,97 (7,81)	17,11 (9,05)	0,35	0,705	-0,033
W-R Anx/Tens	13,38 (4,79)	11,13 (3,75)	11,42 (4,58)	6,02	0,003**	0,170**
Gen Deprssn	13,16 (7,15)	13,99 (6,24)	15,29 (5,94)	1,86	0,158	-0,125
W-R Deprssn	12,21 (4,88)	13,39 (4,97)	13,00 (4,52)	1,23	0,295	-0,063
Job Disstsfm	2,88 (1,82)	3,67 (2,31)	3,53 (2,34)	2,78	0,064	-0,112
Hostility	9,53 (3,42)	9,72 (2,97)	9,24 (2,77)	0,49	0,616	0,035
GenSlf-Estm	16,40 (3,96)	15,93 (3,95)	16,00 (3,70)	0,31	0,730	0,039
W-RSlf-Estm	8,68 (2,08)	7,85 (2,14)	7,88 (2,14)	3,56	0,030*	0,142*
Fatigue	5,97 (2,65)	6,50 (2,96)	6,71 (2,83)	1,24	0,291	-0,099
Absent Occs	0,88 (1,12)	1,02 (1,28)	1,09 (1,32)	0,86	0,425	-0,084
Absent Days	0,66 (1,64)	1,09 (2,06)	1,22 (2,17)	4,17	0,017*	-0,177**

* p < 0,05

** p < 0,01

Table 3.7.1.1: SUBGROUP MEANS AND STANDARD DEVIATIONS (IN BRACKETS) AND STATISTICAL COMPARISONS FOR ROLE DIMENSIONS AND INDICES OF STRAIN

This table indicates significant differences between the groups on several variables. However, these differences largely reflect the confounding influence of the demographic and organizational variables, which are not controlled for in the analyses of variance. So, though the above table contains interesting descriptive statistics, an alternative method needs to be employed to obtain meaningful measures of the significance of the differences between the groups. A suitable alternative is given by partial correlations of each variable with A, X and B group membership, with the linear effects of the five demographic and organizational variables partialled out. When the A, X and B groups are coded 3, 2 and 1 respectively, such partial correlations amount to one-way analyses of covariance with five covariates. In the above table, simple correlations between group membership and each of the variables are given. Almost identical statistical results are obtained (differences in significance level in two cases are not readily explainable). So, to consider differences between the three groups, with the effects of the demographic and organizational variables removed, partial correlations are presented in the following table.

	PARTIAL r	SIGNIFICANCE
Ambiguity	0,097	
Conflict	0,121	
Underload	-0,092	
Overload	0,183	** p < 0,01
General Anxiety/Tension	0,029	
Work-Related Anxiety/Tension	0,123	
General Depression	-0,066	
Work-Related Depression	-0,023	
Job Dissatisfaction	-0,011	
Hostility	0,145	* p < 0,05
General Self-Esteem	-0,044	
Work-Related Self-Esteem	0,058	
Fatigue	-0,068	
Absent Occasions	0,027	
Absent Days	-0,104	

Table 3.7.1.2: PARTIAL CORRELATIONS BETWEEN BEHAVIOURAL GROUP MEMBERSHIP AND THE ROLE DIMENSIONS AND INDICES OF STRAIN

With the effects of the demographic and organizational variables taken into account, the picture changes quite markedly. Relationships are insignificant, indicating no significant differences between the groups, for all variables except overload and hostility. For both these variables, relationships are positive. Thus, increased perceived overload tends to be associated with more highly developed Type A behaviour, as does increased hostility. The overload result represents some support for hypothesis b) 6, but expectations regarding Type As having higher levels of perceived conflict and ambiguity, and lower levels of underload, were not fulfilled. Similarly, the hostility finding represents some support for the exploratory hypothesis b) 7, but expectations regarding higher levels of strain across the board for Type As were also not fulfilled. It will be argued, however, that the hostility finding is particularly crucial.

3.7.2 Differential Relationships between the Role Dimensions and Indices of Strain across the Type A, X and B Subgroups

It is now possible to address the central question in this study — whether differential relationships between the role dimensions and indices of strain exist across the Type A and Type B subgroups. As mentioned earlier, relationships for the middle, unclassified, Type X group will also be considered. Initial analyses involve partial correlations between the dependent and independent variables for each of the groups with Fishers Z transformations (Fisher, 1932) and normal theory being used to determine the significance of differences between correlations across groups. These statistics are presented separately for each of the role dimensions. Finally, results of multiple regressions of each index of strain on the composite set of role dimensions are presented for each group.

3.7.2.1 Role Conflict

	CORRELATIONS			Z DIFFERENCE SCORES		
	TYPE A	TYPE X	TYPE B	A - X	X - B	A - B
General Anxiety/Tension	0,228	0,197*	0,277*	0,19	0,56	0,34
Work-Related Anxiety/Tension	0,215	0,062	0,297*	1,00	1,55	0,51
General Depression	0,148	0,268**	0,367**	0,81	0,68	1,35
Work-Related Depression	0,173	0,354**	0,152	1,25	1,36	0,11
Job Dissatisfaction	-0,021	0,204**	0,228	1,37	0,19	1,41
Hostility	0,216	0,260**	0,287*	0,31	0,19	0,45
General Self-Esteem	-0,049	-0,238*	-0,218	1,19	0,12	0,96
Work-Related Self-Esteem	-0,132	-0,298**	-0,093	1,12	1,36	0,23
Fatigue	0,143	0,132	0,258*	0,06	0,87	0,74
Absent Occasions	0,189	-0,002	-0,058	1,19	0,37	1,41
Absent Days	0,248*	-0,041	0,055	1,81	0,62	1,75

$$r_{68}^{0,005} \approx 0,307$$

$$r_{68}^{0,025} \approx 0,236$$

$$r_{100}^{0,005} = 0,254$$

$$r_{100}^{0,025} = 0,195$$

$$r_{66}^{0,005} \approx 0,311$$

$$r_{66}^{0,025} \approx 0,240$$

* p < 0,05

* p < 0,01

Table 3.7.2.1: DIFFERENTIAL CORRELATIONS ACROSS THE TYPE A, X AND B SUBGROUPS FOR ROLE CONFLICT

The above table indicates that Type A behaviour does not have a moderating effect on the relationships between role conflict and indices of strain. All Z-scores based on Fisher's normal transformation are insignificant, which implies that relationships between role conflict and the indices of strain are statistically the same for all subgroups.

Critical values are given to make the point that correlations within each group, by virtue of the differing sample sizes, are compared with different values to determine significance. Hence, comparison of the relationships in terms of the significance of correlations is misleading. This applies mainly to comparisons between the Type X group and the others. However, with almost identical sample sizes in the A and B groups, it is interesting and informative to make such comparisons between these groups and to note the larger number of significant correlations for the B group than for the A group. Though, as pointed out above, all correlations may be considered as statistically identical, such a trend warrants attention and a possible explanation will be advanced later.

3.7.2.2 Role Ambiguity

	CORRELATIONS			Z DIFFERENCE SCORES		
	TYPE A	TYPE X	TYPE B	A - X	X - B	A - B
General Anxiety/Tension	0,223	0,155	0,139	0,37	0,12	0,45
Work-Related Anxiety/Tension	0,296*	0,065	0,240*	1,50	1,05	0,40
General Depression	0,277*	0,268**	0,379**	0,06	0,74	0,62
Work-Related Depression	0,357**	0,435**	0,394**	0,56	0,37	0,17
Job Dissatisfaction	0,120	0,336**	0,319**	1,31	0,12	1,19
Hostility	0,210	0,317**	0,039	0,74	1,79	0,96
General Self-Esteem	-0,181	-0,279**	-0,198	0,69	0,56	0,11
Work-Related Self-Esteem	-0,256*	-0,388**	-0,330**	0,87	0,43	0,40
Fatigue	0,076	0,191	0,332**	0,69	0,93	1,47
Absent Occasions	0,101	0,064	-0,226	0,25	1,79	1,87
Absent Days	0,129	0,038	-0,007	0,56	0,31	0,79

* p < 0,05

** p < 0,01

Table 3.7.2.2: DIFFERENTIAL CORRELATIONS ACROSS THE TYPE A, X AND B SUBGROUPS FOR ROLE AMBIGUITY

With no statistically significant differences in correlations across the Type A, X and B subgroups, it is clear that Type A behaviour does not

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have a moderating effect on the relationships between role ambiguity and indices of strain.

3.7.2.3 Role Overload

	CORRELATIONS			Z DIFFERENCE SCORES		
	TYPE A	TYPE X	TYPE B	A - X	X - B	A - B
General Anxiety/Tension	0,290*	0,114	0,219	1,19	0,68	0,45
Work-Related Anxiety/Tension	0,302*	0,186	0,500**	0,75	2,22*	1,36
General Depression	0,234	0,113	0,335**	0,75	1,48	0,62
Work-Related Depression	0,138	0,067	0,253*	0,44	1,17	0,68
Job Dissatisfaction	-0,123	0,047	0,186	1,06	0,87	1,75
Hostility	0,023	0,237*	0,209	1,37	0,19	1,07
General Self-Esteem	-0,199	-0,015	-0,185	1,12	1,05	0,06
Work-Related Self-Esteem	0,041	-0,044	-0,055	0,50	0,12	0,57
Fatigue	0,223	0,59	0,156	1,00	0,62	0,34
Absent Occasions	0,221	0,023	-0,104	1,25	0,74	1,81
Absent Days	0,268*	-0,094	0,107	2,31*	1,24	0,96

* $p < 0,05$

* $p < 0,01$

Table 3.7.2.3: DIFFERENTIAL CORRELATIONS ACROSS THE TYPE A, X AND B SUBGROUPS FOR ROLE OVERLOAD

Table 3.7.2.3 indicates that Type A behaviour does not have a moderating effect on relationships between role overload and indices of strain, in so far as differences between the Type A and B groups are concerned. However, the A and X groups differ in the relationship between overload and days absent, and the X and B groups in the relationship between overload and work-related anxiety/tension. In the first case, days absent correlates significantly and positively with overload in the Type A group, but negatively (insignificant) in the Type X group. In the second case, work-related anxiety/tension correlates positively with overload in both the X and B groups, but with significantly greater magnitude in the Type B group. Neither of these findings is particularly informative, as they involve the Type X group for which no particular hypotheses were formulated.

Although the subgroup associations between job dissatisfaction and overload are not significant, comparison of the relative magnitude and direction of the correlations between these variables across the groups is interesting (the difference between the A and B groups is close to significance). The negative correlation for the Type A group and positive correlation for the Type B group indicate that job dissatisfaction tends to decrease with overload for Type A individuals, but increase with overload for Type B individuals. This may be tentatively interpreted as evidence of a difference in the basic orientation of A versus B individuals with respect to what is considered dissatisfying and what is considered not dissatisfying (in Herzberg's [1966] terms) work.

3.7.2.4 Role Underload

	CORRELATIONS			Z DIFFERENCE SCORES		
	TYPE A	TYPE X	TYPE B	A - X	X - B	A - B
General Anxiety/Tension	-0,110	0,138	0,215	1,56	0,49	1,87
Work-Related Anxiety/Tension	-0,172	-0,023	0,028	0,94	0,31	1,13
General Depression	-0,039	0,223*	0,217	1,62	0,04	1,47
Work-Related Depression	-0,080	0,328**	0,237	2,56*	0,62	1,81
Job Dissatisfaction	0,415**	0,581**	0,430**	1,31	1,24	0,06
Hostility	-0,157	0,217*	0,230	2,37*	0,06	2,04*
General Self-Esteem	-0,006	-0,225*	-0,348**	1,37	0,87	2,04*
Work-Related Self-Esteem	-0,186	-0,277**	0,252*	0,62	0,19	0,40
Fatigue	-0,116	0,109	0,262*	1,43	0,99	2,21*
Absent Occasions	-0,017	0,300**	-0,003	1,98*	1,87	0,08
Absent Days	-0,060	0,216*	0,177	1,75	0,25	1,36

* p < 0,05

* p < 0,01

Table 3.7.2.4: DIFERENTIAL CORRELATIONS ACROSS THE TYPE A, X AND B SUBGROUPS FOR ROLE UNDERLOAD

This table indicates that Type A behaviour subgroups differ in relationships between underload and some indices of strain. Specifically,

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general self-esteem relates significantly and negatively to underload for the Type B sample but negligibly for the Type A sample. Thus, the general self-esteem of Type B individuals decreases as underload increases, while concomitant variation between these variables is not observed for the Type A group. Differences between the Type A and B groups also exist for hostility and fatigue. For both variables, relationships with underload are positive for the Type B group but negative for the Type A group. This suggests that Type B individuals respond to increased underload with greater hostility and fatigue, while Type A individuals respond with less hostility and fatigue. Comparison of the direction of relationships across the A and B groups suggests that the above significant differences are part of a general pattern. Though these differences are not all significant, it seems that Type B individuals respond aversively to underload, while Type A individuals generally respond positively, with the exceptions of job dissatisfaction and self-esteem. This will be discussed further later.

It should be noted that all but two of the correlations involved in the above significant differences are insignificant and, in statistical terms, should be seen as zero (given acceptance of the null hypothesis: $\rho = 0$). Therefore, it may be correctly argued that the only statistically meaningful difference is that for general self-esteem (which is the only difference score to retain significance when insignificant correlations are set to zero, for computation of this score). However, rigid application of statistical logic denies the existence of a more subtle psychological truth which is not always governed by issues of statistical significance. Therefore, statistical logic is not rigidly applied in these comparisons.

In addition to the above differences in relationships across the Type A and B subgroups, some significant differences between the A and X groups were found. Specifically, in the relationships between underload and work-related depression, hostility and occasions absent. In each case, relationships are positive for the Type X group but negative for the Type A group (also, significant in the former but insignificant in the latter). These findings are similar to those for the comparison of the Type A and B groups and suggest a similarity between the B and X groups, which suggestion is supported by consideration of Table 3.7.1.1. Thus, as far as underload is concerned, the moderating effects of Type A behaviour involve differences between the A subgroup and the other two, but not between the B and X groups themselves.

3.7.3 Differential Multiple Regressions of the Indices of Strain on the Composite Set of Role Dimensions across the Type A, X and B Subgroups

To consider the moderating effects of Type A behaviour, with the interrelationships of the role dimensions taken into account, multiple regressions of each index of strain on the composite set of role dimensions were computed, for each of the A, X and B subgroups. Results of these analyses are presented in the table below.

	TYPE A		TYPE X		TYPE B	
	R ²	p LESS THAN	R ²	p LESS THAN	R ²	p LESS THAN
General Anxiety/Tension	0,08	0,23	0,08	0,09	0,12	0,10
Work-Related Anxiety/Tension	0,23	0,00**	0,04	0,36	0,28	0,00**
General Depression	0,05	0,46	0,13	0,01**	0,27	0,00**
Work-Related Depression	0,10	0,14	0,27	0,00**	0,26	0,00**
Job Dissatisfaction	0,22	0,00**	0,39	0,00**	0,39	0,00**
Hostility	0,02	0,89	0,16	0,00**	0,13	0,07
General Self-Esteem	0,05	0,49	0,14	0,01**	0,20	0,01**
Work-Related Self-Esteem	0,16	0,03*	0,21	0,00**	0,25	0,00**
Fatigue	0,06	0,44	0,05	0,26	0,12	0,08
Absent Occasions	0,05	0,52	0,16	0,00**	0,04	0,63
Absent Days	0,06	0,45	0,12	0,02*	0,05	0,52

* p < 0,05

x = 0,10

x = 0,16

x = 0,19

* p < 0,01

Table 3.7.3: MULTIPLE REGRESSIONS OF EACH INDEX OF STRAIN ON THE COMPOSITE SET OF ROLE DIMENSIONS, ACROSS THE TYPE A, X AND B SUBGROUPS

Comparison of the magnitude of R² (the proportion of variation in the dependent variable accounted for by the independent variables) across

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the subgroups suggests that, in general and contrary to hypotheses, the role dimensions account for greater proportions of variation in the indices of strain for the Type B group than for the Type A group. However, it should be remembered that the effects of the demographic and organizational variables are not controlled for in these regressions. Thus, it may be that the stronger relationships for the Type B group reflect the confounding influence of these variables. Operationalized, this amounts to saying that the demographic and organizational variables may display greater concomitant variation with role dimensions and indices of strain in the Type B, than in the Type A, subgroup. Reasons for this are not readily apparent, but will be explored.

The above findings should also be seen in the light of differences in the structure of the subgroups, in terms of race, organizational level and age. As tables 3.4.1.3 and 3.4.4 indicate, the Type A group includes relatively many white males and more individuals at higher organizational levels, whereas the Type B group has a preponderance of lower level employees and Coloureds. There is also a trend towards Type A individuals being older than those falling into the Type B category. Thus, differences in questionnaire-answering behaviour between races, ages and levels in the organization would confound differential relationships across the Type A subgroups. Further, real differences across race, age and organizational level in relationships between role dimensions and strain would also confound obtained results. The possibilities and implications of the presence of these confounds will be discussed more fully later.

3.8 PARALLEL-FORM ANXIETY/TENSION SCALES ACROSS THE TYPE A, X AND B SUBGROUPS

Following a similar procedure to that employed in Section 3.6, correlations between the parallel-form, two-item tension scales included in Questionnaires 2 and 3 and the independent and dependent variables are given below, for each of the Type A, X and B subgroups. Comparison of the pattern of relationships across the three groups facilitates inferences with regard to differences in questionnaire-answering behaviour.

	TYPE A			TYPE X			TYPE B		
	QUES 2	QUES 3	DIFFER- ENCE	QUES 2	QUES 3	DIFFER- ENCE	QUES 2	QUES 3	DIFFER- ENCE
RDLE DIMENSIONS									
Conflict	238	68	170	257	89	168	251	153	98
Ambiguity	296	230	66	114	5	109	85	249	-164
Overload	537	140	397	266	125	141	605	331	274
Underload	-274	-214	60	49	74	-25	-240	19	221
\bar{x}	336	163	173	172	74	98	295	188	107
INDICES OF STRAIN									
Gen Anxiety/Tension	379	377	2	254	304	-50	322	229	93
W-R Anxiety/Tension	462	679	-217	253	403	-150	485	448	37
Gen Depression	450	517	-67	366	318	48	392	342	50
W-R Depression	294	500	-206	308	156	152	250	432	-182
Job Dissatisfaction	9	232	-223	219	216	3	27	165	-138
Hostility	217	204	13	152	182	-30	336	96	240
Gen Self-Esteem	-330	-238	92	-232	-261	-29	-203	-193	10
W-R Self-Esteem	-47	-175	-128	-243	-261	-18	6	-304	-298
Fatigue	290	273	17	38	76	-38	136	273	-137
Absent Occasions	152	214	-62	12	-72	-60	-227	-244	-17
Absent Days	193	248	-55	-11	-93	-82	34	-48	-14
\bar{x}	275	355	-80	230	242	-12	240	276	-36
	Interscale r = 517			Interscale r = 200			Interscale r = 339		

Table 3.8: COMPARISON OF RELATIONSHIPS BETWEEN PARALLEL-FORM TENSION SCALES AND ROLE DIMENSIONS AND INDICES OF STRAIN, ACROSS THE TYPE A, X AND B SUBGROUPS (x 1000)

The above table clearly indicates that each of the tension scales generally correlates more highly with measures included in the same questionnaire, i.e. the scale included in Questionnaire 2 correlates more highly overall with the role dimensions than with the other indices of strain, while the opposite is true for the scale included in Questionnaire 3. As argued earlier, this may be seen to reflect questionnaire-specific response sets and/or fluctuations in strain. More importantly for the current concern is a clear trend towards the above pattern being more pronounced in the Type A subgroup than in the Type B subgroup, i.e. the tendency for each of the tension scales to correlate more highly with measures included in the same questionnaire is enhanced for Type A over Type B individuals. This will be interpreted in a number of ways. (Note: measures of association with the absenteeism scales are included in the above table for interest but are obviously not included in calculations.)

CHAPTER 4

DISCUSSION

4.1 IMPLICATIONS OF RESULTS FOR RESEARCH HYPOTHESES

4.1.1 Hypothesis 1: Role Dimensions

The results of the confirmatory factor analysis (Gold, 1984) (Section 3.2.1) clearly indicate that role conflict, ambiguity, overload and underload constitute meaningfully independent research variables. Hence, in general, the findings represent support for Hypothesis 1. Thus, the four/ role dimensions may be seen as valid constructs in organizational behaviour research. In practical terms, this means that it is valid to treat the role dimensions separately, i.e. to develop separate scales for each and to examine the relationships of each with the indices of strain.

To the knowledge of this author, this is the only study which has included a factor analysis of responses to conflict, ambiguity, overload and underload items. However, the extraction of factors labelled conflict and ambiguity represents support for earlier work (presented below) which has obtained two-factor solutions to factor analyses of conflict and ambiguity items only. Rizzo et al (1970) were primarily concerned with role conflict and ambiguity and extracted two factors closely paralleling these constructs in their factor analysis (see Section 2.2.1). Responses to items selected for the conflict and ambiguity scales subsequently developed by

these researchers were factor-analysed by Schuler et al (1977) and Szilagyi et al (1976). Both these studies support Rizzo et al's two-factor solution. In contrast, the identification, clarity and importance of overload and underload factors in the current data set do not occur in the context of a similar research history. Rather, in this regard, findings constitute initial empirical support for the constructural independence of these variables with respect to each other and to role conflict and ambiguity. The extraction of separate factors labelled conflict, overload and underload is particularly important. Clearly, though overload and underload may be described in terms of specific types of conflict (see Section 1.2.4.3), they have practical domains which are largely independent of those tapped by "purer" conflict items.

As described in Section 1.2.4.1-2, several theoretical components contribute to the definitions of role conflict and ambiguity. Thus, to achieve content validity, items were written to tap each of these components by Rizzo et al (1970). They found "that theoretical components of these concepts did not emerge as distinct factorial entities" (p.162) in their factor analysis. Similar results were obtained in this study, which are amenable to a number of possible explanations.

Firstly, it is possible that these components simply reflect theoretical distinctions and that, in practice, they occur largely concurrently. With regard to components of ambiguity, a lack of clarity of behavioural requirements and a lack of predictability of outcomes may both, typically, be seen as consequences of inadequate information flow from supervisor to

subordinate. It is likely that the quality and quantity of information dissemination does not differ across information types but is determined more by the quality of a supervisor's communications skills and predisposition to communicate. Thus, a relative sufficiency or insufficiency of information probably includes information pertaining to both components of ambiguity. With regard to conflict, the positions of foremen will be used to indicate similar practical overlap between components of this role dimension. The positions of foremen are commonly used as examples of roles including inter-sender conflict (between demands from above for stricter supervision and demands from below for more lax control — Section 1.2.4.1). However, in the opinion of this author, such inter-sender conflict is likely to be associated with conflict of the other types as well. To illustrate: foremen probably experience inter-role conflict by virtue of poorly defined group membership, i.e. management or workers; person-role conflict is likely to arise from disciplinary action required by the job in relation to primary identification with, and sympathy for, the workers; intra-sender conflict might well be experienced with demands from management or workers for stricter or more lax supervision, but with hidden agenda including a loss of respect in the event of submission to demands. Though this is a specific example and is drawn from a blue-collar, rather than a white-collar, environment (the focus of the current study), the point is clear: that the theoretical components of conflict may occur concurrently.

Secondly, it is possible that respondents discriminate between items at a broader meaning level and are less concerned with the specific

content of items. To the extent that the broader meaning level pertains to defined role dimensions and the specific content to theoretical components, this would also account for the absence of "distinct factorial entities" for components of conflict and ambiguity in the factor analysis.

Thirdly, it is possible that response alternatives are not sufficiently sensitive to register meaningful differences between items tapping components of the same dimension. With a seven-point Agree/Disagree scale having been used, it is clear that the provision of accurate, discriminatory responses may not have been facilitated.

In summary, alternatives exist for the practical value of the theoretical components: either they have little practical significance and hence have not been identified here, or they actually are relevant, but have simply not been identified in this (or prior) factor analyses. The above argument for the parallelism of the components represents a case for the first alternative, while the second and third points constitute possible reasons for these components not having been identified, given the second. On balance, it is suggested that the actual state of affairs is probably described by the first alternative. Hence, it may be tentatively concluded that the specific content (with respect to components) of items included in the scales developed to measure each of the role dimensions (Section 3.2.2) does not actually matter, provided that the general content (i.e. superordinate meaning) pertains to the dimension which the item was written to tap. Following this, the scale formulated in this study to measure role ambiguity is not seen only as a measure of clarity of

behavioural requirements (as all items included in the scale are drawn from this component of the dimension — as in Rizzo et al's scale) but is also seen as a more general measure of ambiguity, and is labelled as such. Similarly, the conflict scale is given a general label, though it does not include items tapping the component of inter-sender conflict.

The above comments with respect to labelling clearly address the question of whether these scales are valid measures of what they purport to measure and obviously the label assigned to a scale is of superordinate importance in this regard. A more detailed examination of the validity of the scales (Section 3.2.3.2) revealed that a wording confound (reflecting comfort, rather than stress, wording) is present in the ambiguity scale (and possibly in the underload scale, though this is not likely to be the case). This examination of the factor loadings of items contributing to the ambiguity scale also revealed a significant difference in loadings across intended meanings, reflective of the significant weighting of this scale towards role ambiguity as well (similar comments apply to the underload scale). Therefore, the ambiguity scale measures both a generalized tendency to express comfort in the role as well as the perception of role ambiguity (when reverse-scored). Thus, at least one of the scales developed here is known to have less than satisfactory validity and results pertaining to this variable should therefore be treated with some caution. However, the current scales are far less badly affected than those formulated by Rizzo et al, as indicated by Tracy and Johnson (1981) and discussed in Section 3.2.3.2. This has implications for future research and is discussed in Section 4.4.

The presence of the wording confound in the ambiguity scale, arising from the presence of this confound in the extracted factor (Factor 3, Table 3.2.1.9) on the basis of which the scale was developed, means that results of the factor analysis do not provide unqualified support for Hypothesis 1. Rather, results indicate that role conflict, overload, underload and comfort/ambiguity (reverse-scored) constitute meaningfully independent research variables. This implies that the extraction of the factor labelled ambiguity may point to the grouping of items expressing comfort as well as to the grouping of items expressing ambiguity (when reverse-scored). However, the fact that the ambiguity scale gives rise to a significant difference across intended meanings, as described above, means that this qualification is only mildly cautionary. There is certainly no suggestion that this challenges the overall support for Hypothesis 1 to any marked degree.

4.1.2 Hypothesis 2: Relationships between Role Dimensions and Indices of Strain

Overall, the obtained relationships between role dimensions and indices of strain (presented in Tables 3.5.1 and 3.5.2.1) provide considerable support for Hypothesis 2. Though some differences in the pattern of relationships between the sets of variables emerged and notwithstanding the limitations of the methodology (particularly with respect to cause and effect but others as well), these findings (as multiple corroboration of results from several studies) suggest that role conflict, ambiguity and overload may be

described as role stressors. Results indicate that underload is also a source of the experience of stress and may therefore be described as a role stressor as well, though this conclusion is more tentative as it is not based on multiple corroborative evidence.

Both role conflict and ambiguity were found to relate significantly to all psychological indices of strain and in the hypothesized directions (i.e. negatively with the self-esteem measures and positively with the rest), but did not display significant associations with the absenteeism measures. Thus, the experiences of role conflict and ambiguity are associated with a broad range of indicators of mental health. Consequently, results replicate findings from many earlier studies (discussed in Sections 1.5.3.1 and 1.5.3.2) which have generally found such associations between these role dimensions and indices of strain. Clearly, the positive correlation between role conflict and ambiguity ($r = 0,47 : p < 0,01$), as well as the significant associations between the psychological indices of strain (all $p < 0,01$), contribute to the similarity of findings with respect to these role dimensions (intercorrelations amongst the IVs and DVs themselves were expected on the basis of their theoretical and practical overlap — see Sections 1.2.4; 2.2.2; 3.2.6; 3.3.3). However, it is unlikely that such a pattern would emerge without some real foundation. Thus, though some studies have yielded insignificant associations between role conflict and ambiguity and some indices of strain, the current findings constitute multiple corroborative evidence of these role dimensions as stressors, in terms of psychological indices of strain. The absence of significant associations between these variables and the absenteeism measures parallels

Van Dijkhuizen's (1980) findings but not Gross et al's (1958). Van Dijkhuizen would argue that this finding may be seen as support for his sequential model of strain, though it may equally well be seen as a reflection of the unreliability/poor validity of absenteeism as an index of strain, as a consequence of multiple causation (Aldridge, 1970). This will be discussed in more detail when support for hypotheses relating to Van Dijkhuizen's sequential model of strain is evaluated.

In contrast to conflict and ambiguity, role overload and underload do not display patterns of association with the indices of strain similar to each other and nor are either of these patterns particularly like those for conflict and ambiguity. It is noteworthy that underload does not correlate significantly with either general or work-related anxiety/tension whereas overload displays significant, positive associations with both these variables. On the other hand, both role dimensions correlate positively with the depression measures while, most interestingly, underload exhibits a moderately strong, positive association ($r = 0,503 : p < 0,01$) with job dissatisfaction, while overload is unrelated to this index of strain. Further, overload, but not underload, is significantly, positively correlated with hostility, whereas underload displays stronger, negative associations with the self-esteem measures than does overload, as well as being the only role dimensions significantly correlated (positively) with the absenteeism measures.

Clearly, these findings represent support for this author's reinterpretation of Frankenhaeuser et al's (1971) work (advanced in Section

1.5.3.4) as evidence that overload and underload constitute sources of stress with qualitatively different effects. Underload may be seen as threatening internal needs and values while overload may be seen as threatening ability or sense of competence. Hence, it makes intuitive sense that underload is generally significantly associated with indices of strain that may be labelled "inwardly-directed" (i.e. depression, job dissatisfaction, self-esteem) while overload is generally more strongly associated with indices of strain that may be labelled "outwardly-directed" (i.e. hostility and anxiety/tension, in so far as these are associated with physiological arousal which prepares the organism for physical activity, Mowbray and Rodger, 1973). It is not altogether clear how the correlation of absenteeism with underload but not with overload may be accounted for within this formulation. However, given the significant association of job dissatisfaction with the absenteeism measures (see Table 3.3.3.1), in conjunction with the strong correlation between underload and job dissatisfaction, it is suggested that this result does not need to be accounted for theoretically as it is probably a consequence of the absenteeism/job dissatisfaction association. Notwithstanding this point, and bearing in mind the definition of absenteeism in terms of avoidance behaviour, the results as they stand are consistent with Brook's (1973) finding that underpromotion may result in avoidance behaviour of various kinds.

As underload has not previously been studied in relation to the psychological indices of strain included here, to the knowledge of this author, it is not possible to compare results with respect to this role

dimension with findings from other studies. However, a fair amount of research has been conducted on role overload, with mixed results having been found for relationships between overload and job dissatisfaction, self-esteem and absenteeism (see Section 1.5.3.3). Significant relationships between overload and anxiety/tension and between overload and depression, on the other hand, were found in all studies reviewed. Hence, current findings are consistent with previous research in most cases. The exception to this is the relationship between overload and fatigue, which is positive but which falls just short of significance, in contrast to the significant, positive correlation ($r = 0,32 : p < 0,01$) reported for the single study concerned with these variables (Behr et al, 1976). Since the fatigue scale taps "a subjective feeling of a lack of energy" (ibid., p. 43) and not fatigue specifically arising from work, it is perhaps not surprising that overload and this index of strain are not significantly related. However, this does not account for the inconsistency of the findings. It is suggested that Behr et al's significant correlation is probably a product of correlated "method variance" (Campbell and Fiske, 1959) enhanced by their simultaneous measurement of these variables, while measurements of these variables were staggered in this study.

As mentioned above, the insignificant correlation between job dissatisfaction and overload is interesting: in combination with the association of underload with job dissatisfaction, it suggests a weighting of some of the criteria employed by respondents in evaluating the presence/absence, and degree, of job dissatisfaction. (With the inconsistent previous findings, this suggestion is made only with reference to the current sample

— unless previous significant results may be accounted for by simultaneous measurement, no explanation is advanced for the lack of agreement between findings from this study and those reported by French and Caplan (1972) and Van Dijkhuizen (1980.) Bexton et al (1954) suggested that underload is likely to be stressful because of its presumably boring and uninteresting characteristics. Further, Frankenhaeuser et al (1971) found that subjects rated the boredom of understimulation as unpleasant. In comparison with the insignificant association between overload and job dissatisfaction, the highly significant relationship between underload and this index of strain, in conjunction with the above views, suggests that boredom is a characteristic of work more relevant for feelings of job dissatisfaction than excessive work demands/role requirements.

Frankenhaeuser et al's (1971) and Sales' (1969, 1970) studies indicate that overload may be a more aversive source of stress than underload, particularly with regard to cholesterol level, heart rate and the secretion of catecholamines but also with regard to tension, anger and lower self-esteem. Current findings question the general proposition that overload is more aversive but, in general, support the particular results upon which this proposition is based. Clearly, overload is more aversive in terms of anxiety/tension and hostility (presumably related to anger) and, to the extent that these are primarily responsible for physiological arousal (Mowbray and Rodger, 1973), is likely to have stronger associations with physiological indices than underload. However, in ignoring depression and dissatisfaction the above researchers have painted only half the picture for it is in the area of affective psychological indices of strain that underload

reveals its strain-inducing characteristics. Contrary to Sales (1970), this study indicates that underload has greater implications for low self-esteem than overload. Therefore, the current findings indicate that the relative aversiveness of overload and underload depends upon the particular classes of strain being examined. Overall, it does not appear that either constitutes a more aversive potential source of stress than the other.

To explore the relationships between the role dimensions and indices of strain further, multiple regressions of the latter variables on the former were carried out. These analyses have the advantage of including a control for the interrelatedness of the independent variables (role dimensions) and lead to the formation of composite measures of the separate relations of the independent variables with a particular dependent variable. Thus, general statements regarding the relevance of role demands for well-being are facilitated. However, these analyses do not include a partialling out of linear effects of the demographic and organizational variables. Further, and as for the partial correlations described above, such procedures do not allow for removal of the effects of the interrelatedness of the dependent variables, across analyses. Hence, the percentages of variation in the indices of strain accounted for by the set of role dimensions (Table 3.5.2.1) have limited usefulness. The effects of confounding by the demographic and organizational variables may be seen in the significant R^2 's pertaining to associations between the absenteeism measures and role demands, in contrast to the negligible partial correlations displayed with the single dimensions. Similarly, the insignificance of the relationship between fatigue and role demands, in

contrast to the significant partial correlations with conflict and ambiguity, points to such confounding as well. Notwithstanding these points, the multiple regression analyses indicate that highly significant proportions of variation in all indices of strain other than fatigue are accounted for by the role demands. It is clear that, with the exception of job dissatisfaction, the magnitude of these percentages is small, with several indices of strain having less than 10% of their variance accounted for by role demands. Such magnitudes of association were expected (Section 1.5.1) considering the selection of a small subset of potential stressors as well as the likely existence of non-stress related contributors to the variables thought to be reflective of strain (e.g. personality). Similar comments apply to the partial correlations discussed above. However, though the percentages of variation explained are generally small, they are also usually highly significant. Thus, to the extent that these analyses provide information uncontaminated by demographic and organizational confounds, they provide additional, limited support for Hypothesis 2.

In conclusion, though some of the relationships between the role dimensions and the indices of strain are insignificant (particularly with respect to the absenteeism measures but also various relationships between role load and psychological indices of strain, as well as fatigue in the multiple regression analysis), the weight of evidence clearly suggests that role demands are relevant for psychological ill-health and lack of well-being. The wording confound in the ambiguity scale urges tentative conclusions with regard to this variable while limitations of the study (to be discussed later) preclude the making of definitive statements. However,

as the results stand, they represent considerable support for Hypothesis 2 and, consequently, for the labelling of role conflict, ambiguity, overload and underload as role stressors.

4.1.3 Hypothesis 3: Type A Behaviour as a Moderator Variable

Examination of the differential relationships between the role dimensions of conflict, ambiguity and overload (underload is discussed below) and indices of strain, across the Type A and B subgroups (Tables 3.7.2.1; 3.7.2.2 and 3.7.2.3, respectively), reveals that these relationships are not stronger for the former subgroup than for the latter. In fact, there is a trend (particularly with regard to conflict and ambiguity and, to a lesser extent, to overload) towards the magnitude of the correlations being higher for the Type B subgroup than for the Type A subgroup. Related to this is the pattern of more, significant relationships between the role dimensions and indices of strain for the group classified as less coronary-prone than for the group classified as more coronary-prone. Further, multiple regressions of the indices of strain on the composite set of role dimensions, across the Type A and B subgroups (Table 3.7.3.1) indicated that, with the exception of the absenteeism measures (and here the differences in R^2 are of the order of only 1% for each measure), larger proportions of variation in the indices of strain are accounted for in the Type B subgroup than in the Type A subgroup. The computation of mean R^2 s yielded values of 0,10 for Type A and 0,19 for Type B. Clearly, Type A behaviour does not moderate relationships between the role dimensions and indices of strain

(at least, not in the hypothesized direction) and findings therefore lead to rejection of Hypothesis 3.

With only limited empirical evidence for Type A behaviour as a moderator variable (i.e. isolated effects reported by Caplan and Jones (1975); French and Caplan (1972) and Keenan and McBain (1979) — see Section 1.5.3.5), the present findings are consistent with a reasonable body of research material. Inconsistencies exist with just two reported effects on relationships between variables included in the present study — that reported by Caplan and Jones on the relationship between changes in subjective workload and changes in work-related anxiety/tension and that reported by Keenan and McBain on the relationship between role ambiguity and job satisfaction. In contrast to Caplan and Jones' correlations between workload and anxiety/tension of 0,54 for the A group and 0,27 for the B group, correlations of 0,302 and 0,500 were obtained here for the A and B groups, respectively. Similarly, in contrast to Keenan and McBain's correlations between ambiguity and job satisfaction of -0,70 for the A group and -0,26 for the B group, correlations of 0,12 and 0,319 (for job dissatisfaction) were obtained here for the A and B groups, respectively. Clearly, constructive replication of some aspects of Caplan and Jones's and Keenan and McBain's studies does not resolve the conflict between them and, quite obviously, adds to it.

In view of the fact that independent and dependent variables were measured simultaneously in both the above studies, the possibility that Type As have more pervasive response sets than Type Bs was explored in

the current study, as a way of accounting for the inconsistent results (though Caplan and Jones conducted a longitudinal study, both sets of variables were measured at Time 1 and Time 2 — the two sets of simultaneous measures and the analysis of change scores reduced to simple simultaneous measurement, for the current purposes). Table 3.8.1 revealed that the tendency for the parallel-form tension scales to correlate more highly with measures included in the same questionnaire is more pronounced in the Type A group than in the Type B group. Several possible explanations for this trend exist, and these are discussed below.

Firstly, Type A individuals may display greater fluctuations in strain than Type Bs. Were this the case, correlations between the Questionnaire 2 scale and the indices of strain, as well as between the Questionnaire 3 scale and the role dimensions, would be appreciably lower for Type As than similar correlations for the Type Bs. Given that such a pattern does not manifest in Table 3.8.1, this explanation seems unlikely. Secondly, it may be suggested that Type Bs have more durable response sets than Type As which contribute to the greater similarity of relationships across questionnaires displayed by this group. Were this the case, correlations between the tension scales themselves would almost certainly be higher for the Type B group than for the Type A group. In fact, the A group interscale correlation is somewhat larger than that of the B group (0,517 as opposed to 0,339). Hence, there is some evidence to suggest that this is also an unsatisfactory explanation. Thirdly, and statistically the most satisfactory way of accounting for the observed trend, it is possible that Type A individuals have more pervasive response sets. Examination of the

mean (absolute) correlations of each of the tension scales with measures included in the same questionnaires indicates a trend towards such correlations being higher for the A group (0,336 and 0,335 for questionnaires 2 and 3, respectively) than for the B group (0,295 and 0,276 for questionnaires 2 and 3, respectively). Though this trend is only moderate here, it may well become a full effect and confound results where Type A and B subgroups are more homogeneous (e.g. computer users or, male, middle managers' as in Caplan and Jones' and Keenan and McBain's studies). In clarification of this point: though the effects of the demographic and organizational variables within subgroups are partialled out in this study, differences in the variables between subgroups are not controlled for. (In passing, this constitutes a criticism of the present study.)

Thus, to the extent that Type A's do, in fact, have more pervasive response sets than Type Bs, the simultaneous measurement employed in the above studies may explain the inconsistency in findings. However, this possible explanation does not account for why such moderating effects of Type A behaviour were not found for all relationships investigated in the studies under discussion. Further, and this relates to the present findings, in association with whether or not simultaneous versus staggered measurement is even a relevant issue here, it is not all clear what the substance of such a response set might be. Most possibilities, such as social desirability, acquiescence, deviation, etc. are supposedly based on personality traits (Anastasi, 1976) and would therefore be expected to have consistent effects on the responses given by any one individual over time.

Similarly, to the extent that Type A behaviour arises from stable personality traits (in interaction with suitably challenging environments), any characteristic Type A response set would also be expected to contribute to consistent effects over time. In light of this, it may be argued that the question of simultaneous versus staggered measurement is irrelevant and, consequently, that the possibility advanced above of a characteristic Type A response set would lead to stronger relationships between stressors and strains, irrespective of the temporal spacing of measures of these variables. Bearing in mind that such relationships between stressors and strains tend to be even weaker for the Type A group than for the Type B group in the current study, it is clear that the suggestion that Type As have more pervasive, enduring response sets than Type Bs is not valid.

Rather, for the idea of Type A response sets to account for Caplan and Jones' and Keenan and McBain's findings as well as to be consistent with current findings, it would be necessary for Type A individuals to have questionnaire-specific response sets, i.e. to respond generally uniformly to items in one questionnaire and to respond generally uniformly to items in a different questionnaire administered at some later stage, but for the basis of this uniformity to vary from administration of one to administration of the other. This is where the problem identified above becomes apparent, with regard to what the substance of such a response set might be, as the requirements challenge the traditional notion of stable response sets based on personality traits. Clearly, it is difficult to imagine any likely Type A response set (e.g. faking good, conceivably arising from a characteristic

mistrust of people [Newsweek, 10 September 1984] and, specifically, mistrust of this researcher with respect to the confidentiality of individual responses) varying markedly from one session to the next. However, rather than having specific stylistic response sets that vary, it is possible that Type As are simply more likely to respond to questionnaires with any response sets than Type Bs, i.e. Type As might have response styles (used in the sense of more global approaches to answering questionnaires [Anastasi, 1976]) which make greater use of response sets than Type Bs.

Seen in relation to Jenkins' (1978) and Rosenman's (1978) comments regarding the poor insight of Type A individuals, particularly into their behaviour but also more generally, it is possible that these individuals may well rely on response sets to impose some order/structure on questionnaire items. Further, it should be pointed out that the answering of a questionnaire is probably a "suitably challenging environment" (in terms of the definition of Type A behaviour), one that is likely to elicit aspects of the behaviour pattern in characterologically predisposed persons. Most importantly, then, the completing of a questionnaire may lead to efforts towards control. Thus, to the extent that questions about work rather than about themselves constitute qualitatively different challenges for Type As (which is likely considering their excessive job involvement), it is quite possible that they impose individually-based, qualitatively different structures, aimed at control, on questionnaires with dissimilar content, administered separately. (Of course, this argument supposes that such variations are less distinctive where items tapping dissimilar content are randomly mixed, as is usually the case in simultaneous measurement.)

Clearly, the above formulation suggests that the moderating effects isolated by Caplan and Jones and Keenan and McBain are explainable in terms of response sets and allows for the absence of visible, consistent response sets in the current Type A subgroup. Additionally, the implication inherent in this formulation, that Type As tend to respond to items with less regard for an accurate portrayal of themselves or of their work situation (of which they might anyway be incapable) than for the imposition of order/structure (and most vitally, control), may explain the trend towards even weaker relationships between stressors and strains for Type As than for Type Bs. However, as mentioned above, this formulation does not account for the presence of only isolated moderating effects in the earlier work and, further, is based on inadequate data. It is therefore at best, speculative. Alternative explanations for the inconsistency of findings are elusive. Though possibilities such as differences in testing conditions, samples and organizational climate may be introduced, it is not at all clear how these could operate to produce the observed inconsistencies. Therefore, in the event of the response style explanation being rejected, there seems to be little way of accounting for these differences satisfactorily (two possible exceptions are discussed later).

It has been argued that the absence of Type A moderating effects in this study is consistent with a preponderance of previous findings and that the effects reported by Caplan and Jones and Keenan and McBain may conceivably be a consequence of a characteristic Type A response style, in conjunction with the research design employed by these investigators. Clearly, the tone of the preceding discussion implies an acceptance that

Type A behaviour is not a moderator variable in stressor/strain relationships. Where, then, does this leave the conceptual framework upon which the moderating hypotheses for this variable are based? It is suggested that conflict, ambiguity and overload may not threaten Type As' achievement striving, by way of inhibiting successful job performance as much as was supposed. Though Type As' job involvement and needs for control may well enhance sensitivity to these role dimensions, the above suggestion implies that Type As do not necessarily perceive conflict, ambiguity and overload as constituting great impediments to success, possibly as a consequence of successful adaptation to them. There are no specific reasons for advancing such a suggestion, except that it seems the most likely point of breakdown is the transition from conceptualization to demonstration. Keenan and McBain propose a similar explanation for their findings of no moderating effects on the relationships between overload and job satisfaction and work-related tension. They suggest that overload is only aversive for Type A individuals when it is a barrier to successful job performance. Thus, "self-imposed overload, where the individual voluntarily takes on work in an effort to increase his performance effectiveness, need not result in feelings of psychological tension or lowered job satisfaction" (p.284). In fact, with hindsight, it is suggested that overload may well be a prerequisite for job satisfaction in Type As, rather than being aversive in this sense. This reflects Sales' (1970) view that Type As actively seek overloading positions and is discussed more fully later.

Kasl (1978) criticizes cross-sectional research of steady-state work environments from the point of view that "significant adaptations have long

since taken place" (p. 33). Bearing in mind the cross-sectional design employed here, and the possibility that Type As may learn to cope with role stressors so that they are not perceived as inhibiting performance effectiveness markedly, it is conceivable that greater concomitant variation between stressors and strains may only be observed for Type As where this group has low job tenure, though low company tenure may also be relevant. As only company tenure data were collected in the current study and this variable subsequently controlled for, the possibility that job tenure is itself an important moderator variable could not be explored. Thus, to the extent that Type As in the target organization may have high job tenure, there exists a possible explanation for Type A behaviour not having emerged as a significant moderator variable. This argument indicates that job tenure data should have been gathered in this study to enable its statistical control and constitutes a further criticism of the study. It is interesting to relate this possibility to Caplan and Jones' and Keenan and McBain's studies. The former study was opportunistic with the implication that the potential for adaptation by subjects to environmental demands was severely curtailed. Middle-managers attending an in-company training course constituted the sample in the latter study. Though some of the course participants may have been undergoing re-training, it is likely that many were new to their jobs. Clearly, both studies suggest that Type A individuals may have been in novel situations with respect to work. Thus, in the absence of controls for job or company/institution tenure in either and the insignificant results in this study with a steady-state work environment, it is speculated that job tenure may be a crucial moderator of the moderating effects of Type A behaviour. It should be pointed out

that this speculation still does not account for the fact that only isolated effects were observed by the above researchers.

The suggestion that many Type As in this study may simply not perceive role stressors as barriers to effective performance, as a consequence of successful adaptation to them over time, may be valid, but this reformulation is only called for by the insignificant effects observed. Clearly, such findings may reflect the true state of affairs, in which case it is necessary to reformulate the Type A conceptual framework. However, the possibility that rejection of the moderating hypothesis constitutes the committal of a Type II Error* should not be overlooked. Some factors that may have contributed to the making of such an error, in addition to the absence of controls for job tenure, are discussed below.

As mentioned previously, Type As reportedly have little insight into their behaviour and may be unreliable responders to questionnaire items. To quote Rosenman (1978): "In our own extensive experience over two decades, Type A individuals often have little insight into their Pattern A behaviour and are often totally inaccurate in their responses to a written questionnaire" (p. 57); and Jenkins (1978): "It is known that Type A individuals are often particularly lacking in insight regarding their own style of behaviour" (p.75). This is relevant for two reasons. Firstly, unreliable responses to questionnaire items will obviously result in unreliable (and possibly invalid) scale scores, with a consequent reduction in

* acceptance of the null hypothesis when it is false

the magnitude of correlations between stressors and strains. Thus, to the extent that Type A individuals do, in fact, respond unreliably to written questionnaires (and more so than Type Bs), there exists a likely source of a Type II Error (and perhaps an additional explanation for the trend towards relationships being even weaker for the Type A group than for the Type B group).

Secondly, if Type As are inaccurate in their responses to questionnaires, and particularly if they have little insight into their behaviour, the use of the JAS to measure Type A behaviour may mean that the A and B subgroups formed in this study are not entirely valid as discriminated subgroups of these individuals. Clearly, were this the case a Type II Error may well be made. Considerations such as the above, as well as Jenkins' (1978) suggestion that "Type B persons may feel it socially desirable to portray themselves as hard-driving and achievement orientated" (p. 75), have prompted some commentators to urge the use of the Structured Interview assessment, rather than questionnaire measures (e.g. Rosenman, 1978). This implication is that the unreliability of the questionnaire may "negate the value of later objective handling of the written responses" (ibid. p.157). However, the JAS has proven its validity as a measure of coronary-prone behaviour through prospective and retrospective prediction of CHD. Hence, the criticisms of this measure do not, themselves, seem completely valid, though the poorer predictability of the JAS for CHD than the Structured Interview (1,7 As to Bs versus 2,2 As to Bs, respectively) may reflect the more unreliable responses of Type As and their less adequate insight than those/that of Type Bs. Thus, the

reasonable validity of the JAS (particularly towards extremes of the scale — Note 3), in conjunction with the trichotomization of the sample into the upper 29,1% and the lower 28,2% of the distribution (based on the -5,0 and +5,0 critical points established in the WCGS), suggests that the subgroups may not be invalidly discriminated. Consequently, this does not suggest the basis of a Type II Error.

In this regard, it is interesting that the studies which did find moderating effects for Type A behaviour used measures of this variable which are far less adequately tested and standardized than the JAS. Vickers' (1973) four-item scale, Keenan and McBain's eight-item extension of this and the short scale used by Caplan (1971) in the Goddard study cannot compare with the JAS in terms of psychometric qualities, and nor have these measures been related to CHD, either prospectively or retrospectively. Hence, there is some suggestion that relatively sophisticated measures are not necessary to effect meaningful Type A/B splits. Alternatively, the short scales used by the above researchers may measure some unknown variable other than, or in addition to, Type A behaviour which, either alone or in combination with Type A behaviour, serves to moderate stressor/strain relationships. Further, all these studies used median splits to form Type A and B groups. Consequently, there is additional support for the notion that A/B splits need not necessarily be highly sensitive discriminations. The alternative, that the observations of Type A moderating effects somehow stem from median splits rather than trichotomizations, is unlikely.

Additional support for the view that Types A and B are not invalidly discriminated in this study arises from particular results which are in line with theoretical expectations concerning relationships between variables, i.e. particular results point to the construct validity of the sample trichotomization. Firstly, and importantly, is the finding that Type As report more overload than Type Bs (Table 3.7.1.2). Many studies have found such a relationship between Type A behaviour and perceived overload and it may be seen as crucial to the experience of Type A individuals (see Section 1.4.3). Secondly, Type A behaviour was found to be significantly (but weakly) and positively related to hostility (Table 3.7.1.2). As described earlier, easily aroused hostility and excesses of aggression are considered to be among the defining characteristics of a Type A individual. Hence, this finding also provides considerable support for the construct validity of the sample trichotomization. Both these results will be discussed more fully in Section 4.1.5 when hypotheses concerning the levels of role dimensions and indices of strain across the Type A and B subgroups are evaluated. Thirdly, though job dissatisfaction and overload were found to be insignificantly related for the full sample and are not significantly correlated for any of the subgroups, there is an informative trend in the data which is relevant here. The Type A group exhibits a negative relationship between these variables ($r = -0,123 : p > 0,05$) while this is positive for the Type B group ($r = 0,186 : p > 0,05$). Clearly, Type A individuals tend to have markedly different views from Type B individuals regarding what constitutes dissatisfying or not dissatisfying work, in Herzberg's (1966) terms. Specifically, overload is favourably received by Type A individuals but not so by Type Bs. This is consistent with the

orientation of Type As towards achievement striving and their active seeking of additional work and/or self-selection into overloading positions, with a view to increasing performance effectiveness. Hence, there is additional empirical support for the construct validity of the sample trichotomization. (Note: It has been pointed out that Type A's needs for control and job involvement, as components of their achievement striving, may be equally interpreted as suggesting overload to be a cause of job dissatisfaction or a prerequisite for job satisfaction. The current findings are better explained in terms of the latter hypothesis, advanced by Sales (1970). Hence, it is only given acceptance of Sales' views that this finding provides empirical support for the construct validity of the sample trichotomization. The tautology inherent in this argument is simply unavoidable in the interests of making full use of the data). It is also noteworthy that, though there is a trend towards a negative relationship between overload and job dissatisfaction for Type As, there are significant, positive relationships between overload and both measures of anxiety/tension for this group. On the other hand, the Type B group exhibits a significant, positive association between overload and work-related anxiety/tension as well as with job dissatisfaction. This may be loosely interpreted as suggesting that Type As but not Type Bs prefer "what is not good for them". It will be seen that a nearly opposite trend emerges with respect to underload, which gives more substance to this interpretation.

The conclusion that is inevitably drawn from the few preceding pages is that there are fairly pressing reasons for believing that the A and B subgroups formed in this study are valid as discriminated groups of these

individuals, rather than the reverse. Hence, the possibility that a Type II Error might have arisen from this source seems most unlikely. There are, however, two further issues that need to be discussed with regard to possible causes of a Type II Error. Firstly, rejection of the moderating hypothesis (3) in this study is based on the results of a series of multiple regressions of the indices of strain on the role dimensions (Table 3.7.3.1) as well as on the partial correlations displayed in Tables 3.7.2.1 - 3.7.2.3. As emphasized in the relevant section, the multiple regression analyses do not include a control for the effects of the demographic and organizational variables. Hence, it may be suggested that the absence of expected moderating effects as well as the trend towards more variation in the indices of strain being accounted for by the role dimensions in the B group than in the A group, can be explained by there being greater concomitant variation between the demographic and organizational variables and each of the sets of variables in the B group than in the A group. Rephrased, the suggestion is that Type B individuals reported levels of role dimensions and strains more related to their demographic and organizational status than did Type As. This could have arisen from Type Bs inferring levels of role dimensions and strains from such status to a greater degree than might Type As conceivably have done. However, there is little to suggest why Type Bs may have so responded. In fact, it is far more likely that Type As would have responded in this way, considering the possibility that these individuals may have little independent insight, in combination with their need to impose structure, and hence control, on questionnaire items (suggested above). Further, results of the multiple regressions indicate similar patterns of association to those exhibited by the simple

correlational analysis, for which the effects of the relevant variables were statistically controlled. Therefore, it is concluded that the absence of suitable controls in the multiple regressions has not contributed to the making of a Type II Error.

Secondly, as mentioned in the concluding paragraph of Section 3.7, differences in the structure of the A and B subgroups may have contributed to the making of such a Type II Error. It has been pointed out repeatedly that, though the effects of the demographic and organizational variables were partialled out within each subgroup, similar statistical controls for differences in these variables across the subgroups were not instituted (and nor, to the knowledge of this researcher, is such a procedure readily available). Hence, given that the Type A subgroup includes relatively many White males and more individuals at higher organizational levels, with a trend towards the inclusion of older respondents, there may be problems in this regard. Clearly, then, it is necessary to consider the possible implications of these differences for the current findings.

Examination of the formula for partial correlations, with the effects of one variable removed (Formula 14.27: Guilford, 1965), indicates that (generalized to more than one partialled-out variable) variations in the structure of subgroups are important in the event of one or both of two situations occurring: firstly, where these cause differences in the magnitude of correlations between, on the one hand, the role dimensions and/or the indices of strain and, on the other, the demographic and

organizational variables (the variables to be partialled out), across the subgroups; secondly, where these cause the magnitudes of simple correlations between independent and dependent variables to differ across the subgroups.

The former situation may occur as a consequence of, for instance, different ranges of variables between subgroups. In the current study, this is observed with respect to organizational level, with no managers in the Type B subgroup but several in the Type A subgroup. This may also occur with different loadings of subgroups with certain classes of variables. Here, the relatively high weighting of the Type A subgroup with males, particularly White males, and the relatively high weighting of the Type B subgroup with females, as well as Coloured males, is relevant. Consequently, variations in the structures of the A and B subgroups may be responsible for differences in stressor/strain relationships across these subgroups that are not solely attributable to variations in levels of coronary-prone behaviour. It is less easy to see the direction of effects that varying weightings of subgroups might have on differential partial correlations than it is to see the likely effects of the restricted range of organizational level in the Type B subgroup. As the magnitude of correlations generally increases as the ranges of the variables being correlated increase (Guilford, 1965), it is probable that partial correlations for the Type A group are computed with larger correction factors for the stronger association of the demographic and organizational variables with the role dimensions and indices of strain than are those for the Type B group. Hence, the different subgroup structures may account to some

extent for the absence of Type A moderating effects. However, it is most unlikely that this would account for the absence of moderating effects as well as the trend towards weaker relationships for the A subgroup than for the B subgroup — it is more reasonable to suggest that this may account for the trend towards weaker relationships only.

The second situation described above, with regard to the possible confound of differences in subgroup structures, may occur as a consequence of differences in questionnaire-answering behaviour between levels of the demographic and organizational variables. More specifically, this refers to the possibility that the tendency to respond to items with particular types of response sets may vary with the demographic and organizational variables, and concomitantly with the differences in these variables across subgroups. Alternatively, or in addition, differences in the magnitude of stressor/strain relationships between levels of those demographic and organizational variables which constitute the basis of subgroup variations would also cause the second situation. Obviously, this refers to the question of whether or not these variables are themselves moderators. The status of the demographic and organizational variables is not researched, and nor is it much discussed, in the literature reviewed. Similarly, with the apparent waning of interest in response sets (Anastasi, 1976), researchers have not explored this confound in the context of stress research and do not even caution the interpretation of their findings, while making extensive use of cross-sectional (simultaneous) measurement. Consequently, the literature offers little by way of clarification of these current concerns.

With the current data base, it is quite possible to explore thoroughly each of the suggested causes of the two situations described above as reflective of confounding by differences in subgroup structures. However, this analysis would entail an extremely time-consuming examination of:

1. the differences in relationships between the demographic and organizational variables and the role dimensions and indices of strain, across the A and B subgroups;
2. the differences in relationships between each of the parallel-form tension scales and the role dimensions and indices of strain, across levels of each of the relevant demographic and organizational variables; and
3. the moderating effects of each of the demographic and organizational variables for which the subgroups differ, as for the analysis of Type A behaviour.

Clearly, such an analysis is beyond the scope of this study (as pointed out in Section 1.5.1, with regard to moderating effects of race, sex, etc.) and emphasizes the necessity for future research to match individuals assigned to the A and B subgroups on all, conceivably relevant variables. Unfortunately, this procedure requires very large initial samples to achieve meaningful results and is likely to exceed the resources of all but the most affluent research centres.

In summary of the above discussion concerning the possibility of a Type II Error having been made in this study, it is clear that doubt must exist as to the validity of current findings. The foregoing discussion leads to the conclusion that the Type A and B subgroups almost certainly do not

represent invalid discriminations of the behavioural types. Hence, it is most unlikely that a Type II Error has arisen from this source. Further, the absence of controls for the demographic and organizational variables in the multiple regressions are also not seen as having contributed to the making of such an error. However, the lack of a control for job tenure, the possibility of unreliable questionnaire responses by Type As and the differences in structure of the A and B subgroups all present as significant obstacles to the drawing of a definitive conclusion regarding the status of Type A behaviour as a moderator variable, however tempting this might be. Notwithstanding this, the tests of the moderating hypothesis in this study lead to rejection of Hypothesis 3, with the guarded conclusion that Type A behaviour does not serve as a moderator of relationships between role demands and psychological and behavioural strain. Thus, to the extent that role dimensions have the potential to cause the experience of stress, and the previous section suggests that they do, they may be described as stressors equally for Type A and B individuals.

The focus of this section turns now to the exploratory findings for role underload. In the absence of previous research and with little conceptual clarity regarding the likely effects of Type A behaviour on relationships between underload and indices of strain, no specific predictions were made for these variables. It is ironic that Type A moderating effects were found for this non-directional exploration (Table 3.7.2.4) while no such effects were found with the role stressors for which a directional hypothesis was formulated. Table 3.7.2.4. indicates that a pronounced trend exists towards the direction of relationships between

underload and several indices of strain differing across the A and B subgroups. Further, three of the relationship contrasts attain significance. In conjunction with the trends mentioned earlier with regard to differing relationships between overload and some indices of strain for the A and B subgroups, the findings for overload and underload are highly suggestive of important differences between Types A and B in responses to these role dimensions. Clearly, these results support the earlier conclusion that overload and underload constitute potential sources of stress with qualitatively different effects and suggest that this is particularly so across levels of coronary-prone behaviour. Thus, though the "effect" for overload is only a slight trend, it appears that Type A behaviour is a partial moderator of relationships between role underload and indices of strain. These points are more fully discussed below.

The significant relationship contrasts identified are those of underload with hostility, general self-esteem and fatigue. The contrasts indicate that

1. general self-esteem and underload are significantly and negatively related for the Type B group ($r = -0,348 : p < 0,01$) but that these variables display practically no concomitant variation for the Type A group ($r = -0,006$). This difference in the magnitude of the correlation coefficients is statistically significant ($p < 0,05$). The inference is that underload is a stressor for Type Bs but not for Type As, at least as far as the index of strain is concerned. It is noteworthy that this difference in the magnitude of the correlation coefficients across the coronary-prone and less coronary-prone subgroups is opposite to that hypothesized for differential

- relationships of role conflict, ambiguity and overload with the indices of strain;
2. there is a strong trend towards hostility and underload being positively related for the Type B subgroup ($r = 0,230$) and negatively related for the Type A subgroup ($r = -0,157$). The difference between these coefficients is statistically significant ($p < 0,05$) (refer to Section 3.7.2.4 for a discussion of the appropriateness of statistical tests on correlations that are themselves insignificant). The inference is that underload is a stressor for Type B individuals but tends to be adaptive for Type As; and
 3. fatigue and underload are significantly and positively related for the Type B subgroup ($r = 0,262 : p < 0,05$) while there is a moderate trend towards these variables being negatively associated for the Type A subgroup ($r = -0,116$). As for hostility, the difference between the coefficients is statistically significant ($p < 0,05$), with the similar inference that underload is a stressor for Type Bs but tends to be adaptive for Type As.

As mentioned in Section 3.7.2.4, these differences appear to be part of a fairly general pattern. It should be emphasized that few of the correlations being discussed actually attain significance. Consequently, much of this discussion may be criticized as interpretation of results that are not statistically meaningful. However, a pattern such as that exhibited in Table 3.7.2.4 clearly warrants attention, albeit tentative (refer to Section 3.7.2.4 for additional comments on this). The pattern is less reflective of differences in the magnitude of correlations than it is of

differences in the direction of relationships. The pattern indicates that relationships between underload and indices of strain tend to be positive for the Type B subgroup and negative for the Type A subgroup. In addition to hostility and fatigue (mentioned above), such trends exist for general and work-related anxiety/tension, general and work-related depression and days absent. Exceptions to this pattern are the relationships of underload with job dissatisfaction, general and work-related self-esteem and occasions absent. Clearly, Type A individuals tend to respond to underload and overload differently from Type Bs, at least for most of the indices of strain examined in this study. Thus, in general terms, underload may be described as aversive for Type Bs and adaptive for Type As. In passing, it is mentioned that these differential relationships for the A and B groups clearly indicate the practical significance of examining individual differences in stressor/strain relationships. The partial correlations for the total sample (Table 3.5.1) are insignificant for the relationships of underload with general anxiety/tension, hostility and fatigue, while the differential partial correlations for the same variables clearly display variations which are important for both theory and practice. In the terms used here, Type A behaviour is "masking" relationships between underload and these variables.

The above findings lend support to the alternative formulation described in Section 1.5.4, that underload implies the perception of control of the environment. It may therefore be perceived as reflective of some achievement and/or simply makes it easier for Type As to perform effectively. Hence, underloading work may inhibit the activation of efforts

was concerned with quantitative load while the current concern is with qualitative underload. Further, as Sales points out, no data directly relevant to the "perceived-success-as-beneficial" hypothesis are reported in the literature and nor is it clear how this may be reconciled with the fight-or-flight response and the general adaptation syndrome. Consequently, all that is relevant is that the notion that "success experiences" may have "beneficial" effects on strain has been mooted. Finally, of course, this does not explain why underload is adaptive for Type A and a satisfactory formulation is elusive (it should be noted that a statistical observation, to be reported later, may account for the observed pattern).

Though relationships between underload and many of the indices of strain are consistent with the trend discussed above, a number are not, i.e. as mentioned previously, job dissatisfaction, general and work-related self-esteem and occasions absent. The magnitudes of relationships between underload and occasions absent are minimal for both subgroups, as is that between underload and general self-esteem for the Type A subgroup. Therefore, these variables are not relevant here. However, both Type A and B individuals display significant, positive relationships between underload and job dissatisfaction ($r = 0,415 - A$; $r = 0,430 - B$: $p < 0,01$) while both display negative relationships between underload and work-related self-esteem; though this is not significant for the Type A subgroup ($r = -0,186 - A$: $p > 0,05$; $r = -0,252 - B$: $p < 0,05$). Thus, both groups find underload dissatisfying and, when they perceive it in their jobs, think less highly of themselves in the work context. In some senses, then,

underload is aversive for Type As, while it appears to be adaptive in others. In conjunction with the direction pattern discussed above, the emergent picture may be interpreted as suggesting that Type As find dissatisfying, and think less of themselves with respect to work for experiencing, a job characteristic that is "largely good for them". Type Bs, on the other hand, also find underload dissatisfying and think less of themselves in the work context for experiencing it, but this seems to be more appropriate considering the evidence that underload is aversive for them.

Thus, the findings for Type A individuals are consistent with the original formulation in Section 1.5.4 (which formulation is alternate to that discussed above), that Type As are likely to be sensitive to underload and find it aversive, by virtue of its potential implications for underachievement. Clearly, then, both formulations seem to be partly correct (i.e. that underload is aversive for Type As and is also adaptive), but in terms of different indices of strain. When the pattern of relationships between underload and job dissatisfaction in particular, across the behaviour pattern subgroups, is combined with the trends discussed earlier for overload, it becomes clear that differences between Types A and B with regard to differential responses to overload from underload display an interesting trend. In short, Type As find overload not dissatisfying while this role dimension is a stressor for them. On the other hand, they find underload dissatisfying while this role dimension may be largely adaptive in other senses. Type Bs find both overload and underload dissatisfying while these role dimensions are stressors for them.

Consequently, it may be suggested that the Type A achievement orientation results in seemingly inappropriate sources of dissatisfying work. In contrast, Type Bs have more appropriate sources of dissatisfying work.

In summary, the data indicate that Type A behaviour does have some moderating effects on relationships between underload and indices of strain and that these generally reflect differences in the direction of relationships, rather than in their absolute magnitudes. These differences seem to be part of a more general pattern which suggests that underload is a stressor for Type B individuals, while the direction of its associations with the indices of strain vary for Type As. Hence, at this stage of research, it is uncertain whether underload should be described as a stressor for Type As or not. It should be pointed out that the possible sources of a Type II Error conceded earlier with regard to the perhaps incorrect rejection of the Type A moderating hypothesis, for role conflict, ambiguity and overload, are obviously just as relevant for conclusions regarding underload, i.e. the lack of a control for job tenure; the possibility of unreliable responses by Type As; and the differences in structure of the A and B subgroups. Hence, the tentative conclusion of Type A behaviour as a partial moderator of relationships between underload and the indices of strain may reflect the committal of a Type I Error. Finally, differences between overload and underload in the directions of relationships with the indices of strain, across the A and B subgroups, should be seen in the light of differences in the direction of relationships between overload and underload themselves, across the A and B subgroups. The partial correlation between these role dimensions for the full sample is

minimal ($r = -0,069$). However, subsequent examination of the relationships for each of the behaviour pattern subgroups indicated that, though the partial correlations are insignificant, they differ markedly ($r = -0,170 - A$; $r = 0,166 - B$).* This implies that overload and underload will tend to yield similar relationships with the indices of strain for the B subgroup, but will tend to yield opposite relationships for the Type A subgroup. It is unclear to what extent this may be responsible for the observed pattern, but it is sure to have contributed. Therefore, inferences regarding variations in the direction of relationships of overload and underload with the indices of strain, across the behaviour pattern subgroups, should be treated with particular caution. In passing, it is mentioned that the trend towards a negative relationship between overload and underload for Type A individuals provides some support for the conceptual framework leading to the expectation that Type As would report less underload than Type Bs (discussed in Section 1.4.3). It will be seen in Section 4.1.5, however, that this expectation did not materialize.

(Note: The very real possibility that the difference in the relationships between overload and underload across the subgroups is responsible for the observed pattern, may be seen as critical evidence of the necessity for the partialling out of all variables other than those being studied in a particular correlation. Some reasoning as to why this was not done is presented in Section 3.2.6. In final justification of this, it needs

* these correlations are not presented in the results section

to be pointed out that such a procedure may be responsible for the committal of Type II, rather than Type I, Errors. The following example will illustrate this point: let overload and underload each correlate 1.0 with anxiety/tension and correlate 1.0 with each other. The partial correlation between overload and anxiety/tension with the effects of underload removed would be 0, as would the partial correlation between underload and anxiety/tension with the effects of overload partialled out. Hence, it would be concluded that role load does not have implications for anxiety/tension when this is not the case. It is suggested that, in the area of stress, it is preferable to make one correct decision and one Type I Error [by not partialling out the third variable] than it is to make one correct decision and one Type II Error [by partialling out the third variable]. This reasoning informed the current analysis.)

The final topic in this discussion of the implications of results for the hypothesis of Type A behaviour as a moderator variable in stressor/strain relationships, concerns the status of the subgroup labelled Type X. Little has been said about this subgroup throughout the current work, mainly because it arose simply as a consequence of the formation of the Type A and B subgroups and was not directly of interest. However, for the sake of completeness, it is noted that relationships between the role dimensions and indices of strain for this subgroup are similar to those displayed by the other subgroups in almost all cases. Several significant contrasts were found for relationships between underload and the indices of strain across the A and X subgroups. These reflect a similarity of relationships between underload and the indices of strain across the Type B

and X subgroups and clearly indicate a difference in direction of relationships for the Type A subgroup with respect to the others. As mentioned in Section 3.7.2.4, these findings point to a general similarity of the Type B and X subgroups, which is supported by the similarity of mean levels of role dimensions and indices of strain across these groups, displayed in Table 3.7.1.1. Further, significant contrasts were found for the A and X subgroups and the X and B subgroups, in correlations of overload with days absent and work-related anxiety/tension, respectively. The finding with regard to days absent reflects the difference between a significant positive relationship between days absent and overload for Type A individuals and an insignificant negative relationship between these variables for the unclassified group. The finding for work-related tension reflects a difference in the magnitudes of the positive relationships between this variable and overload, with the magnitude being greater for the Type B subgroup than for the unclassified individuals. Neither of these findings is particularly informative in isolation. Thus, it may be stated that the Type X subgroup does not emerge as involved in noteworthy Type A moderating effects, with the inference that the role dimensions may be described as stressors for this group as well.

4.1.4 Hypotheses a) 4 and 5: Van Dijkhuizen's Sequential Model of Strain

To the extent that comparison of the coefficients of determination of the role dimensions for general versus work-related indices of strain (presented in Table 3.5.3.1) constitutes a valid test of Van Dijkhuizen's Sequential

Model of Strain (which is questionable), the results suggest that relationships between role dimensions and general psychological strains are mediated by work-related strains (see Sections 1.3.1 and 1.5.1 for the underlying reasoning). Thus, there is some evidence to support the notion that role dimensions (as stressors) do not affect general well-being directly, but do so via their effects on work-related well-being (or quality of work-life) which, in turn have implications for general well-being (or quality of life). This is an intuitively reasonable proposition and is consistent with the sequence model originally tested by Van Dijkhuizen (1980) (see Figure 1.6). However, Van Dijkhuizen's findings led him to posit the general sequence model presented in Figure 1.7, in which work-related and general strains are seen as temporally coincident. It is unclear why similar statistical analyses (though age is not introduced here as a temporal dimension) should have yielded inconsistent findings. What is clear, however, is that the comparison of static coefficients of determination between classes of variables leaves much to be desired as a test of the sequential idea. Longitudinal, rather than cross-sectional, research is obviously far more appropriate here. The reader should also be reminded that the demographic and organizational variables were not controlled for in the multiple regressions. Therefore, differential coefficients of determination for the general versus work-related measures may reflect greater concomitant variation of the demographic and organizational variables with the role dimensions and work-related, rather than general, indices of strain. However, partial correlations display generally similar trends and it is therefore unlikely that the absence of controls for these variables in the multiple regressions are confounding results markedly.

Further, it may be suggested that the current findings are simply reflective of greater transparency of the work-related, as opposed to general, measures. An examination of items contributing to these scales, as well as their location within Questionnaire 3, indicates that response sets may have been more readily imposed on the work-related measures than on the general measures. Asking, for example, "How often do you feel this way in connection with your work?"

- a) I feel tense;
 - b) I feel anxious;"
- etc.

(Question 85) is arguably more transparent than asking respondents to indicate agreement or disagreement with a statement such as, "My hands and feet are usually warm enough" (Question 24). Further, as the items contributing to the work-related depression and anxiety/tension scales were each presented in single tables (questions 14 and 85, respectively) (to avoid the extensive repetition of space-consuming response alternatives), while those for the general indices were randomly mixed throughout the questionnaire, it is possible that the provision of more consistent (i.e. reliable) responses (arising from response sets) for the work-related, than for the general, measures was facilitated. In so far as greater reliability contributes to higher correlations (Guilford, 1965), the potential exists for response sets having contributed to the differential relationships observed for the general and work-related measures. Notwithstanding these problems with the statistical analysis and possibly with response sets, the relevant findings are amenable to the interpretation that work-related psychological strain mediates relationships between role dimensions and

general psychological strain. Thus, a limited examination of the exploratory hypothesis a) 4 implies that, in general, sources of occupational stress are likely to have their effects on general psychological strain via work-related strain.

Comparison of the percentages of variation in the absenteeism measures accounted for by the role dimensions with percentages accounted for by the same variables in the psychological strains, indicates that generally larger proportions are accounted for in the psychological strains than in the behavioural strains (see Section 3.5.4). Thus, to the extent that the comparison of coefficients of determination for these variables constitutes a satisfactory test of Hypothesis a) 5 (comments made above concerning this apply equally here), the findings support this directional hypothesis. It may therefore be suggested that relationships between the role dimensions and absenteeism are mediated by psychological strain. This is largely self-evident and has, in fact, even been assumed in parts of this report (e.g. Section 1.3.3). It is, however, important that some empirical support for this assumption is found which conforms with Van Dijkhuizen's (1980) findings and a large body of opinion (cf. Aldridge, 1970; Bass and Barrett, 1973). Though the finding that larger proportions of variation are accounted for by the role dimensions in the psychological, rather than the behavioural, indices of strain may be explained in terms of the mediating effects of psychological strain, it may equally be seen as a reflection of the notorious unreliability/lack of validity of behavioural measures as "indices of strain" (see Sections 1.3.3 and 1.5.3) — hence, as an excuse for, rather than as an explanation of, the observed pattern. Also relevant

here is the likelihood of little common "method variance" in objective versus subjective measures, though it is not impossible that respondents justify their absence to themselves through the perception and reporting of enhanced levels of role dimensions. However, it is argued that behavioural indices may often be apparently unreliable or invalid precisely because there are many variables which intervene between the experience of stress and behavioural consequences, i.e. mediating variables such as work-related and general psychological strain, psychosomatic complaints and actual physical illness (those specified in Figure 1.7.). Consequently, it seems valid to interpret the current findings as support for Hypothesis a) 5 with the concluding truism (?) that psychological strain mediates relationships between sources of occupational stress and behavioural strain.

4.1.5 Hypotheses b) 6 and 7: Role Dimensions and Indices of Strain across the Type A and B Subgroups

A series of one-way analyses of variance (Table 3.7.1.1) indicated that significant differences exist between the Type A and B subgroups in role conflict, ambiguity, overload, underload, work-related anxiety/tension and self-esteem and days absent, but with no significant differences between the subgroups for the remaining role dimensions and indices of strain. Examination of the subgroup means for the significant contrasts revealed that Type A individuals perceive more conflict, ambiguity and overload and less underload, while having higher work-related anxiety/tension and self-esteem and being absent for fewer days than Type Bs. Thus, initial

analyses provide support for the hypothesis of more overload for Type As and indicate that expectations regarding differential levels of the other role dimensions across the subgroups are upheld. Findings for the indices of strain are not as clear, with higher and lower levels than Type Bs of the two indices of strain for which significant differences were found (the lower level of strain referring to Type As higher self-esteem). Thus, expectations regarding higher levels of strain for Type As across all indices did not materialize.

As pointed out in Section 3.7.1, the linear effects of the demographic and organizational variables were not removed in conducting the above analyses of variance. However, Tables 3.2.4.2 and 3.3.1.2 indicate many significant associations of the role dimensions and indices of strain with the demographic and organizational variables, particularly with organizational level. Therefore, with a strong suspicion that the above findings reflect confounding by race, organizational level, etc., coronary-prone behaviour subgroup membership was coded (1, 2, 3 for B, X, A, respectively) and partial correlations of the role dimensions and indices of strain with this variable were computed. These analyses amount to one-way analyses of covariance with five covariates and yield an uncontaminated measure of differences between the A and B subgroups in levels of the role dimensions and indices of strain (uncontaminated, that is, by the demographic and organizational variables included in this study). It should be pointed out that significant partial correlations of this type suggest significant differences between the Type A and B subgroups only and not differences between either the A and X or X and B subgroups. In

clarification, it is clear that a significant correlation would be found where, for instance, the B and X subgroups have similar mean scores but both differ significantly from the Type A subgroup. Consequently, this analysis provides precisely those desired, uncontaminated measures of differences between the A and B subgroups which are of particular interest, but basically sacrifices the Type X data in the interests of developing such measures.

Results of this more appropriate analysis are presented in Table 3.7.1.2 and indicate that Type A individuals perceive more overload in their jobs than Type B individuals ($r = 0,183 : p < 0,01$) and have greater feelings of hostility than less coronary-prone individuals ($r = 0,145 : p < 0,05$). However, no significant differences between the subgroups in the remaining role dimensions or indices of strain emerged. Thus, a more realistic assessment of differences in the subgroups still leads to acceptance of the directional hypothesis b) 6, but does not support expectations regarding Type As perceiving more conflict and ambiguity and less underload than Type B individuals. The overload finding is consistent with much previous research (see Section 1.4.3) and, with the insignificant differences for conflict and ambiguity, findings precisely parallel those of Keenan and McBain (1979). (Unfortunately, all too often Caplan and Jones [1975] do not report relevant statistics and the difference between the Type A and B subgroups in reported workload is no exception.)

With regard to conflict and ambiguity, the implication is simply that Type As do not have clouded perceptions (purportedly associated with their

enhanced sensitivity to threatened control — Section 1.4.3) which heighten their experiences over those of Type Bs of whatever conflict and ambiguity is present in their work situations. It was suggested in Section 4.1.3 that Type As may be capable of adapting to role stressors over time. It is conceivable that such adaptation to demands may result in as realistic an appraisal of the work situation as that of Type Bs. As far as underload is concerned, the differences in the direction of the relationships between overload and underload across the subgroups indicate that there is a tendency for Type As to experience underload inversely to overload, and for Type Bs to experience them concurrently (Section 4.1.3). However, though Type As reported significantly more overload than Type Bs, there is only a slight trend in the direction of the related underload expectation. Therefore, the data suggests that Type A individuals differ from Type Bs in the extent to which they create overloaded positions for themselves (by self-selection into overloaded positions, adding to role requirements or simply perceiving greater loads with objectively similar environments than Type Bs) but do not display a significant, inverse concern with creating the experience of less qualitative underload (presumably because the experience of qualitative underload may imply some control and/or achievement). It should be emphasized that this assumes that Type A individuals create overload, rather than the reverse (see Section 1.4.3). In addition, as discussed in the same section, the overload result in isolation does not suggest which of the three potential sources (listed above) of Type As reporting more overload is most likely, or whether the actual scenario entails some interaction between some or all of these. However, findings for conflict and ambiguity indicate that the sensitivity argument, which

leads to the suggestion that Type As may perceive more overload than Type Bs in objectively similar situations, is unlikely to be pertinent (assuming that Type As do not differ in their sensitivity to conflict, ambiguity and overload). Hence, current findings encourage a leaning towards the Sales hypothesis: that the ambition, competitiveness and achievement orientation of Type As will lead them to select overloading positions, or to increasingly add to role requirements, in an attempt to constantly improve their positions (see Section 1.4.3). Clearly, opportunities for self-selection into overloading positions are limited. Further, personal interviews conducted by this researcher with a number of extremely Type A respondents yielded complaints regarding their inability to handle the number of tasks effectively that they had volunteered for, in their efforts to assist other departments and individuals (and thereby improve their positions, but at some personal cost). Though these are isolated cases and few in number (four), they suggest that the active seeking by Type As of additional tasks may well be the primary reason for the typical finding that this group reports more overload than less coronary-prone individuals.

Associated with expectations regarding Type As experiencing different levels of role dimensions to Type Bs, was an expectation that these individuals would have different levels of strain: specifically that, notwithstanding the suggestion of less underload for Type As, these individuals would display higher levels of strain than the Type B subgroup (see Section 1.4.3). This exploratory concern has its origins in the debate regarding the nature of the relationship between Type A behaviour and

CHD. With the implications of anxiety/tension, depression, hostility and job dissatisfaction for CHD (sources cited in 1.4.3) and with mostly significant relationships between the role dimensions and these indices of strain, higher levels of role dimensions and indices of strain for Type As than for Type Bs would directly implicate the work environment in the increased risk of CHD in Type As. In addition, of course, such a set of results would represent a satisfactory explication of the Type A/CHD link. In this study, the finding of higher levels of overload for Type As is accompanied only by significantly greater feelings of hostility for this subgroup over the Type B subgroup. Further, Table 3.7.2.3 indicates that overload and hostility are not significantly correlated for the Type A subgroup ($r = 0,023$). However, strong trends towards hostility being positively related to role conflict and ambiguity are observed in Tables 3.7.2.1 and 3.7.2.2 ($r = 0,216 : p > 0,05$ - conflict; $r = 0,210 : p > 0,05$ - ambiguity). Finally, Table 3.7.2.2 indicates that role ambiguity is significantly and positively related to work-related anxiety/tension and depression and general depression for the Type A subgroup, while further significant relationships for this subgroup are observed in Tables 3.7.2.3 and 3.7.2.4 between overload and work-related and general anxiety/tension, as well as between underload and job dissatisfaction. Consequently, bearing these results in mind, the following points may be made regarding the link between Type A behaviour and CHD.

Firstly, if the link between Type A behaviour and CHD is based on excessive elicitation of the fight-or-flight response and associated physiological "wear and tear", stimulated by enhanced perceptions of

overload for Type As, then this operates independently of higher levels of psychological strain. Rather, results suggest that this link can only be a direct one, between role perceptions and physiological strain and there is, in fact, some evidence that stressors (particularly objective demands) may have direct effects on physiological risk factors for CHD (cf. Kasl, 1978; Matthews, 1982). It should be pointed out that such a formulation contradicts the sequential model developed by Van Dijkhuizen (1980) and, at this stage, it does not seem possible to reconcile sequential theory and empirical findings without introducing the concept of the unconscious. This is likely to be fraught with difficulty and is not discussed further here.

Secondly, it needs to be reiterated that Type A moderating effects, of any type but in isolation from mean levels of strain, do not suggest the nature of the relationship between the behaviour pattern and CHD. In clarification, in addition to the moderating effect of Type A behaviour on the relationship between workload and anxiety/tension, Caplan and Jones (1975) found that the relationship between anxiety/tension and heart rate was greater for the Type A, than for the Type B subgroup. In conjunction with similar relationships to those reported above, between anxiety/tension and overload and underload for the Type A subgroup in this study, such a finding has been seen as suggestive of the process underlying the Type A/CHD link (e.g. *ibid.*). However, in the absence of differences between the behaviour pattern subgroups in levels of strain, these findings are clearly independent of the explication of the nature of this relationship (see Figure 1.8 and the ensuing discussion).

Thirdly, in the opinion of this author, the hostility finding is particularly crucial for the relationship between Type A behaviour and CHD. Excesses of aggression and easily-aroused hostility are amongst the most central definitional parameters of Type A behaviour (see Section 1.4.1). Thus, as argued in Section 4.1.3, greater feelings of hostility amongst Type As than amongst Type Bs (though this is relatively weak) constitutes some empirical support for the construct validity of the sample trichotomization. The hostility finding is consistent with results obtained by Carver and Glass (1978) and Van Egeren (1979) but not with Glass, Snyder and Hollis' (1974) finding, while mixed results were obtained in the Framingham Heart Study (Haynes et al, 1978). Glass et al found that, when Type A and B undergraduate students were interrupted during task performance, no significant differences between the groups in behavioural signs of irritation emerged, though there was a trend towards Type As showing more irritation. Carver and Glass found that Type A individuals increased the level of shock delivered to a learner, subsequent to their working on the same frustrating task. Van Egeren's results, with Type A-Type A, Type B-Type B and Type B-Type A dyads playing a modified Prisoner's Dilemma game, indicate that Type As engage in more aggressive behaviour in competitive interactions than Type Bs and particularly with other Type As. In the Framingham Heart Study, the Framingham Type A score was positively related to the experience of many bodily sensations when angry but not with the expression of anger outwardly or inwardly.

Several studies have suggested that hostility is a significant risk factor for CHD (e.g. Haynes et al, 1980; Matthews et al, 1977; Medalie

and Goldbourn, 1976; Williams et al, 1980). More recently, Williams at Duke University and Shekelle at Rush-Presbyterian St. Luke's Medical Centre have conducted several studies which provide considerable support for this hypothesis (reported in Tonus, March 1983; Newsweek, 10 September 1984). More detailed research indicated that the principal component of the hostility being measured was a mistrust of people. Hence, Williams and Costa label this component "cynicism" (Newsweek, 10 September 1984). Laboratory experiments have shown that hostile/cynical people secrete more plasma norepinephrine, epinephrine and cortisol in fight-or-flight reactivity than do those who are less hostile/cynical (Tonus, March 1983). With the established implications of these hormones for plaque buildup on artery walls (atherosclerosis), it is clear that hostility may well be a "heart-harming..... trait" (ibid. p. 4). Consequently, the current finding that Type A individuals have greater feelings of hostility than do Type B individuals presents as more than mildly interesting. Rather, in conjunction with the recent, empirical evidence reported above, it may well point to the nature of the relationship between Type A behaviour and CHD.

Fourthly, if hostility does present as the basis of the Type A/CHD link, it becomes a matter of the utmost importance to seek its origins. Hostility, or aggression, obviously has an etiology inclusive of far more, broadly-based factors than occupational stressors alone (this applies equally to all the indices of strain and is presented in Section 1.5.1 as one of the reasons for the expectation of only moderate degrees of relatedness between them and the role dimensions). Some theories of aggression which

point to the complexity of this variable are: Freud's theory of aggression as the death instinct turned outwards; Neo-Freudian frustration-aggression theory; and Bandura's Social Learning theory which conceptualizes aggression as a learned response (Hall and Lindzey, 1970). Clearly, then, in seeking the origins of hostility, it is necessary to go beyond occupational stressors, which can be seen as being subsumed by a much broader framework of potential causes of this strain. Notwithstanding this point, occupational stressors are the current concern and these provide some insight (assuming cause and effect) into the origins of hostility. In the absence of Type A moderating effects on relationships between hostility and role conflict, ambiguity and overload, the full sample correlations (Table 3.5.1) were examined, which indicate that these three role dimensions are significantly and positively correlated with hostility. For underload, however, Type A moderating effects suggest that this role dimension is likely to reduce Type As hostility but increase Type Bs (this result is largely discounted owing to the possibility of its being a statistical artefact — see Section 4.1.3). Hence, it may be tentatively suggested that the higher overload experienced by Type As contributes to their greater feelings of hostility. "Statistical cheating"*, or examination of the correlation between overload and hostility for the Type A subgroup alone (given above) suggests that this is not the case. Alternatively, it may be hypothesized that it is the experience of conflict and ambiguity which gives rise to hostility — here, examination of the A subgroup

* this is called "statistical cheating" because, in the absence of moderating effects for Type A behaviour, results for the full sample and not for the subgroups should be examined.

correlations (given above) lends credibility to this hypothesis, with strong trends in the direction of positive relationships between these variables. Therefore, in the absence of significant differences between the Type A and B subgroups in levels of role conflict and ambiguity, it is tentatively suggested that Type A individuals respond to these role dimensions with more hostility than Type Bs and that this establishes the increased risk of CHD in the former subgroup over the latter. The current findings therefore suggest only partial support for the exploratory hypothesis b) 7 but, in conjunction with the research cited, yield a particularly crucial result.

In concluding this discussion of the directional hypothesis b) 6 and related, exploratory concerns, as well as the exploratory hypothesis b) 7, which relate to the nature of the relationship between Type A behaviour and CHD, it should be emphasized that, in addition to the overload and hostility formulations, many other views exist regarding the nature of this relationship. These include the three formulations presented in Section 1.4.3 (i.e. component analysis, self-involvement and uncontrollability), as well as the greater denial of fatigue by Type As than by Type Bs (Note 4) and even the suggestion that Type B students drink more milk than their Type A counterparts (Hicks and Gaus, 1983)! The latter view is actually relevant, as research has shown that a lower calcium intake may contribute to hypertension (*ibid.*). Clearly, some overlap exists between the various views, not least because they reflect varying levels of analysis and specificity (e.g. greater denial of fatigue probably simply reflects Type A's desires to persevere with a task as long as is necessary to establish

control). Thus, many and varied explications of the nature of the relationship between Type A behaviour and CHD are advanced. This displays the general uncertainty surrounding the question. It is conceivable that the current hostility finding points to a more profitable line of enquiry.

4.2 PRACTICAL IMPLICATIONS OF RESULTS

For the full sample, results have shown that role conflict, ambiguity, overload and underload can be described as role stressors, i.e. that they have the potential to cause the experience of stress and, consequently, that they have implications for psychological health. However, the examination of moderating effects of Type A behaviour indicates that, while conflict, ambiguity and overload have similar implications for mental health in Types A and B, qualitative underload may not be described as a stressor for Type A individuals (and could even be adaptive), at least in some senses, but can be so described in terms of other criteria. At this stage, therefore, the overall impact of underload on Type As is unclear. The associated implication is that, if underload were removed from some Type As work environments, they would then develop poorer mental health in some ways. In the opinion of this author, this may be discounted, considering the fact that none of the negative correlations for the Type A subgroup attain significance, while there is a distinct possibility that these negative trends are an artefact of the negative association between overload and underload for this subgroup (see Section 4.1.3). Thus, in practical terms, it is suggested that efforts to deal with qualitative underload need not be constrained by the possibility that such efforts will have negative consequences for Type As — at the very least, it is reasonable to suppose that Type As are simply neutral to this role dimension. On the other hand, of course, the significant, positive correlation between underload and job dissatisfaction implies that a reduction in this role dimension is likely to have some positive

consequences for Type As. Thus, with reference to the broad aims of this study, the primary implications of the results are that work design practice should address issues of conflict, ambiguity and quantitative and qualitative load in organizational roles and that this may proceed independently of individual differences in the coronary-prone behaviour pattern.

A number of crucial issues arise from the above primary implications: the domain of stress management; the relationship between objective and subjective environments; and the generalizeability of findings.

Firstly, the domain of stress management (in the broader sense, inclusive of prevention): the stress model employed in this study, for the purposes of conceptualizing and operationalizing the experience of stress, highlights several possible means of intervention in the stress/ill-health link (Cox and Mackay's Transactional Model of Stress — Section 1.1.4). Cox (1978) presents these as:

- a) alteration of the actual demand;
- b) alteration of actual ability to cope;
- c) supporting existing ability to cope;
- d) alteration of cognitive appraisal;
- e) alteration of importance of coping;
- f) alteration of the behavioural response to (the experience of) stress;
and
- g) alteration of the physiological response to (the experience) of stress
(pps. 112-127).

Broadly speaking, a) may be achieved by environmental restructuring — in organizational contexts, by introducing changes at the systems or job design level (Moerdyk [1983]) lists socio-technical design, industrial engineering, management by objectives, role negotiation and (re)definition, work study, ergonomics and work environment change in this context); b) may be achieved by education, training and relaxation techniques; c) and d) by psychotherapy and drugs (e.g. tranquilizers or anti-depressants); e) by societal restructuring, and the development of more appropriate cognitive defences (e.g. sublimation) in counselling and psychotherapy (particularly psychoanalysis); f) by the development of more appropriate behaviours in counselling and psychotherapy; and g) by drugs (e.g. beta-blockers) and biofeedback techniques (Benson, 1975; Cox, 1978; Danskin and Crow, 1981; Levi, 1981; Marshall and Cooper, 1981; Moerdyk, 1983; Newman and Beehr, 1979). Clearly, a tolerably acceptable examination of available intervention methods would entail a discussion of industrial, organizational, clinical and counselling psychology, as well as psychopharmacology, while this is not necessary for the current purposes. Rather, it simply needs to be pointed out that two major dichotomies may be identified in the practice of stress management: firstly, intervention practice may be directly concerned with the environment (a) or with the individual (b-g); secondly, intervention practice may have the goal of preventing the experience of stress (a - e) or of counteracting its harmful effects (g - h). The current concern is with the determination of the need for improved work design and redesign in the area of organizational roles. Therefore, with its emphasis on alteration of the actual demand (a), work design and redesign represents an environmentally-based, preventative

approach to stress management. However, and this is the point of raising this issue, there are other, possibly equally effective approaches to dealing with the social-psychological stressors identified in this study. However, in the opinion of this author, "going to source", as it were, presents as the most desirable of the possible means of intervention listed above, while being more in keeping with the spirit of a preventative health psychology of work than, for instance, training employees to cope with role demands.

Moerdyk (1983) also stresses the importance of environmental restructuring, not as necessarily exclusive of other approaches but as an aspect of intervention, exclusion of which may prevent satisfactory solution of person-environment mismatch problems. Moerdyk notes that strategies aimed at improving person-environment fit can focus either on changing the individual (fitting the man to the job) or on introducing changes at the systems or work design level (fitting the job to the man). Returning to Cox's strategies of intervention, a) falls within the former approach and b) - g) within the latter. Moerdyk argues that, although the importance of techniques aimed at changing the individual cannot be challenged, they do involve problems, appreciation of which directs attention to those approaches which attempt to adapt the environment to the individual. Training, for example, involves difficulties such as poor transfer of skills and abilities from the training environment to the practical situation and the commitment of large amounts of time, money and effort. Moerdyk argues that the latter is a particular problem in the South African context. As regards strategies such as drug-administration, counselling, etc., "treatment" is aimed at "symptomatic relief" rather than at "curing the

disease" (ibid, p. 68) since they are not intended to modify the environmental conditions giving rise to the mismatch but, rather, attempt to adapt individual responses to environmental demands. In addition, problems may arise with such approaches due to their reliance on the motivation and/or ability of the individual to make use of, or apply himself to, the various techniques (Gavin, 1977; Moerdyk, 1983).

In light of the above, Moerdyk reaches the conclusion that "while..... person-oriented strategies go some of the way to solving many of the problems that arise from a person-environment mismatch, they are in themselves incapable of providing a total solution and attention must therefore also be given to organizationally — or environmentally — based interventions" (p. 68). He goes on to stress the importance of such interventions in the South African situation, pointing out that in a mixed economy in which cultural and educational differences can be very large, adaptation of organizational structures to the values and needs of the majority of the work force becomes increasingly important. Cherniss (1980) adds more weight to this argument with the point that "it is easier to restructure a role than to restructure the character of either an individual or a society" (p. 158).

Secondly, the relationship between objective and subjective environments: following the generally accepted view of stress as perceived (Shirom, 1982) (see Section 1.1.4), the operationalization of stress in this study was directed towards respondents' perceptions of the relative presence/absence of the various role dimensions in their work environments.

Hence, the practical utility of effecting changes in the objective environment, when it is the perceived/subjective environment that is important, is brought into question. House (1974) notes that a number of studies (e.g. Caplan, 1971; Caplan and French, 1968; French et al, 1965) have shown positive correlations between subjective work load and more objective measures, such as the average number of telephone calls and office visits received per hour. However, the generally low level of association between objective and subjective measures is widely reported (e.g. Kahn et al, 1964; Kasl, 1978; Sales, 1969; Shirom, 1982). In this regard, it is important to note that changes in the objective environment are unlikely to be accompanied by temporally coincident changes in an employee's perception of it — there is certain to be some delay, while subjective change is not likely to parallel objective change exactly. Hence, in cross-sectional research, simple, linear relationships between the measures should not be expected. Further, there is considerable dubiety associated with the reliability and validity of some objective measures. For example, the average number of telephone calls and office visits received per hour may largely depend upon the position held by the focal person rather than upon actual workload. In a similar vein, "objective" measures developed using other members of the role set as informants (e.g. Van Dijkhuizen, 1980) may be criticized for the introduction of alternative sources of subjectivity. Bearing in mind the dual subjectivity of his data, it is interesting that Van Dijkhuizen found a minimum, mean percentage agreement of 65,7 (and a maximum of 80,4) between opinions of the focal person and those of elements of the role set (superiors, subordinates, etc.) for variables such as task definition, importance of tasks, etc. It should

be pointed out that the composite of expectations of, and attitudes to, the focal person, held by elements of the role set, clearly constitute an important component of the "objective" environment perceived by this individual. Hence, particularly for role conflict and ambiguity, which mostly develop from poor interactions between the focal person and elements of the role set and which are therefore highly subjective dimensions, the pertinence of the objective versus subjective distinction becomes highly questionable. In the final analysis, of course, it is simply inconceivable that employees develop perceptions of their work environments which are unrelated to the objective environment and which are insensitive to it. Thus, in the opinion of this author, alterations to organizational structure and individual jobs which pertain to dynamics of the role dimensions are certain to have consequent, beneficial effects on employees' perceptions of role demands, though these effects may not be immediate or exactly parallel objective changes. It is conceivable that the efficacy of objective change will be enhanced by discussion of the purpose and substance of this change, prior to its introduction, with the employees concerned.

Thirdly, the generalizeability of findings: the Pocket Oxford Dictionary defines a "sample" as "a small part taken from a quantity to give an idea of the quality of the whole,....." (p. 737). The usage of the term in research methodology is identical to the standard definition. Hence, the employees obtained for this study may not be described as a sample, in the strictest sense of the word, as almost all individuals in the organization were assessed, with no attempt to randomly select employees

to obtain a representative sample. This implies that results are not generalizable to the population of employees of medium-sized insurance companies. Rather, the sample in this study is the target organization and, strictly speaking, results are therefore only generalizable to all other, medium-sized life insurance societies in the same urban centre (of course, this is largely an artificial distinction, as organizations are constituted by their employees). Further, as the sample is singular and, again strictly speaking, non-randomly selected, generalization of results should be tentative. However, though choice of the target organization was informed by its being readily accessible, there is little reason to believe that it differs markedly from other medium-sized life insurance societies in the region or in the country, i.e. the target organization is seen to be representative of the population of medium-sized life insurance societies in South Africa. Consequently, results are generalizable to this population of organizations.

Related to this question of generalizability is the assumption specified in Section 1.1.5, concerning any degree of conflict or ambiguity being "too much" (this is exclusive of overload and underload, for which dimensions items have discrepancy measures built in). There seems to be only one study (Kahn et al, 1964) which has implications for this assumption and, though their results suggest that it might not be completely valid, this is only for a small percentage of their sample (9%) (see Section 1.1.5). However, Kasl (1978) and Shirom (1982), amongst others, take issue with the methodology of asking respondents to report only whether or not a certain type of demand is present in their work

situations. To quote Shirom (1982): "getting unclear directives from the boss may be perceived by some respondents as a welcomed indication of an increase in their autonomy, beneficially affecting their resources, while other individuals may regard these directives as bothersome, detrimentally impinging [upon] their intellectual capability and time spent at work" (p. 32). Though Shirom's hypothesis is plausible, there is little evidence to suggest that this occurs to an extent likely to affect results markedly (mainly by default, as there appears to be only Kahn et al's (1964) study which addresses this question). Notwithstanding this point, the implications of this assumption being hopelessly wayward need to be explored. Firstly, as mentioned above, this would not have implications for overload or underload. Secondly, there would be no theoretical basis for the hypothesis of the current conflict and ambiguity measures as stressors, as person-environment fit theory would obviously be inapplicable (this is not really a practical implication but is included here for convenience). Thirdly, significant positive correlations of the current role conflict and ambiguity measures with the indices of strain would not be expected. As such correlations were obtained in the present study, it is unclear whether this means that the assumption is valid or whether, overall, actual levels of the role dimensions are so high or so low that they differ widely from many of the respondents' desired levels, to the extent of counteracting the effects of those respondents for whom desired levels are in accordance with actual levels (recalling that $\text{actual} > \text{desired} = \text{misfit} \longrightarrow \text{strain}$; $\text{actual} = \text{desired} = \text{fit} \longrightarrow \text{no strain}$). Fourthly, given the third point, efforts to reduce conflict and ambiguity could conceivably have the effect of causing greater misfits than before. Fifthly, related to

generalizeability, if the assumption is not fairly generally valid, then it means that implications concerning the need for work design and redesign would relate only to the target organization. In clarification, results would then simply indicate that, in the target organization, levels of conflict and ambiguity differed sufficiently widely from desired levels (but in an unknown direction) to be described as stressors. However, this would not say anything about levels of conflict and ambiguity per se. Hence, determination of the need for work design and redesign would have to be carried out on an organization-specific basis. This would be the case, unless it could be assumed that actual levels of these role dimensions were similar across all elements of the population of medium-sized life insurance societies in South Africa and that all employees of these elements had similar desired levels.

It is clear from the above points that the theoretical and practical utility of the ambiguity and conflict findings would be severely limited by the assumption of "any conflict or ambiguity is too much" being completely invalid. However, the fact that significant correlations of the current conflict and ambiguity measures with the indices of strain were obtained, in conjunction with the observation made in Section 3.2.5 that levels of the role dimensions are just slightly lower than those reported for the comparative data presented, suggests that this assumption is unlikely to have been a serious source of error in the current findings. Thus, it is suggested that, for practical purposes, employees' desired levels of conflict and ambiguity may generally be regarded as zero. Hence, findings for these role dimensions are thought to be generalizable to the population

specified above, though the possibility should not be overlooked that the specified assumption poses some potential problems in this regard.

In summarizing the three points discussed above, it is clear that the work design and redesign approach to preventative stress management (in the broader sense) is but one of a number of approaches that could be valuable in dealing with the role dimensions identified as stressors in this study. Further, changes to the objective environment are likely to have beneficial consequences for the experience of stress, though these effects may not be immediate or precisely parallel the objective changes. Finally, results are generalized to all medium-sized life insurance societies in South Africa, though a conceivably invalid assumption may prevent the generalization of conflict and ambiguity findings.

The practical implications of results have been expressed in terms of individuals. However, as pointed out in the section on behavioural strain (1.3.3), the experience of stress may have undesirable effects on organizational effectiveness, in terms of increased absenteeism and turnover, lower productivity, etc. Results of this study do not suggest that the role stressors lead to absenteeism directly but, as indicated by the work on Van Dijkhuizen's Sequential Model of Strain, via psychological strain and, particularly, job dissatisfaction. Further, role stressors may have implications for organizational effectiveness which transcend psychological and behavioural strain. For example, French and Caplan (1972) report results from the Goddard Study which indicate that role ambiguity is associated with a lack of utilization of intellectual skills and

knowledge and a lack of utilization of administrative and leadership skills. This suggests that an organization which is fraught with role ambiguity may not realize the full potential of its human resources, possibly because the channels for utilization of skills and abilities may be unclear or ambiguous. Thus, French and Caplan conclude that: "The upshot of all this is that role ambiguity may have far-reaching consequences beyond the strain which the individual experiences — consequences such as turnover of personnel and poor coordination which directly affect the efficiency and operating costs of any modern organization" (p. 312).

It was pointed out in the preface to this work that the orientation is "more towards determination of the need for improved work design and redesign than the precise manner in which satisfactory working environments should be structured". It is believed that the need for improved work design and redesign is established in the preceding pages. As the structure of satisfactory working environments is not the domain of this study, the reader is referred to Brief et al (1981); Hackman and Oldham (1980); Handy (1981); French and Caplan (1972); Marshall and Cooper (1981); Newman and Beehr (1979) and Stoner and Fry (1983) for some critical insights regarding work design in relation to the role dimensions of current concern.

4.3 LIMITATIONS/CRITICISMS OF THE CURRENT STUDY

In describing and discussing the results of the current study, a number of criticisms and limitations have been mentioned. These, together with some more general issues, are presented in this section. For convenience, point form is used.

1. Throughout this work, it has been assumed that relationships between role dimensions and indices of strain reflect cause and effect and that it is the role dimensions that "cause" strain. Now, correlations based on a cross-sectional, self-report methodology do not necessarily suggest cause and effect. Further, even if relationships are cause/effect, it is not certain that it is the role dimensions that cause strain rather than that individuals infer their levels of role dimensions from their feelings of anxiety/tension, job dissatisfaction, levels of absenteeism, etc. Recent work by Arsenault and Dolan (1983) and Parasuraman and Alutto (1984), using path analysis, suggests that it is the role dimensions that lead to strain, rather than the reverse. Notwithstanding this evidence, path analysis was not carried out in this study and some doubt must therefore exist regarding the direction of effect. The issues of cause/effect and direction of the effect need to be seen in relation to person-environment fit theory, which forms the theoretical basis of the current study. This theory suggests that, where an imbalance is perceived between the actual and the desired level of some role dimension, strain will result (see Section 1.1.5). Thus, the above critical assumptions are based on

some theorizing — when levels of role dimensions differ from desired levels, this misfit leads to strain. This does not change the fact that these assumptions are still largely "articles of faith" and together constitute one of the two most serious limitations of the current study.

2. The second of the two most serious limitations concerns the questionnaire methodology that was employed. In general terms, the questionnaire methodology may be criticized for introducing problems with response sets, the reliability and validity of subjects' responses, response alternatives that have different meanings for different subjects, etc. (Anastasi, 1976) into findings. In attempting to minimize the possibility of response sets inflating the true association between measures, assessment sessions were staggered, with one month intervals between each, while parallel-form anxiety/tension scales were included in the second and third questionnaires to facilitate a limited exploration of this pernicious, potential source of error. Results indicate that relationships with each of the scales are higher for measures included in the same questionnaire (see Section 3.6). This may be interpreted as an indication of the importance of staggered, as opposed to simultaneous, measurement but it also introduces the potential confound of fluctuations in stressors and strain between assessments. Kanner, Coyne, Schaefer and Lazarus (1981) and Shirom (1982) have pointed to the importance of "episodic, single-event-like demands" (Shirom, p. 32) in the development of stress. Thus, it is quite possible that a known source of error has

been reduced at the expense of introducing an alternative, relatively unknown one. Clearly, what is most desirable is that the effects of both response sets and fluctuations are neutralized. In this regard, it should be pointed out that it may, in fact, simply be impossible to control response sets. For instance, a "generalized tendency to complain or to be defensive" (Kasl, 1978, p. 27) would influence the response pattern irrespective of the temporal staggering of measurements. Consequently, the suggestion in Section 3.6 that the obtained measures of association can be seen as lower limits, of the association between the role dimensions and indices of strain, may not be valid. The self-report, questionnaire methodology also depends upon the reliability of a subject's responses as well as upon insight into, or perceptiveness with respect to, his or her work situation. The possibility that Type A individuals may be particularly unreliable and/or inaccurate responders has been discussed. However, there is little reason to suppose that Type Bs are themselves completely reliable or totally accurate (of course, validity in this sense largely subsumes reliability). Thus, there are a number of general problems with the questionnaire methodology (i.e. response sets, reliability/validity of responses, meaning of response alternatives [which was briefly mentioned earlier]) that, combined with the staggering of assessments, imply that results have to be interpreted with some caution.

3. In the previous section the implications of the assumption, that any degree of conflict or ambiguity is "too much", being invalid were

discussed. It was concluded that, for practical purposes, this assumption is probably sufficiently valid for the current conflict and ambiguity "environment" measures to yield meaningful results. However, the possibility that a small proportion of the sample may not perceive some conflict and/or ambiguity as too much, dictates that findings with respect to these role dimensions be treated circumspectly. It should be pointed out that this assumption is necessary in order to operationalize the role dimensions in terms of person-environment fit theory. Consequently, if this assumption can be shown to be highly questionable, or simply invalid, it is clear that dual-item discrepancy measures (with known pitfalls) would have to be re-introduced, as long as questionnaire measurement is still employed.

4. It is frequently emphasized that some stress is necessary for life (Selye, 1976). Given this maxim, the implications for stress management of correlations between role dimensions and psychological strain are open to question. In clarification, zero relationships between these sets of variables are not maximally desirable, as the work environment is therefore not a source of vital stimulation. On the other hand, strong relationships between role dimensions and psychological strain are also not maximally desirable as employees are therefore overstimulated (as distinct from its earlier usage in relation to overload) by the work environment. Clearly, some optimal level of relationship exists but this is a completely unstudied and therefore unknown entity, while it is difficult to conceive of research strategies for its satisfactory exploration. This is presented as a criticism of

this study as it is not addressed here, while being essential for an informed interpretation of the meaning of results (this point was not made in the section on practical implications of the results [4.2] as, quite simply, it is suggested that there are none — it is suggested that, until some clarity exists with regard to this question, it is preferable to adopt a conservative approach, ignoring this issue, and to treat identified stressors as undesirable).

5. This study may be criticized for the failure to include data for job tenure, in addition to those for company tenure. The possibility of job tenure being a crucial variable, mediating the effects of Type A behaviour on relationships between role demands and psychological and behavioural strain, was discussed in Section 4.1.3.
6. Though differences in the structure of the Type A and B subgroups, with respect to the demographic and organizational variables, were unavoidable, it was shown that this may be responsible for the absence of Type A moderating effects in this study (Section 4.1.3). Consequently, this constitutes a further criticism of the study.
7. Findings with respect to role ambiguity need to be treated cautiously, as this scale includes a wording confound (Section 3.2.3.2). More specifically, this scale reflects role ambiguity as well as a tendency to respond positively to items expressing comfort with the role (when reverse-scored).

8. The examination of qualitative underload in this study was exploratory. Hence, only two items (which subsequently formed the underload scale) were written to tap this role dimension. Thus, consisting of only two items, results with the underload measure must be seen as tentative.
9. Van Dijkhuizen (1980) shows that curvilinear regression techniques may often yield higher measures of association between independent (stressors) and dependent (indices of strain) variables than linear analyses. As linear statistical techniques were employed throughout this study, there remains the possibility that results are conservative and that Type II Errors have been committed. The failure to do path analysis, in considering the idea of the sequential emergence of strain, is a further statistical criticism.
10. As emphasized throughout much of the Results section, the interrelatedness of the role dimensions and the interrelatedness of the indices of strain imply that conclusions should be limited to more general statements of the associations between independent and dependent variables, as opposed to a detailed interpretation of each relationship (the rationale underlying the decision not to partial out non-involved, other than the demographic and organizational, variables in computing the correlations between particular role dimensions and particular indices of strain was detailed in Sections 3.2.6 and 4.1.3).

In concluding this presentation of some criticisms and limitations of the current study, it may be stated that many (actual or possible problems) exist. Thus, though it is regrettable, it is necessary to urge circumspection with respect to the treatment of findings.

4.4 IMPLICATIONS AND GUIDELINES FOR FUTURE RESEARCH

The present work has brought to the fore an abundance of issues demanding of further or initial exploration. These are presented in this section, while some general guidelines for future research that, in the opinion of this author, are essential for meaningful progress, are suggested. In general, point form is used.

1. As discussed in Section 1.1.5, future research should take care to operationalize stress in terms of a particular conceptualization, one that is both suitable for the subject matter and compatible with other formulations, rather than obtaining measures which have little theoretical basis. This would facilitate the interpretation and integration of research findings, but has not been the dominant trend in the literature reviewed.

It is suggested that use of the self-report, questionnaire research method, independently of other methods, should be abandoned for the purposes of most stress research. Alternative approaches will be presented. However, if questionnaire measures of the role dimensions are sought, the following suggestions should be considered:

2. Future research should use the role conflict and ambiguity scales developed in this study, in preference to those of Rizzo et al (1970). The wording confound in Rizzo et al's scales seriously questions their validity as measures of conflict and ambiguity, while it is only the

current ambiguity scale that is moderately confounded by wording (see Section 3.2.3.2);

3. Clearly, however, the conflict and ambiguity item pools need to be expanded to include more ambiguity items expressed in the stress sense and more conflict items expressed in the comfort sense. Factor analysis of such an enlarged set of items would indicate whether it is conflict and ambiguity that have structural independence or stress versus comfort wording.
4. Results from the exploration of qualitative underload suggest that further research is necessary to attempt corroboration of these findings, as underload presents as an important stressor, particularly at lower levels of the organization (see Table 3.2.4.1.1). This is a general implication for future research. However, if such research makes use of a self-report, questionnaire methodology, then it is suggested that additional items be written to complement the current underload set.
5. Before "environment" measures of conflict and ambiguity are used again, it is desirable that some further research into the validity of the assumption that any degree of these role dimensions is "too much" be conducted. It should be determined whether there are only very few individuals for whom this assumption does not hold or whether this is likely to be invalid for a significant proportion of any sample (also, what the predominant situational, personal, etc.

characteristics are of any individuals for whom the assumption does not hold). Though the former possibility seems most likely (see Section 4.2), it is clearly preferable to develop empirical evidence, if only because results with environment measures can be seen as simply uninterpretable if this assumption is invalid for most individuals.

In the opinion of this author, the current study has introduced sufficient, serious problems with isolated use of self-report questionnaires to suggest that future research employ alternative methodologies, or employ the questionnaire methodology in conjunction with these. In the concluding paragraph of Section 1.1, it was mentioned that phenomenological research methods and the Repertory Grid technique could well be attractive alternatives or additions. These are briefly discussed:

6. The focus here is upon phenomenological methodology, not necessarily as exclusive of questionnaire use but as a possible means of enhancing the quality of findings obtained in questionnaire-based research. Although still in the early stages of development, phenomenological methodology, with its emphasis upon qualitative research as a means of tapping the lived or experiential domain (Giorgi, 1970), could enhance questionnaire research in two major ways. Firstly, it could promote research practices along the lines suggested by Sardello (1971) who advocates a "reciprocal participation model" (p. 62) of research in which, amongst other things, the meaning of the research situation to the subjects is explicated. Sardello refers specifically to the experimental situation but his ideas

are equally applicable to questionnaire-based research using cross-sectional designs. For example, questionnaire data could be supplemented with information from interviews with subjects as to how they understood or interpreted the questionnaire items and what factors may have influenced their responses. Secondly, the phenomenological methodology could promote increased understanding of what questionnaire findings mean in terms of actual lived experience — the lived processes reflected in these findings could be explicated. It should be noted at this point that phenomenologically-based research approaches need not necessarily be used in combination with questionnaires. Depending on the particular research issues, such qualitative research methodologies may be employed on their own or in combination with other strategies. It should also be noted that qualitative methodologies such as interviewing can be extremely time-consuming and this constitutes a limitation of their usefulness. This was the case in the current study, in which interviews were not systematically conducted due to time limitations.

7. In general terms, the Repertory Grid technique can be seen as a type of phenomenological research. Use of this technique has been advocated by Crump et al (1980) as a means of overcoming an important methodological limitation of using pre-designed questionnaires to conduct research in the field of occupational stress. This limitation refers to the exclusion of important stressors at work and/or the distortion of those that are included, due to use of such

questionnaires. Most fundamentally, the Repertory Grid technique is able to overcome this obstacle by "involving the relevant subject population" (ibid., p. 191), this revealing its association with phenomenology. More specifically, use of the technique involves eliciting stressors from the subject himself, from which his own idiosyncratic map can be constructed, thus avoiding the imposition of "ready-made" constructs on the individual and the resultant problems mentioned above.

A number of additional, general methodological and statistical points need to be made:

8. Longitudinal, rather than cross-sectional, research is clearly most desirable. Particularly where meaningful change is known to be taking place, the repeated measurement of stressors and strains can yield valuable information concerning cause and effect (especially with path analysis, cross-lagged correlations and the correlation of change scores). Such studies may often be opportunistic, in the sense that significant change is seen to be taking place (e.g. transition from a manual to a centralized, electronic typing pool) or warning of it is given (e.g. as in Caplan and Jones' [1975] study of an imminent computer shutdown), at which point a research offensive is hastily mounted.
9. Though experimental research in the laboratory is felt to have limited usefulness for an understanding of the complexity of social-

psychological stressors in open-systems, it is invaluable for an understanding of physiological responses to the experience of stress. Experimental studies such as those by Frankenhaeuser et al (1971) and Sales (1969; 1970) are amongst the most widely cited in the literature and constitute impressive evidence of the value of experimental work in this area. It is noteworthy that a review of the recent literature does not reflect similar experimental research — perhaps future research should revive this concern?

10. There is a need for more sophisticated statistical analyses of data. Path analysis, cross-lagged correlations, etc. were mentioned above in connection with longitudinal studies. However, path analysis is just as appropriate with cross-sectional data. The partialling-out of possibly confounding variables should be practised. Curvilinear regression may be useful in exploring relationships between strains and the continua of quantitative and qualitative overload and underload (Figure 1.5). Further, factor analyses of responses to items contributing to customized measuring instruments should be carried out, rather than assuming that these scales measure factorially independent constructs. By way of partially discounting this point, it should be emphasized that sophisticated statistics are no substitute for poor measurement — these are only particularly valuable where the data themselves are sophisticated (to some extent, the current statistical analysis may be seen as more sophisticated than the data).

The final, general classification of implications for future research is research topics. This work has pointed to several areas requiring initial or further exploration and these are presented here.

11. Though this study has indicated that Type A behaviour is not a moderator of relationships between role demands and psychological and behavioural strain (discounting the underload findings), sufficient problems with the questionnaire methodology and an uncontrolled confound have been raised to warrant some further research. It is suggested that one further study be conducted and that it be structured along the following lines: use the Structured Interview (rather than the JAS) to assess Type A behaviour, given the possibility that the JAS may not enable as sensitive a classification of individuals; use questionnaires but in conjunction with interviews (as described above); select a group of individuals for study who are experiencing, or will experience, significant change between repeated measurements in the course of a longitudinal investigation; match the Type A and B subgroups according to relevant demographic and organizational variables, particularly job tenure — job tenure might also be studied as a moderator of the moderating effects of Type A behaviour; include physiological indices of strain. Such a study presents overwhelming practical problems but until it is conducted, doubt will remain as to the status of Type A behaviour as a moderator of relationships between social-psychological stressors and strain.

12. There is a need for clearer explication of the origins of Type A behaviour. What is the role of the environment in relation to the role of personality in eliciting the behaviour? What are the origins of the personality predisposition?
13. With regard to CHD, current findings suggest that future research should explore the nature of the Type A hostility component in more detail. Is it a must of people? If so, where does this originate? If the effects of hostility are partialled out, is there still a relationship between Type A behaviour and CHD, i.e. is hostility the key component?
14. Future research should follow the example of McCranie, Simpson and Stevens (1981), in examining individual differences amongst Type As in physiological indices of strain. These investigators found that field dependent Type As had higher levels of total cholesterol and triglycerides than field independent Type As. Such studies might be useful for determining which Type As are most likely to suffer from CHD. Research examining individual differences amongst Type As in other indices of strain might also be advocated.
15. Additional work is required on the notion of sequentiality in the emergence of strain. More specifically, how findings that the blood pressure of patients increases under general anaesthesia during bypass surgery (Kahn, Kornfeld, Frank, Heller and Hoar, 1980), may be integrated with the idea that relationships between stress and

- physiological strain are mediated by psychological strain (see Sections 4.1.4. and 4.1.5). This study also raises the critical possibility that overt Type A behaviour is not necessary to elicit its pathogenic effects (Matthews, 1982), as Type As were found to display greater increases in blood pressure than Type Bs under the same circumstances. Possibilities such as these demand extensive research.
16. As has been suggested repeatedly throughout this work, the demographic and organizational variables that were partialled out may themselves be moderators of the relationships between occupational stressors and strain. Consequently, future research should address this possibility, with a view to isolating demographic and organizational groups that are potentially high-risk for the experience of aversive consequences of work (such re-analyses of the current data will be carried out in the future — as pointed out in Section 1.5.1, the additional consideration of these questions is beyond the scope of the current work).
 17. Research into the effects of combinations of socia-psychological stressors is required. As discussed in Section 1.2.3, little is known about the interactive effects of environmental stressors on performance, while nothing (to the knowledge of this author) is known about the interactive effects of social-psychological stressors on psychological and physiological strain. Though Poulton's (1978) suggestion that, at this stage of knowledge, stressors should be conceptualized additively, has been applied in developing arguments in

this work (Section 1.4.3), there is no empirical justification for such a suggestion. This constitutes both a criticism of the present study and an indication that such research is desirable, at least to facilitate justifiable theorizing but with clear practical implications as well.

18. It was pointed out in the previous section that zero relationships between role stressors and psychological strain are possibly not maximally desirable and that this question has not been researched in relation to these variables, to the knowledge of this author. As a research topic demanding of attention in the future, there is little doubt but that it represents a considerable challenge to the ingenuity of stress researchers.

4.5 CONCLUSION

This study has indicated that some social-psychological components of work may have aversive consequences for individuals, in terms of poor mental health, and thus for organizations, in terms of decreased effectiveness. Moerdyk (1983) has argued that, particularly in a developing country such as South Africa, where there is both a shortage of high-level skills and a large number of unemployed and unskilled individuals, "the need for optimum utilization of human resources..... is self-evident" (p. 66). Clearly, poor mental health and decreased organizational effectiveness are incompatible with the optimum utilization of human resources. Consequently, particularly in South Africa, there is a need for improved "new" job design and "old" job redesign, aimed at reducing the potentiality for emergence of role stressors in this country's organizations. This research indicates that such work design practice is simplified by not needing to take individual differences in the Type A behaviour pattern into account.

R E F E R E N C E N O T E S

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2. This procedure and the subsequent elimination criteria and interpretation were advised by a statistics consultant at the Medical Research Council.
3. Personal communication with Professor Ethyl Roskies, October, 1983.
4. Guest lecture delivered by Professor Michel Janisse, University of Cape Town, 24th September, 1984.

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APPENDIX A

OCCUPATIONAL STRESS RESEARCH PROGRAMME

ASSESSMENT SESSION 2

JULY 1983

TEST NO

INSTRUCTIONS

In this questionnaire are a number of statements which may describe your job and what you do on your job. Indicate, by circling the appropriate number, how much you agree or disagree with each of the statements.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
I have considerable freedom to adopt my own approach to the job	1	2	3	4	5	6	7
I frequently struggle to meet deadlines . . .	1	2	3	4	5	6	7
I know that I divide my time properly	1	2	3	4	5	6	7
I feel certain how I will be evaluated for a raise or promotion	1	2	3	4	5	6	7
On my present job, the amount of work seems to interfere with how well I can do the job	1	2	3	4	5	6	7
I like to work in a prestigious, successful company or organisation	1	2	3	4	5	6	7
I know exactly what is expected of me on my job	1	2	3	4	5	6	7
I am told how well I am doing my job	1	2	3	4	5	6	7
I like to have an element of variety and adventure in the job	1	2	3	4	5	6	7
I have to "feel my way" in performing my duties	1	2	3	4	5	6	7
I receive incompatible requests from two or more people in my job	1	2	3	4	5	6	7
The performance standards on my job are often too high	1	2	3	4	5	6	7
I receive an assignment without adequate resources and materials to execute it	1	2	3	4	5	6	7
I perform work that suits my values	1	2	3	4	5	6	7
I have tasks to complete which seem too difficult	1	2	3	4	5	6	7
I have little tension and stress on the job	1	2	3	4	5	6	7
I do things that are apt to be accepted by one person and not accepted by others . .	1	2	3	4	5	6	7
I live in an area desirable to me and my family	1	2	3	4	5	6	7
I have good physical working conditions (good ventilation and lighting, adequate work space, etc.)	1	2	3	4	5	6	7

	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Slightly disagree</i>	<i>Neither agree nor disagree</i>	<i>Slightly agree</i>	<i>Agree</i>	<i>Strongly agree</i>
20) I work on unnecessary things	1	2	3	4	5	6	7
21) I have just the right amount of work to do	1	2	3	4	5	6	7
22) I am able to act the same at work, regardless of the group I am with	1	2	3	4	5	6	7
23) I have enough time to complete my work	1	2	3	4	5	6	7
24) There is a lack of policies and guidelines to help me in my work	1	2	3	4	5	6	7
25) I have to do things that I think should be done in a different way	1	2	3	4	5	6	7
26) I have to work under vague directives or instructions	1	2	3	4	5	6	7
27) I am uncertain as to how my job is linked to overall organisational functioning	1	2	3	4	5	6	7
28) I like to have an opportunity for helping other people	1	2	3	4	5	6	7
29) I feel certain about how much authority I have	1	2	3	4	5	6	7
30) I do not know if my work will be acceptable to my boss	1	2	3	4	5	6	7
31) I have an opportunity for advancement to higher level jobs	1	2	3	4	5	6	7
32) I perform tasks that are too easy or boring	1	2	3	4	5	6	7
33) I am given enough time to do what is expected of me on my job	1	2	3	4	5	6	7
34) I make a real contribution to the success of the organisation	1	2	3	4	5	6	7
35) I often feel nervous or tense at work	1	2	3	4	5	6	7
36) I have challenging tasks to do, from which I can get a sense of accomplishment	1	2	3	4	5	6	7
37) There are clear, planned goals and objectives for my job	1	2	3	4	5	6	7

Strongly disagree
Disagree
Slightly disagree
Neither agree nor disagree
Slightly agree
Agree
Strongly agree

38) I receive an assignment without the manpower to complete it	1	2	3	4	5	6	7
39) I am corrected or rewarded when I really don't expect it	1	2	3	4	5	6	7
40) It is important for me to be consulted by my direct superior in his/her decisions .	1	2	3	4	5	6	7
41) I have sufficient time for my personal and family life	1	2	3	4	5	6	7
42) I know what my responsibilities are	1	2	3	4	5	6	7
43) It is important for me to have a good working relationship with my direct superior	1	2	3	4	5	6	7
44) I work under incompatible policies and guidelines	1	2	3	4	5	6	7
45) What has to be done is clearly explained to me	1	2	3	4	5	6	7
46) I receive assignments that are within my training and capability	1	2	3	4	5	6	7
47) It often seems that I have too much work to do	1	2	3	4	5	6	7
48) I have to buck a rule or policy in order to carry out an assignment	1	2	3	4	5	6	7
49) It is important to me to have an opportunity for high earnings	1	2	3	4	5	6	7
50) I have security of employment	1	2	3	4	5	6	7
51) My work often seems too easy	1	2	3	4	5	6	7
52) I often notice too great an increase in my workload	1	2	3	4	5	6	7
53) I work in a well-defined job situation where the requirements are clear	1	2	3	4	5	6	7
54) I work with two or more groups who operate quite differently	1	2	3	4	5	6	7
55) I often feel that too much is expected of me	1	2	3	4	5	6	7
56) I work with people who cooperate well with one another	1	2	3	4	5	6	7

57) The descriptions below apply to four different types of managers. First, please read through these descriptions :

Manager 1 : Usually makes his/her decisions promptly and communicates them to his/her subordinates clearly and firmly. Expects them to carry out the decisions loyally and without raising difficulties.

Manager 2 : Usually makes his/her decisions promptly but, before going ahead, tries to explain them fully to his/her subordinates. Gives them the reasons for the decisions and answers whatever questions they may have.

Manager 3 : Usually consults with his/her subordinates before a decision is reached. Listens to their advice, considers it and then announces the decision. He/she then expects all to work loyally to implement it whether or not it is in accordance with the advice they gave.

Manager 4 : Usually calls a meeting of subordinates when there is a decision to be made. Puts the problem before the group and invites discussion. Accepts the majority viewpoint as the decision.

57) a) Now, for the above types of manager, please mark the one you would prefer to work under (only circle one alternative) :

- i) Manager 1
- ii) Manager 2
- iii) Manager 3
- iv) Manager 4

57) b) And, to which one of the above four types of managers would you say your own superior most closely corresponds ?

- i) Manager 1
- ii) Manager 2
- iii) Manager 3
- iv) Manager 4
- v) He/she does not correspond closely to any of them

58) How old are you ? (circle the appropriate number)

- 1) Under 20
- 2) 20 - 24
- 3) 25 - 29
- 4) 30 - 34
- 5) 35 - 39
- 6) 40 - 49
- 7) 50 - 59
- 8) 60 or over

APPENDIX B

OCCUPATIONAL STRESS RESEARCH PROGRAMME

ASSESSMENT SESSION 3

AUGUST 1983

TEST NUMBER

.....

INSTRUCTIONS

For each of the following statements and questions, circle the number corresponding to the most appropriate alternative. Remember that absolute confidentiality is assured. You may therefore be entirely open in your responses.

- 1) I have to tell people to mind their own business
1-very often 2-often 3-sometimes 4-rarely 5-never
- 2) I am a very nervous person
1-true 2-false
- 3) I have very few headaches
1-true 2-false
- 4) I hardly ever notice my heart pounding and I am seldom short of breath
1-true 2-false
- 5) I often find myself worrying about something
1-true 2-false
- 6) Knowing what you know now, if you had to decide all over again whether to take the job you have now, what would you decide? Would you
 - 1) take the same job without any hesitation
 - 2) have some second thoughts
 - 3) definitely not take the same job
- 7) People get on my nerves
1-never 2-rarely 3-sometimes 4-often 5-very often
- 8) I don't like to face a difficulty or make an important decision
1-true 2-false
- 9) Life is often a strain for me
1-true 2-false

10) I hardly ever feel under such strain that it's too much effort to cope with things

- 1-True,I don't feel under strain
- 2-Uncertain
- 3-False,I do lack energy to cope

11) I have diarrhea once a month or more

- 1-true
- 2-false

12) I am troubled by attacks of nausea

- 1-true
- 2-false

13) I feel completely worn out at the end of the working day

- 1-never
- 2-rarely
- 3-sometimes
- 4-often
- 5-very often

14) How often do you feel this way at work?

Very Often Often Sometimes Rarely Never

a)I feel downhearted

and blue

1 2 3 4 5

b)I get tired for

no reason

1 2 3 4 5

c)I find myself restless

and can't keep still

1 2 3 4 5

d)I find it easy to do the

things I used to do

1 2 3 4 5

e)My mind is as clear as

it used to be

1 2 3 4 5

f)I feel hopeful about

the future

1 2 3 4 5

g)I find it easy to make

decisions

1 2 3 4 5

h)I am more irritable than

usual

1 2 3 4 5

i)I still enjoy the things

I used to

1 2 3 4 5

j)I feel that I am useful

and needed

1 2 3 4 5

- 15) I seem to blame myself for everything that goes wrong, and I'm always critical of myself
1-true, most times 2-true, sometimes 3-false
- 16) I rate myself as a happy contented person in spite of troubles here and there
1-true 2-uncertain 3-false
- 17) I practically never blush
1-true 2-false
- 18) At times I worry beyond reason about something that really does not matter
1-true 2-false
- 19) I frequently notice my hand shakes when I try to do something
1-true 2-false
- 20) If I were called in by my boss, I'd
1-be afraid I had done something wrong
2-in between
3-make it a chance to ask for something I want
- 21) I blush as often as others
1-true 2-false
- 22) When embarrassed I often break out into a sweat which is very annoying
1-true 2-false
- 23) I am not at all confident of myself
1-true 2-false
- 24) My hands and feet are usually warm enough
1-true 2-false
- 25) I think that most people can be trusted
1-true 2-false
- 26) I do not tire quickly
1-true 2-false

- 27) I sweat very easily, even on cool days
1-true 2-false
- 28) I boil inside myself without letting people know about it
1-very often 2-often 3-sometimes 4-rarely 5-never
- 29) At times I am so restless that I cannot sit in a chair for long
1-true 2-false
- 30) I have a great deal of stomach trouble
1-true 2-false
- 31) I have the feeling that most people who know me really and truly like me
1-true 2-in between 3-false
- 32) I find it hard to keep my mind on a task or job
1-true 2-false
- 33) There are times when I think I'm no good for anything at all
1-true, many 2-in between 3-false, almost never
- 34) I rarely lie awake at night wondering what will happen because of wrong things that I've done
1-true 2-in between 3-false, I do lie awake
- 35) I seldom feel tense on my job
strongly agree slightly neither agree slightly disagree strongly
agree agree nor disagree disagree disagree
1 2 3 4 5 6 7
- 36) I am easily embarrassed
1-true 2-false
- 37) My mind works quickly and well these days
1-yes, nearly always 2-sometimes 3-hardly ever
- 38) I do not have as many fears as my friends
1-true 2-false

39) I worry quite a bit over possible troubles

1-true

2-false

40) I almost never feel that life is a burden

1-true

2-in between

3-false

41) I cannot keep my mind on one thing

1-true

2-false

42) My energy for work is great

1-nearly always

2-sometimes

3-hardly ever

43) I blame myself and feel bad over things that I've done

Very Much

Sometimes

Not at all

5

4

3

2

1

44) I feel worn out and can't get enough rest

1-usually

2-sometimes

3-very seldom

45) How often do you feel like smashing things for no good reason

1-never

2-rarely

3-sometimes

4-often

5-very often

46) Sometimes a dark mood of depression comes over me for no reason

1-true

2-uncertain

3-false

47) I am confident that I can face and handle most emergencies that come up

1-true,always

2-sometimes

3-false,I cannot face emergencies

48) Do you feel that you can make your future what you want it to be?

Definitely

Mostly

Not really

5

4

3

2

1

49) How do you see yourself in your work?

Really doing my best

Making a moderate effort

Not doing my best at all

5

4

3

2

1

62) I have nightmares every few nights

1-true

2-false

63) At times I feel that I am going to crack up

1-true

2-false

64) How often do you find that people are so unreasonable that it is hard to talk to them?

1-very often 2-often 3-sometimes 4-rarely 5-never

65) All in all, how satisfied are you with your job?

1-very satisfied

2-somewhat satisfied

3-not too satisfied

4-not at all satisfied

66) I often dream about things that I don't like to tell other people

1-true

2-false

67) How do you see yourself in your work?

Very successful moderately successful Not at all successful

1

2

3

4

5

68) Sometimes I feel that my nerves are going to pieces

1-true

2-uncertain

3-false

69) I feel anxious about something or someone almost all of the time

1-true

2-false

70) I am often afraid that I am going to blush

1-true

2-false

71) I find it difficult to get up in the morning

Strongly Disagree Slightly Neither agree Slightly Agree Strongly
disagree disagree nor disagree agree agree

7

6

5

4

3

2

1

72) My feelings are hurt more easily than most peoples'

1-true

2-false

84) I am happy most of the time

1-true

2-false

85) How often do you feel this way in connection with your work?

	Never	Rarely	Sometimes	Often	Very Often
a) I feel tense	1	2	3	4	5
b) I feel anxious	1	2	3	4	5
c) I feel nervous	1	2	3	4	5
d) I feel worried	1	2	3	4	5
e) I feel relaxed	1	2	3	4	5
f) I feel calm	1	2	3	4	5
g) I feel preoccupied with the day's problems	1	2	3	4	5
h) I feel upset	1	2	3	4	5

86) How much do you feel that you are accomplishing the sorts of things that you would like to in your life ?

A great deal	A fair amount	Not at all
1	2	3
4	5	

87) I feel self-confident and relaxed

1-almost all the time 2-sometimes 3-hardly ever

88) I am the sort of person who takes things hard

1-true

2-false

89) I am very confident of myself

1-true

2-false

90) If a good friend of yours told you that he/she was interested in working in a job like yours would you

1-strongly recommend the job

2-have doubts about recommending it

3-strongly advise him/her against this sort of job?

91) On the whole how do you feel about your life and the way it has been working out

Very satisfied

Moderately satisfied

Most dissatisfied

5

4

3

2

1

92) If acquaintances treat me badly and show they dislike me

1-I tend to get downhearted

2-in between

3-it doesn't upset me a bit

93) How do you see yourself in your work?

Important Moderately important Not at all important

1 2 3 4 5

94) At times I lose sleep over worry

1-true

2-false

95) Do people often hurt your feelings

1-yes, a lot

2-sometimes

3-never

96) I certainly feel useless at times

1-true

2-false

97) I have fears that no one really loves me

1-often

2-once in a while

3-not at all

98) I work under a great deal of strain

1-true

2-false

99) I wish I could be as happy as others

1-true

2-false

Research Evaluation

A - Participation in the research has been boring

Strongly agree	Agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Disagree	Strongly disagree
1	2	3	4	5	6	7

B - This study is probably a waste of time

Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Disagree	Strongly disagree
1	2	3	4	5	6

C - Any additional comments ?

Criticisms ?

APPENDIX C
RELIABILITY ESTIMATION

(from Kerlinger, 1964)

ROLE AMBIGUITY

ANNOVA SUMMARY TABLE

SOURCE	SS	df	MS	F-RATIO
Items	618,49	6	103,08	63,63**
Individuals	1 409,31	241	5,85	3,61**
Residual	2 346,94	1 446	1,62	
Total	4 374,74	1 693		

$$r = \frac{MS_{IND} - MS_{RES}}{MS_{IND}}$$

$$= 0,72$$

$$F_{6;1446}^{0,01} \approx 2,88$$

$$F_{241;1446}^{0,01} \approx 1,35$$

** Significant at 1% level

Appendix C

ROLE CONFLICT

ANNOVA SUMMARY TABLE

SOURCE	SS	df	MS	F-RATIO
Items	246,44	4	61,61	29,62**
Individuals	1 239,60	241	5,14	2,47**
Residual	2 005,16	964	2,08	
Total	3 491,20	1 209		

$$r = \frac{MS_{IND} - MS_{RES}}{MS_{IND}}$$

$$= 0,60$$

$$F_{4;964}^{0,01} \approx 3,40$$

$$F_{241;964}^{0,01} \approx 1,35$$

** Significant at 1% level

ROLE OVERLOAD

ANNOVA SUMMARY TABLE

SOURCE	SS	df	MS	F-RATIO
Items	559,28	9	62,14	33,96**
Individuals	2 603,23	241	10,80	5,90**
Residual	3 976,12	2 169	1,83	
Total	7 138,63	2 419		

$$r = \frac{MS_{IND} - MS_{RES}}{MS_{IND}}$$

$$= 0,83$$

$$F_{9;2169}^{0,01} \approx 2,49$$

$$F_{241;2169}^{0,01} \approx 1,35$$

** Significant at 1% level

Appendix C

ROLE UNDERLOAD

ANNOVA SUMMARY TABLE

SOURCE	SS	df	MS	F-RATIO
Items	22,35	1	22,35	17,46**
Individuals	1 179,47	241	4,89	3,82
Residual	307,65	241	1,28	
Total	1 509,47	483		

$$r = \frac{MS_{IND} - MS_{RES}}{MS_{IND}}$$

$$= 0,74$$

$$F_{1;241}^{0,01} \approx 6,74$$

$$F_{241;241}^{0,01} \approx 1,35$$

** Significant at 1% level

APPENDIX D

OCCUPATIONAL STRESS RESEARCH PROGRAMME

ASSESSMENT SESSION 1

JUNE 1983

TEST NUMBER :

1) In which department do you work ?

2) What is your position ? (e.g. clerk, programmer, H.O.D.)
.....

3) Who is your immediate supervisor ?

4) For how long have you been employed at Norwich ?yrs

PLEASE TURN OVER

Head Office Staff

20 May, 1983

Information Circular No. 649

RESEARCH IN THE AREA OF OCCUPATIONAL STRESS

Mark Forshaw, who is a lecturer in Industrial Psychology at the University of Cape Town, is currently engaged in a programme of research in the area of "occupational stress" as part of his Master's Degree course.

We have agreed to assist him in his project and he is hoping to assess most of our Head Office staff in his efforts to build up an adequate statistical data base.

Participation by staff in this research is voluntary, though we hope that all individuals - particularly those in managerial positions - will make themselves available.

Assessment sessions will be held in the Training Room on 1st and 2nd June, 4th and 5th July, and 1st and 2nd August. Mr. Forshaw will contact individuals a week in advance of each assessment session to ascertain participation.

Considering the long-term importance of research such as this for individual health as well as for organisational functioning, we hope that participation will be general.

In terms of the Ethical Standards of Psychologists, participants are assured of absolute confidentiality with regard to the treatment of data.

Signed by candidate

Personnel & Administration

OCCUPATIONAL STRESS RESEARCH PROGRAMME

Session 3

August 1983

Dear Participant

Next Monday, Tuesday and Wednesday, the 1st, 2nd and 3rd of August, the final assessment sessions for this research will take place. The extent of participation has been really exceptional so far (96%) and I hope for your continued participation in this important final phase.

On the attached departmental list, you will find your name and scheduled session time. Please try and attend your scheduled session but should this be inconvenient, feel free to swop your time or just come along to any other session - there will almost certainly be a spare seat.

Session times are as follows :

Monday :	8.30	;	10.30	;	11.30	;	2.00	;	3.30
Tuesday:	8.30	;	10.30	;	11.30	;	2.00	;	3.30
Wednesday:			10.30	;	11.30	;	2.00	;	3.30

Note : In addition to a general research report for Norwich, personal feedback for individuals will be provided. This will be arranged at the sessions for those who are interested.

Thank you for your participation

Mark Forshaw

STRESS RESEARCH PROGRAMMEREINSURANCE

Assessment Venue : Training Room

Dates : Monday, Tuesday and Wednesday, the 1st, 2nd and 3rd of August

<u>Test No.</u>	<u>Name</u>	<u>Day</u>	<u>Time</u>
3802	Bowers, Mr. M	Wed	10.30
3803	Kerchoff, Miss F	Mon	3.30
3804	Ladegourdie, Mrs. J	Tues	3.30
3801	Mohamed, Mr. R	Mon	10.30
3805	Schiller, Miss K	Wed	3.30
3806	Whitforth, Miss C	Mon	11.30

A P P E N D I X G
V E R B A T I M I N S T R U C T I O N S T O S U B J E C T S

Assessment Session 1

My name is Mark Forshaw.

I'm happy to see that you received the letters and I would like to thank you all for coming along to participate in this research programme.

I'm not going to spend much time talking but a few points regarding what I would like you to do today need to be made.

Firstly, I would like you to give some brief factual information regarding your jobs at [see Appendix D], and then to complete the questionnaire that follows. The questionnaire deals with some aspects of behaviour that have been found useful in medical practice.

Proceedings will probably take about 20 minutes but there are no time limits, so you may take as much time as you need.

When it is time to begin, turn over the face sheet of the booklet in front of you and work through the questions in their order of presentation.

Please enter your test number in the appropriate space on the opening page. This is important for connecting your responses today with further data to be collected at a later stage. Should you not remember your test number, you can use your name, or ask me and I'll look up your number now. In whatever way, please ensure that there is some form of identification on your booklet.

When you have completed the questionnaire, I will collect it from you and check it for completion.

Appendix G

When you leave, please take one of the leaflets on the table next to the door with you.

Are there any questions?

Okay, please begin and I hope you find it interesting.

Assessment Session 2

Good morning/afternoon.

I would like to thank you all very much for participating in the second phase of this research programme. The extent of participation in the first session was really exceptional and I'm pleased to see you back again.

Today's task is fairly straightforward and involves the completion of the questionnaire in front of you. It deals with your beliefs about your job and will probably take about 20 minutes.

Mostly, a seven-point agree/disagree scale is used. So, for each statement, decide to what extent you agree or disagree with the statement, and circle the number corresponding to the appropriate alternative.

Please make a choice for every item and if you find it hard to decide, choose the alternative which is closest to what you believe to be the truth.

Do not spend too long on any one item and try to work through the items at a consistent pace.

When it is time to begin, turn over the facesheet of the booklet in front of you and work through the statements in their order of presentation.

Appendix G

Most important is that you enter your test number on the face sheet. Should you not remember your number, you can use your name, or ask me and I'll look up your number now. In whatever way, please ensure that there is some form of identification on your booklet.

When you have completed the questionnaire, I will collect it from you and check it for completion.

When you leave, please take one of the leaflets on the table next to the door with you.

Are there any questions?

Okay, please begin.

Assessment Session 3

Good morning/afternoon.

Thank you for coming along to take part in the final assessment session of this research programme. As I mentioned in the letter each of you received, the extent of participation has been really exceptional so far — about 96% — and this is most satisfactory. Thank you!

The questionnaire for today involves questions about yourselves and will probably take about half an hour to complete. Some of the questions are rather personal and intimidating — but remember that your responses are treated highly confidentially and that you may therefore be quite open.

Several different methods for indicating responses are used in this questionnaire. Being quite experienced "questionnaire completers", I am sure that you will not have any problems with this. However, if you have a problem with any question, raise your hand and I will clarify it for you.

Appendix G

When it is time to begin, turn over the face sheet of the booklet in front of you and work through the questions in their order of presentation.

Most important is that you enter your test number on the face sheet. Should you not remember your number, you can use your name, or ask me and I'll look up your number now. In whatever way, please ensure that there is some form of identification on your booklet.

As usual, when you have completed the questionnaire, I will collect it from you and check it for completion.

Finally, if you would like to receive feedback about your responses, complete one of the forms on the table next to the door on your way out and place it in the box provided.

Are there any questions?.....

Okay, please begin.

APPENDIX H

SESSION 1

OCCUPATIONAL STRESS RESEARCH PROGRAMME

Dear Participant

Thank you for participating in this research programme. Stress at work is a common phenomenon and is thought to be related to physical and mental health. Only through research in organisations, as opposed to in the laboratory, is it possible to accurately explicate these relationships. In the long term this will enable the modification of work environments, to reduce the frequency of occurrence, and severity, of these aversive conditions. It is for this reason that your participation is invaluable.

Today's assessment session is the first in a series of three in which various parameters relating to stress at work will be explored. The nature of the research is such that only complete individual profiles are useful. Therefore, it is hoped that you will return at the same time on the 4th or 5th of July and, finally, on the 1st or 2nd August to complete several further short questionnaires.

Thanking you in anticipation

Yours faithfully

Mark Forshaw

OCCUPATIONAL STRESS RESEARCH

Assessment Session 2

July 1983

Dear Participant

PLEASE TAKE THIS AWAY WITH YOU

Once again, thank you for participating in this study.

With the excellent response to the first session, I am confident that on completion of the data-gathering phase of this study, a sufficiently large data base will have been developed to make a meaningful contribution to theory and practice.

The final sessions will be held on the 1st and 2nd (and possibly the 3rd) of August. A similar notification procedure will be employed and I hope for your continued, invaluable participation.

Yours faithfully

Mark Forshaw

Note : If anyone would like to discuss any matter arising out of this research or related issues, please contact me at :

69-8531 x193 (Work)

72-2224 (Home)

PERSONAL FEEDBACK REQUEST FORM

If you would like to receive feedback about your questionnaire responses, enter your name and department in the spaces below and indicate what form you would like this feedback to take. Place the completed form in the box provided.

Note : As the scoring and analysis of these many hundreds of questionnaires is an extremely time-consuming business, feedback will only be available from December.

NAME

DEPARTMENT

Place an X in the appropriate box :

Written report

Written report and discussion

NORWICH UNION LIFE INSURANCE SOCIETY

STRESS RESEARCH PROGRAMME

JUNE - AUGUST, 1983

INDIVIDUAL FEEDBACK REPORT

MARCH, 1984

FOR :

FROM : MARK FORSHAW
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF CAPE TOWN

234 employees of the society, of all race and sex groups, from most departments, and from clerks to senior managerial staff, were tested over three sessions separated by a month. This represents a 90% sample of the original employee pool, with the remaining 10% including employees who declined to participate and those who left while the study was in progress. The purpose of the research was to explore the moderating effects of Coronary-Prone Behaviour on the relationships between perceived role stressors and indices of psychological strain. A theoretical overview, and some of your own scores on the variables assessed, are provided. These are briefly discussed

ACKNOWLEDGEMENTS

The search for truth is often limited by those who control access to groups of people which, if researched, can by their very nature extend the boundaries of knowledge. For this reason, I would like to thank the management and staff of Norwich Union for their readiness to sacrifice time and give of themselves, for altruistic purposes likely to be of less importance to them than to science in general. Meagre and insubstantial as it might be, I hope that this report serves to express my gratitude and that you find it interesting, and possibly useful.

PREFACE

The Professional Board for Psychology has clearly stated that psychometric test scores may not be given to research subjects or clients. Therefore, this report will not include actual scores for some of the variables assessed, but will necessarily be vague in some areas. Fortunately, however, these variables are of lesser importance and interest in this study. For the rest, actual scores in relation to departmental and organizational means will be provided, with some discussion of what they mean for you. For those who wish to discuss this report, I will be available on :

Tuesday, 24th April : 8.00 - 1.00 ; 2.00 - 4.00

Thursday, 26th April : 8.00 - 1.00 ; 2.00 - 4.00

Venue :

Particularly those who requested discussion on their feedback request forms, but others who would like to follow up, are invited to come along for an informal chat.

INTRODUCTION

What was this research about? There were several questions which I hoped to answer and areas which needed exploration. In general, the focus of the study was on the causes and effects of stress in organisational settings and, particularly, the role that Type A/B personality or Coronary-Prone Behaviour plays in influencing the nature of relationships between these causes and effects. This initial statement immediately raises problems with the usage of terms, and theoretical orientation with regard to the concept of stress. To prevent confusion, let me digress to clarify some important concepts and terms.

Definitions of Stress

What is "stress"? Three alternative formulations are presented:

- (a) Stress has been defined as a response. In other words

STRESSOR → STRESS

Stress is seen as the maladaptive consequences of environmental conditions which are aversive for a particular individual (stressors). Thus, stress is seen as "diseases of adaptation" such as anxiety, depression, absenteeism, job dissatisfaction, etc.

- (b) Stress has been defined as a stimulus. So,

STRESS → STRAIN

Here, stress corresponds to the aversive environmental conditions and strain to the undesirable end-states.

- (c) Stress has been defined interactively, i.e. as an interaction between the person and the environment. This seems a more realistic approach to the area, and the general formulation within which my view of stress falls. As such, stress is neither stimulus nor response but is defined cognitively in terms of an imbalance between perceived environmental demands and perceived capacity for handling these demands. Thus, it is possible to conceive of stress arising out of perceived demands exceeding an individual's perceived capacity as well as out of capability exceeding demands. Considering this view it is therefore impossible to quantify stress per se. Rather, to study stress

it is necessary to explicate the nature of the relationships between supposed causes of this cognitive imbalance and supposed results. For clarity, this model may be simply schematized as a combination of the first two definitions, with identical definitions of stressors and strain.



Cognitive Imbalance

So, in this report, stressors will be considered as organisational characteristics hypothesized as leading to stress, the way to evaluate their stressful effects being to consider the relationship between these and hypothesized results of stress, indices of strain.

Unfortunately, the situation is not quite so simple. As was emphasized, stress is seen as a cognitive state. Thus, certain characteristics of individuals will affect the ways in which they perceive their capability as well as demands, thereby influencing the relationships between stressors and indices of strain. This brings us back to the Type A/B personality variable which I mentioned earlier and which, it is hypothesized, is one of the variables important in influencing individual's perceptions of capability and demands and in influencing their reactions to the presence or absence of a cognitive imbalance. In addition, Type A personality has been consistently implicated in the occurrence of Coronary Heart Disease, and therefore presents as a psychological variable worthy of study in its own right. It is this CHD connection which has resulted in Type A behaviour being referred to as the Coronary-Prone behaviour pattern. It should be understood that the presence of Type A does not mean that the individual concerned is going to have a coronary heart attack. In fact, most Type A individuals do not have a coronary. Rather, as with other standard risk factors like smoking, hypertension, etc., Type A behaviour merely increases the chances of coronary heart disease. What can be concluded from this is that "very" Type A individuals should try to alter their typical modes of responding to challenging, demanding situations. This is what doctors usually imply when telling patients to "slow down".

Coronary-Prone Behaviour

So, what is Type A behaviour versus Type B? Type A individuals are characterised by extremes of competitiveness, striving for achievement,

aggressiveness (although sometimes stringently repressed), haste, impatience, restlessness, hyperalertness, explosiveness of speech, tenseness of facial musculature, and feelings of being under the pressure of time and the challenge of responsibility. Persons with this pattern are usually deeply committed to their job or profession and often have achieved success in it. Obviously, these characteristics are present to varying degrees in most men in present-day Western cultures since they largely constitute the stereotype and the role expectations of Masculinity. Increasingly however, it is being realised that women display these characteristics as much as do men. It is when these are present to an enhanced or excessive degree, that the pattern is referred to as the coronary-prone, or Type A, behaviour pattern. Type B persons, on the other hand, are mainly free of these characteristics, i.e. they are satisfied, relaxed, unhurried and mellow individuals.

Generally, Types A/B are referred to as personality types, where this is not altogether true. Rather, Coronary-Prone Behaviour is seen as the response of susceptible individuals to certain challenges and demands in the environment. Thus, the personality component involves an individual's susceptibility to respond in one of the ways described above rather than in the other, to identical environments. As higher organisational levels generally present greater challenges and demands, it is to be expected that the incidence of Type A behaviour will increase with increasing organisational level. Thus, it should not be supposed that coronary-prone behaviour is a prerequisite for good management, much as this behaviour is often rewarded with promotion.

Stressors

The most commonly considered causes of stress in organisations involve excessive role demands. Within an organisational context, the term "role" can be defined as a set of expectations applied to the incumbent of a particular position by the incumbent and by role senders within and beyond an organisation's boundaries. In many instances the incumbent personalizes the position so that individuals in the same position will exhibit different effective behaviours. It is this range of freedom in role performance which allows people to fill a role without experiencing stress. Individuals are frequently confronted, however, with situations in which

they may be required to play a role which conflicts with their value systems or to play two or more roles which conflict with each other. Additionally, the single or multiple roles which confront the individual may not be clearly articulated in terms of behaviours or performance levels expected. The former situation is referred to as role conflict and the latter as role ambiguity.

More specifically, role conflict is defined as incongruity of the expectations associated with a role. Several types of role-conflict have been identified.:

- (a) Intra-sender role conflict - incompatible expectations from a single role sender (e.g. "meet this (early) deadline and make certain that the work is perfect").
- (b) Inter-sender role conflict - expectations from one role sender which are incompatible with those of another role sender.
- (c) Person-role conflict - incompatibility between the expectations held by the role incumbent and the expectations otherwise associated with his/her position.
- (d) Inter-role conflict - role pressures stemming from one position incompatible with the role pressures arising from a different position (e.g. career and family).
- (e) Role overload - expecting the role incumbent to engage in several role behaviours, within too short a period of time (i.e. too much work!).

Role ambiguity has not been as elaborately conceptualised in the literature. Generally, however, it has been defined as the degree to which clear information is lacking regarding -

1. the predictability of the outcome or responses to one's behaviour, and
2. the existence or clarity of behavioural requirements.

So, items tapping role ambiguity reflect certainty about duties, authority, allocation of time, and relationships with others; the clarity or

or existence of guides, directives and policies; and the ability to predict sanctions as outcomes of behaviour.

It should be pointed out and emphasized that what is being considered is each individual's perception of the degree to which a particular role stressor exists in his job, rather than the absolute, objective degree.

Strain

The evaluation of strain presented many problems. Finally, I decided on -

1. General anxiety;
2. Work-related tension/anxiety;
3. General depression;
4. Work-related depression;
5. General self-esteem;
6. Work-related self-esteem;
7. Job dissatisfaction;
8. Hostility;
9. Fatigue;

as providing a broad picture of psychological state. General, as well as work-related, measures were obtained for some of the variables to control for the operation of factors outside the work environment. It would have been desirable to have obtained job performance and physiological data but these are beyond the scope of a single researcher.

In concluding the introduction, to explore the moderating effects of Coronary-Prone Behaviour on the relationship between stressors and strains, the Jenkins Activity Scale was administered in Questionnaire 1, with scales being compiled to assess role stressors and indices of strain, in Questionnaires 2 and 3, respectively.

RESULTS

Role Stressors

Initially, a factor analysis was performed to examine the item clusterings. This factor analysis produced two important findings. Firstly, role overload emerged as a powerful factor separate from conflict, as did role underload. Secondly, the theoretical subdivision of ambiguity into predictability of outcomes and clarity of behavioural requirements was supported by the extraction of two factors closely paralleling these two constructs. Thirdly, as in earlier research, the theoretical components of conflict did not emerge as separate factors. The factor analysis, then, suggested the computation of 5 scores :

- a) Conflict
- b) Overload
- c) Underload
- d) Lack of Clarity of Behavioural Requirements
- e) Lack of Predictability of Outcomes

Coronary-Prone Behaviour (Type A/A)

From the outset, it needs to be understood that personality types A and B fall on a single bipolar continuum of coronary-prone behaviour, with mean 0. Positive scores are seen as indicative of Type A behaviour, while negative scores imply Type B behaviour. Clearly, small individual, absolute deviations from zero are of little diagnostic value. However, when scores differ substantially from zero, more informed inferences may be drawn with respect to the individual's behaviour patterns.

Strain

It is with the measures of strain that ethical considerations impose the most constraints with respect to the provision of full feedback. Particularly, individual details of general anxiety, general depression and general self-esteem must be omitted. Details of the remaining strain variables will be provided. It is emphasized that scores on these variables must be considered in relation to the points made below, and no conclusions further than the clearly defined limits of these points should be drawn.

- 1) All these measures relate to the work situation. Therefore, no inferences beyond this should be made. A person who is tense at work or tired (fatigued) at work is not necessarily tense or tired outside of the work situation, i.e. do not generalize any of these scores to yourself as a person
- 2) No matter what your scores are, do not think that this makes you a "good" person or a "bad" person. These are purely descriptive measures and make no statement concerning your quality, status or importance.
- 3) For me, the provision of this feedback is a way of enabling you to possibly get to know yourself better. In this connection, it is necessary to point out that no psychological measure is absolutely correct. There is always some error in assessment, which is why large numbers of people are required to conduct worthwhile research. The idea is that errors cancel out over many measurements. The conclusion to be drawn from this is that the individual scores can only give a general idea and, even then, may sometimes be way off the mark, depending on your mood and feelings at the times you completed the questionnaires, as well as the care with which you completed them.

In summary, then, the measures of strain must only be seen as general indications of your feelings with respect to certain issues, and that these issues relate to the work situation, and do not imply anything good or bad about you as a person. If you feel any concern whatsoever with regard to your scores, please come and talk to me at the times I have indicated.

	YOU	YOUR DEPARTMENT	YOUR SOCIETY	STANDAP DEVIATIC
CONFLICT				
OVERLOAD				
UNDERLOAD				
LACK OF CLARITY OF BEHAVIOURAL REQUIREMENTS				
LACK OF PREDICTABILITY OF OUTCOMES				
TYPE A/B				
WORK - RELATED TENSION				
WORK - RELATED DEPRESSION				
WORK - RELATED SELF-ESTEEM				
JOB DISSATISFACTION				
-HOSTILITY				
-FATIGUE				

Note : It is necessary to briefly explain the meaning of the number in the last column, the standard deviation. It is not sufficient to know that your score is 2 points above the mean, for example, as it is not possible to decide whether this is well above the mean score or whether this is average. The standard deviation helps out here, and gives some idea of the spread of scores. It is assumed that the variables in this table are normally distributed in the population. Then,

- a) 38,3% of scores are expected to lie within half a standard deviation above and below the mean.
- b) 68,3% of scores are expected to lie within one standard deviation above and below the mean.
- c) 86,6% of scores are expected to lie within one and a half standard deviations above and below the mean.
- d) 95,4% of scores are expected to lie within two standard deviations above and below the mean.

From these four results, you should be able to work out how usual or unusual your scores are.

Appendix K

Test 2

$$H_0 : X \sim N(0 ; 10)$$

$$H_A : X \not\sim N(0 ; 10)$$

RANGE	OBSERVED FREQUENCY	THEORETICAL FREQUENCY
< -20	1	1,69
-20 - -15	3	6,31
-15 - -10	23	18,57
-10 - -5	43	39,27
-5 - 0	51	55,67
0 - 5	52	55,67
5 - 10	37	39,27
10 - 15	22	18,57
15 - 20	11	6,31
> 20	0	1,69
N = 243*		

The χ^2 Goodness of Fit test:

$$D^2 = \sum \frac{O_i^2}{E_i} - N$$

$$= 9,978$$

$$9,978 > 16,919 \quad \therefore \text{Accept } H_0 \text{ (} p < 0,05 \text{)}$$