

**THE RELATIONSHIP OF SENSE OF COHERENCE TO HEALTH AND WORK
IN DATA PROCESSING PERSONNEL**

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DECLARATION

I hereby declare that this thesis is my own work and that I have not submitted it for a degree at any other university.

Signed by candidate

G. FRITZ

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ABSTRACT

The aim of the present study was to test a model of stress and to examine whether the theoretical construct of sense of coherence (SOC) moderated the relationship between stressors and health-related and work-related outcomes.

This construct of SOC was identified by an Israeli medical sociologist, Antonovsky. He maintained that the current focus of research on stress is largely pathogenic in nature. He suggested that it would be of value to shift research more towards that which identifies the origins of health. He consequently developed the term "salutogenesis", which requires people to focus on those factors which promote well-being. He also argued that people are not either sick or well, but rather are located on a continuum between health-ease/dis-ease. With respect to their health, persons will find themselves somewhere along this continuum, where they may shift between the two positions.

He then suggests that certain factors contribute to facilitating the movement along this continuum. These factors together form a construct which he calls the SOC. The SOC is comprised of core components. He hypothesizes that someone with a strong SOC is likely to make better sense of the world around him/her, thereby engendering a resilience towards the impinging stressors. The person with a weak SOC is likely to capitulate to these stressors more readily and by succumbing to them is going to increase the likelihood that (s)he will move to the dis-ease end of the continuum.

This study attempted to investigate the following research questions, namely, whether (1) the stressors were related to the stress outcomes, (2) the SOC was related to the stressors and outcomes, and (3) the SOC moderated the relationships between stressors and outcomes.

In the present study the subjects were drawn from all data processing professionals in a large financial organisation. The respondents ($n = 194$) replied to a questionnaire which contained scales which measured a variety of job-related stressors, an SOC scale as well as job-related and health-related outcome variables. Intercorrelations between the stressor, moderator and outcome variables were calculated. Other statistical procedures that were utilized were subgroup analyses and the moderated multiple regression analyses.

Partial support for all three research questions was obtained. Four of the six stressors were found to correlate significantly with somatic complaints, thereby suggesting that stressors result in persons feeling the results of stress and reporting them physically.

The SOC was found to relate to some of the stressors and outcome variables. This would lend partial support to an interpretation of the SOC as having a main effect relationship to stressor and outcome variables.

In the subgroup analyses the results showed that out of a possible 54 relationships, the SOC moderated in only seven of them. The moderated multiple regression (MMR) analyses showed that out of 54 possible relationships, the SOC moderated in 12 of them. Furthermore, the SOC moderated between six health-related outcome variables and six work-related outcome variables. These findings then partially support research question 3, which examined whether the SOC would moderate relationships between stressors and outcome variables.

This study was concluded by a discussion of the findings, its implications, and the limitations of this research.

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"Human beings are born with different potentialities and susceptibilities which life experiences may then mold into a protective shield undergirding future health."

(Thomas, 1981, p.41)

CHAPTER 1

THE PROBLEM AND ITS SETTING

Statement of Problem

Occupational health psychology is a burgeoning field within the discipline of psychology, and in recent years has made important contributions towards enhancing our understanding of a little known field. Central to much of the literature in this field is the concept of "stress". There are many different approaches towards the understanding of stress, and these have been reviewed by various authors (e.g. Bluen, 1986; Glowinkowski & Cooper, 1986; Hart, 1987; Hobfall, 1989; Hurrell, Murphy, Sauter & Cooper, 1988; Jubiler, 1989; Lazarus & Folkman, 1984; Matteson & Ivancecich, 1987; Strümpfer, 1983). Strümpfer (1988) pointed out that this endeavour has been characterised by following the traditional medical model. This means that much of the research has been focused at trying to understand the sources of breakdowns, identifying the determinants of disease, or isolating risk factors which lead to ill-health. Once it is possible to understand why particular diseases develop, it then is possible to find ways of combating and preventing each of the diseases in turn.

Recently an Israeli medical sociologist, Aaron Antonovsky (1979, 1987), has turned this approach "on its head", so to speak. He argued that each of us in our daily life have to experience such a range of pathogens and stressors that, according to him, it seems to be self-evident that "everyone should succumb to this bombardment and constantly be dying" (Antonovsky, 1979, p.13). Clearly this is not the case and it is obvious that we as human beings are able, in varying degrees, to resist the nature and intensity of

stressors that impinge on our daily life. This led him to start exploring the basis for a new theory. He argued that research should not only be focused on the causes of pathology, but that we should also consider what contributes towards the origins of health. This approach he called the "salutogenic" approach, as opposed to the pathogenic approach.

At the core of this concept of salutogenesis is a construct what Antonovsky termed the "sense of coherence" (SOC). He maintained that people with a strong SOC will be able to manage the effects of stressors far easier than those with a weak SOC. This construct constitutes the focus of the present research. Antonovsky (1979, 1987) argued persuasively that this construct will have a mediating effect between stressors and outcomes. Therefore this study proposes to examine the construct of SOC and to determine whether it has any moderating effects between stressors, on the one hand, and health- and work-related outcomes, on the other hand. The details of the research question will be stated once the variables have been identified.

Delimitations

This study will attempt only to test Antonovsky's (1979, 1987) theory in a specific organisation, with respect to a specific occupational group; therefore it cannot serve as a basis for broad generalisation. *limitation* It is limited to data processing professionals, who are employed by one of the largest financial institutions in South Africa.

The construct, SOC, is a very specific one which has been identified and researched by Antonovsky. He has

developed a research instrument to measure the construct of SOC (Antonovsky, 1987, p.75-88). This study will use both the construct and the short form of the measuring instrument as defined by him; it will make no attempt to adapt or change it prior to its use, apart from minor modification of the wording of three items.

Stress research is dominated by a plethora of varying approaches and there appears to be little agreement amongst them, even on how stress is defined (Bluen, 1986). For the purposes of this study, the variables which have been selected, have been divided up into three categories, namely:

Stressors

Moderator

Outcomes

The variables to be included were selected after a careful study of the literature. The choice was also determined by the design of measurement. The data were gathered by means of a questionnaire, and this clearly limited the kind of information one could or could not obtain. Chapter 3 identifies each of the variables and the sources for each of them.

Importance of Study

The field of stress and occupational health has enjoyed increasing popularity over the last few years (Goldberger & Breznitz, 1982; Selye, 1983). This was furthermore illustrated by Selye (1982), who claimed that there were at the time over 120 000 publications dealing with stress from medical and behavioural perspectives. In addition, the stress concept has usually been used to explain a variety of outcomes, mostly negative, that otherwise defy explanation (Baum, Singer & Baum, 1981).

In the scientific realm, stress has been used as a psychological precursor of illness, as a result of any number of conditions, or as a catch-all for anxiety reactions, discomfort and the like. It is also fashionable to attribute erratic or unexplainable behavior of friends and acquaintances to the fact that 'they are under a lot of stress'. (Baum et al., 1984, p.4)

As can be seen from the above, the focus has primarily been on the pathogenic approach to stress and stress research. The work of Antonovsky (1979, 1987) has introduced a new approach towards occupational health psychology and to the understanding of the effects of stress. His view is that one should also consider the origins of health, and through an understanding of what contributes towards resilience to the effects of stress. This will assist in enhancing our knowledge of a subject which, as Selye (1980) said in a different context, that is well-known and yet little understood.

Antonovsky (1979) urged his readers to remove the blinkers of the pathogenic approach, and to look for the sources of good health. If Antonovsky's theory can be confirmed through research, it would have major implications for many different fields, e.g. medicine, psychotherapy and approaches to organisational behaviour. In particular, the focus within organisations would have to move progressively away from stress management interventions aimed at pathogenic factors, and move more towards developing the resources that would enhance people's SOC. Also stress management at all levels throughout an organisation, but in particular at executive levels, would have to be redesigned.

The present study could be of importance for other reasons too. McLeod (1985) has cited three reasons for concern regarding stress at work:

- the need to improve productivity in the face of more competition;
- the fact that stress has a deleterious impact on performance;
- the fact that occupational health is associated with sharply rising health care costs.

Data processing personnel in particular are also concerned about the impact on productivity within their field (Gish, 1984; Inmon, 1984; McElroy, 1982; Plasket & Wilneff, 1983). Two concerns, related to productivity, which emphasise the importance of understanding stress, in particular with reference to data processing personnel, are turnover and morale.

The data processing field has been particularly hard hit by increased labour turnover. Bussin (1989) showed that the turnover rate among data processing personnel in South Africa has increased from 15% in 1987 to 26% in 1988. This turnover rate means that more than one in four data processing professionals switched jobs in 1988. Clearly labour turnover is not only linked to stress, but in most cases where it is, senior management no doubt would wish to reduce these figures.

Morale and feelings of dissatisfaction have enormous and varying consequences. The organisation can only benefit where something is done about it, particularly when it relates to data processing personnel. As Murphy and Hurrell (1987) pointed out, low morale and dissatisfaction can be obviated at least in part by reducing factors which contribute towards job stress.

If Antonovsky's (1979, 1987) concept of SOC can be tested through research and shown to have substance, it could mark a new approach to stress research. Some of the traditional views of stress may be shaken, which would encourage researchers to explore the field in a different way.

CHAPTER 2

LITERATURE REVIEW

This chapter will, firstly, present a model of the stress process, in order to position various classes of variables that will be used in the present study.

Since the SOC is so central to the study, the main portion of this chapter will summarise the body of theory that Antonovsky (1979, 1987) has developed around the construct of SOC. Other reviews will be found in Anstey (1989) and Strümpfer (1988).

Model of Stress Process

Various models of stress have been identified (Charlesworth & Natham, 1985; French et al, 1974; Matteson & Ivancevich, 1982; McGrath, 1976; Schuler, 1982; Shirom, 1982). Most of these have been summarised by Anstey (1989).

The model which will be discussed here is the one developed by Strümpfer (1983). Outlined overleaf in Figure 1 is his model of stress which depicts the interaction of **organisational** stress variables.

The labelled rectangles are the different variables of which the model is comprised. The solid arrows reflect where the variables have a directional effect on one another. Broken arrows indicate where conditioning effects may strengthen or weaken relationships between variables.

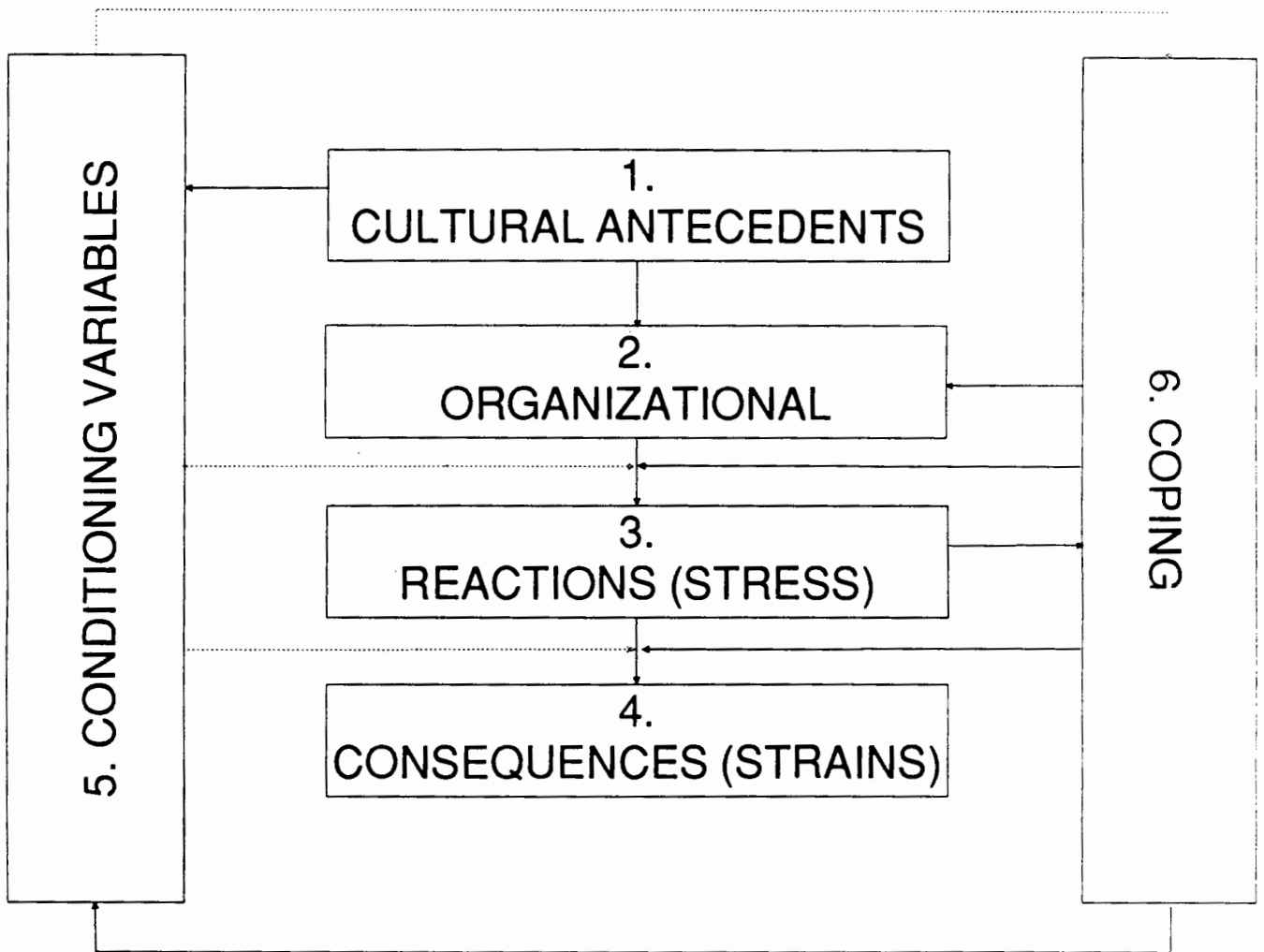


Figure 1 Interaction of organizational stress variables (Strümpfer, 1983, p. 376).

Many researchers approach stress in an individual context only, often ignoring the group or cultural context. Clearly cultural issues such as value systems, social, economic, political or even religious factors all exercise an influence on an individual and may determine one's behaviour. Consequently the individual can feel "duty bound" or pressurised to respond in a particular way due to the cultural environment.

The organisational environment generates stressors which can be classified in terms of social interaction into five broad categories, such as, individual, interpersonal, group, organizational and boundary spanning. The stressors at the individual level are among problems like quantitative and qualitative overload and underload, job insecurity and unemployment. At the interpersonal level issues like role ambiguity, role conflict, lack of participation, responsibility for people and things, and interpersonal conflict are all stressor sources. Stressors at the group level can be found among factors like low morale and lack of cohesiveness. At the organizational level relevant stressors can be found among issues like management styles, inter-departmental conflict, control systems and organizational culture. Boundary spanning refers to **when** "executives find themselves in positions where they have to represent their organizations at the interface with suppliers or consumers, with labour unions or employer associations, or with various government bodies" (Strümpfer, 1983, p.378). The stressor variables to be investigated in the present study will only represent the individual and interpersonal categories mentioned here.

One's immediate reaction to a stressor is referred to as the "fight-or-flight" response. This is accompanied by a longer term reaction, the so-called "general adaptation syndrome". Essentially what this means is that, when one is confronted by a stressor, one undergoes certain physical changes which prepares one in a state of readiness to deal with the situation. Secondly, everyone has a certain tolerance level in dealing with stressors. So we can perform at a peak level over a period of time in reaction to stressors, but this will vary from person to person.

Our reaction to stressors and the consequences of such stress are all influenced by various conditioning variables. These conditioning variables are mainly physical, genetic, psychological and situational factors. The SOC, which will be central to the present study, is an important example of psychological conditioning variables.

Methods and strategies for coping shape the way the individual perceives stressors, reacts to them, and prevents the stressors from being converted into strains.

When a person has been exposed to stressors over an **extended** period of time, consequences of stress, or **strains**, may appear. These could take the form of **changes** in the person's health, habitual changes in the person's behaviour (e.g. addictions) or changes in the person's performance of work or attitudes towards work, as well as changes in general life satisfaction. In the present study a number of health-related consequences, a number of work-related consequences, as well as a life satisfaction measure, will be investigated as variables.

Antonovsky (1987) argued that stressors create a state of tension. An individual will react to this in a way that the tension is either converted into pathogenic or salutogenic consequences. These consequences will be determined by the strength of the individual's SOC and the GRR's that (s)he is able to mobilise in order to manage the tension. In terms of Strümpfer's model of stress (1983), this study will endeavour to examine the relationship between stressors and the consequences, to determine what relationships exist between the two, to establish whether SOC is related to the stressors or consequences, or whether SOC acts as a moderator between them, or not.

A New Approach to Occupational Health

As has been pointed out before, occupational health psychology has customarily adopted a pathogenic orientation towards researching and understanding psychological phenomena. At the core of the pathogenic paradigm is the assumption that physical, biochemical and micro-biological agents, as well as more recently, psychosocial ones, cause disease. Therefore, according to Strümpfer (1988, p.4) the pathogenic (pathological) approach is "directed, generally, at finding out why people fall ill and, in the specific, at why they develop particular disease entities. Such understanding is then used to find ways of combating and preventing each of the diseases in turn".

According to Strümpfer (1988), fundamental to the pathogenic paradigm, too, is the concept of homeostasis. It implies that the normal state of the human organism is a relatively constant condition; depending

on circumstances it may vary but is maintained by complexly interacting regulatory mechanisms. "Homeostasis may, however, be disrupted by pathogens and stressors and if the regulatory mechanisms do not function adequately, disease sets in" (Strümpfer, 1988, p.4).

Clearly then the traditional approach to occupational health psychology has been influenced by the medical approach, and it is characterised by attempts to find out what causes ill-health. Although this is by far the major focus within stress research, there is a growing body of writers who are attempting to influence current thinking by suggesting the examination of other factors which either promote health, or act as resistances to breakdowns (e.g. Antonovsky, 1979, 1987; Ben-Sira, 1985; Hobfall, 1989; Kobasa, 1982; Sutton & Kahn, 1986; Watson & Clarke, 1984). While each of the writers approach the issue from different perspectives, they are, nonetheless, unanimous in saying that the field of stress is a complex one and that there are other factors which need to be taken into account.

Salutogenesis

Antonovsky (1979) observed that stressors are omnipresent in human existence, and in fact the human condition itself is stressful. He summarised his perplexity with the following statement:

Given the ubiquity of pathogens - microbiological, chemical, physical, psychological, social and cultural - it seems to me self-evident that everyone should succumb to this bombardment and constantly be dying. (p.13).

As this is clearly not the case, he asks the following questions:

- How many of us manage to stay healthy? (1979, p.9)
- How anyone ever stays alive? (1979 ,p.14)
- Whence the strength? (1979, p.7)

We are all experiencing stressors in our daily life and are constantly being bombarded by them; in the light of these pressures, human beings should be constantly capitulating from any healthy condition and be thoroughly immersed in a state of ill-health. Antonovsky believes in "heterostasis, disorder, and pressure toward increasing entropy as the prototypical characteristic of the living organism" (1987, p.2).

He introduced the concept of salutogenesis, which refers to the origins of health. He argued that this is an area which has not been fully explored. While he does not advocate the abandonment of the pathogenic orientation, he nevertheless believes that research on the origins of health can build onto the existing body of knowledge and add significantly to our understanding (1987).

Antonovsky (1987) identified three implications of the **salutogenic** orientation. Firstly, he argued that it will be necessary to do away with the dichotomy of people being either diseased or healthy, in favour of the health-ease/dis-ease continuum. Essentially this implies that there is no single position towards which the living organism consistently returns. Instead it suggests the movement between two positions, the theoretical poles of total well-being and terminal illness. He does not see people as being either sick

or healthy, instead he believes that a more powerful way of viewing the issue is by examining what he calls the health-ease/dis-ease continuum. He says that, "As long as we are alive, we are in part healthy and in part sick" (1979, p.5). Therefore he believes that a fundamental approach to stress should not focus on either a health orientated emphasis, nor only a disease-orientated position. He argues that the two positions are not incompatible with each other and therefore create a dichotomy. Instead an understanding of both of them will contribute towards a more holistic understanding of health.

Secondly, the salutogenic model rejects the commonly held assumption that stressors are inherently bad (Antonovsky, 1979). Strümpfer (1988) suggests that, if stressors are endemic and that although all of us have a high stressor load, some maintain their position on the above continuum and some even move to the wellness pole. This then has implications for how we view the role of stressors. Stressors must be neutral in their health consequences. What is crucial though, is that the consequences depend on a person's response to the stressor. Antonovsky (1979) maintains that the stressor arouses a condition of tension in the person; if **the** tension is managed poorly, stress results and the **way** for disease is open. However, if it is managed well, the stressor may remain neutral or even become health-enhancing.

A third implication of the salutogenic orientation, is that we ought to study the "deviant case" (Antonovsky, 1984a, 1984b, 1987). Antonovsky indicated that, within the pathogenic approach, focus is on the confirmation of hypotheses; in other words, confirming the relationship between a pathogen or a stressor and a given outcome (e.g. smoking and lung cancer). The person

following the salutogenic approach instead looks at those people who are subject to the same conditions, but who do not fall ill (e.g. smokers who do not get lung cancer) and endeavours to determine the reasons for it. Therefore the focus is on trying to understand why is it that some of those who experience the same stressors, do not succumb and may even move towards the health-ease pole of the continuum. The focus then is on endeavouring to identify and understand those factors that contribute towards increasing the person's resilience to the impinging stressors.

Sense of Coherence

The core construct of the salutogenic approach is what Antonovsky defines as a sense of coherence (SOC; 1979, 1987). He sees the SOC explicitly and unequivocally as a generalised, long-lasting way of viewing the world and one's life in it. Antonovsky (1987, p.19) defined the SOC in the following way:

The sense of coherence is a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from **one's** internal and external environments in **the** course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by the stimuli; and (3) these demands are challenges, worthy of investment and engagement.

The three numbered portions of the definition describe the three core components of the SOC construct which

Antonovsky (1987) identified on the basis of qualitative data. These components will be discussed in the following section.

According to him the formation of a SOC is based on a perceptual process, with both cognitive and affective components.

The SOC construct is given shape by two important sources. Firstly, the core components, and secondly the generalised resistance resources (GRR's). These two sub-structures will be discussed in the following sections.

Core Components

Antonovsky argued (1987) that the core components of the concept of a SOC comprise of the following:

- Comprehensibility
- Manageability
- Meaningfulness

He believes that a certain pattern of life experiences tends to shape our SOC in such a way that we may **develop** either a strong or a weak SOC. The sources of life **experiences** that shape these components are as follows:

Consistent experiences provide the basis for the comprehensibility component; a good load balance, for the manageability component; and, least clear of all, participation in shaping outcome, for the meaningfulness component.
(Antonovsky, 1987, p.92)

In order to gain a fuller understanding of each of these components, the following definitions of each are identified by Strümpfer (1988, p.15):

- **Comprehensibility** refers to the extent to which the person perceives the stimuli from both within and without as clear, ordered, structured and consistent information, and on the basis of which (s)he can expect that these stimuli will in future also be orderable, explicable and even predictable. Basically, it means that the perceptions make cognitive sense.

Manageability refers to the extent to which the person perceives the events of her/his life as experiences that are, at least, bearable, or better still, that can be coped with, or even better, challenges that can be met. The "available resources" of the definition may be under the person's own control, but may also be under the control of legitimate others who have the power to resolve matters in her/his interest, for instance, a spouse, relatives, friends, a physician, leaders, formal authorities, the party or God.

Meaningfulness refers to the extent to which the person feels that life makes sense emotionally, rather than cognitively. At least some of the problems and demands of living are welcome challenges, motivating one to invest energy.

As Antonovsky indicated, one's SOC is shaped by one's perception, either cognitively or through affective means of a particular pattern of life experiences. These life experiences are appraised within the framework of these three core components. Therefore, in terms of these components, a person with a low SOC would perceive internal and external stimuli as noise, not information, as inexplicable disorder and chaos, and as unpredictable in future; (s)he would experience the events of life as unfortunate things that would happen to him/her and victimise him/her unfairly; (s)he feels that nothing in life mattered much, or worse, are unwelcome demands and wearisome burdens (cf. Antonovsky, 1987, pp.17-18).

Generalised Resistance Resources

As has been pointed out earlier, everyday living is accompanied by the forces of the various stressors. These stressors have the effect of arousing tension in an individual. This tension need not necessarily be a negative experience. According to Antonovsky (1987) tension can be salutogenic, but it can also lead to stress. He argued that it is vital that a distinction must be made between these two concepts. He then **continued**, asking the following question: "What **determines** whether a state of tension will be **transformed** into a state of stress, or will have a neutral or salutary consequence?" (p.92). Through this question he wished to determine whether a person in a state of tension will be pushed in one direction or the other on the health-ease/dis-ease continuum. He argued that the rapidness and completeness with which problems are resolved and tension dissipated is called tension management. Not everyone manages his/her problems and

By implication then, the absence of some GRR's can become a stressor (Antonovsky, 1979). The absence of GRR's limits the resources an individual is able to mobilise, in order to deal with the presence of stressors and consequent tension that is created by them. Obviously then the fewer GRR's one is able to draw on, the greater the impact is going to be on the individual's SOC, and the weaker the SOC is likely to be.

On working

Boundaries of SOC

Having a strong SOC, according to Antonovsky (1987) does not mean that the person views his/her entire world as being comprehensible, manageable and meaningful. People set boundaries for their SOC, and people differ in terms of the width of these boundaries. What is important is that what happens outside of these boundaries does not trouble them. All of life need not be highly comprehensible, manageable and meaningful for a person to have a strong SOC. Quite conceivably, it is possible to have a strong SOC and have little interest in politics, little competence in manual skills, little concern for social welfare issues, and so on.

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Antonovsky (1987) argued that there are four spheres that cannot be excluded if a person is to maintain a strong SOC; these are: his or her own feelings; immediate interpersonal relations; the sphere of one's major activity; and existential issues of death, failures, shortcomings, conflict and isolation. He maintained that if we immerse ourselves and our energies in activities which exclude these spheres, a lack of continued involvement may lead to a low SOC.

Antonovsky also postulated the notion of flexibility with regards to the life areas which could be included within the boundaries of a person's existence. This flexibility, according to Strümpfer (1988), might be an effective strategy of maintaining a coherent view of one's world, by temporarily or permanently withdrawing from an area whose demands are becoming less comprehensible or manageable, or by including new areas within the boundaries - so long as it does not apply to the four crucial spheres mentioned above.

Strong or Weak SOC

The collaborative interaction between the core components and the GRR's which an individual is able to mobilise, will contribute towards his or her overall SOC. According to Antonovsky (1979, 1987) there are two extremes of a continuum within which this would fall. Someone with a strong SOC is able to draw readily on a range of GRR's and able to integrate this with the way in which (s)he perceives his/her life experiences through the three core components. A person with a weak SOC is somebody who has limited access to a range of GRR's and who struggles to make sense of his/her life experiences in a comprehensible, **manageable** and meaningful way.

Antonovsky (1987) argued that a person with a strong SOC is likely to maintain it, but will not be able to have it continually increased. Although this person will, on an ongoing basis, be able to make sense of the various life experiences, the strength of his SOC will not increase. The person who has a weak SOC experiences life in a negative way, where (s)he becomes a "loser", and life becomes more chaotic, unmanageable, and meaningless. Through the progression of adulthood

and increasing disparity in the strength of SOC, the differences between those with a strong SOC and those with a weak SOC will become obvious.

The question that next begs to be answered, is whether a person with a weak SOC can do anything to develop it. Antonovsky argued that ~~one's life experiences shape~~ ^{Ontological} one's SOC and therefore while the development of one's SOC is possible, it will take a period of time to do so.

He maintains that there are three ways in which professionals can have an impact on the SOC of someone, viz. to structure encounters that do not damage SOC; to create experiences where the individual is able to see it as consistent, balanced and to participate meaningfully; and to enable the individual to seek out SOC-enhancing experiences. This would have the effect of reinforcing the SOC and of enhancing the individual's range of GRR's which (s)he can draw on.

Interaction between Stressors, SOC and Tension Management

As ~~has~~ been stated earlier, stressors are omni-present in human existence. However, the question is: what is a stressor? Antonovsky (1979) saw the difference between a stressor and other types of stimuli as a matter of degree. The routine stimulus is one to which the organism responds more or less automatically, in a way that does not pose a problem in adjustment. However, a stressor is defined as "a demand made by the internal or external environment of an organism that upsets its homeostases, restoration of which depends on

in Def
Stressor

a nonautomatic and not readily available energy-expending action" (1979, p.72). Once a stressor presents itself to an individual, (s)he responds to the stressor - a response which Antonovsky calls tension. He argued that this tension can be accompanied by either negative and positive effects. Furthermore, the consequences to the individual of having entered into a state of tension can be negative, neutral or salutary. Once a stimulus (stressor) has created a state of tension, the way in which this tension is managed determines whether it is going to be converted into stress. Therefore the key to the whole process is the individual's management of this tension.

The process by which the stimulus is identified as a stressor or a non-stressor is through what Antonovsky calls, primary appraisal-I. This term is borrowed from Lazarus and Folkman (1984). He argued that the very first mechanism through which SOC operates is related to this primary appraisal-I. He maintained that the person with a strong SOC is more likely to define stimuli as non-stressors, to assume that (s)he can adapt automatically to the demand, than one with a weak SOC. Consequently the person with a strong SOC will not experience tension, and therefore eliminate the possibility of its transformation into stress.

Following the model of Lazarus and Folkman (1984) Antonovsky indicated that the next step, primary appraisal-II, is the judgment of the nature of the stimulus - now perceived as a stressor - as endangering one's well-being, positive, benign or irrelevant. It is during this appraisal that the stressor is evaluated with regards to its salutary, neutral or pathogenic effects.

The final appraisal, termed tertiary appraisal, involves two processes. The first refers to the nature of the emotional problem engendered by a stressor. The same stressor could arouse different emotions within the individual who has a strong SOC and another person who has a weak SOC. For example, the widower who meets an attractive woman and has a strong SOC, will experience feelings of hope and excitement; with a weak SOC he may experience feelings such as hopelessness and apathy. According to Antonovsky (1987), what distinguishes these two sets of emotions is that the former provide a motivational basis for action, while the latter are paralyzing. Within the former, emotions are focused; within the latter, they are diffused.

The second element pertains to how the instrumental problem involved is perceived when a stimulus is being defined as a stressor. For example, if one has been promoted into a managerial position, for the weak SOC person, it is likely to bring to the fore, even though the position had been wanted, a number of perceived and anticipated complex problems. The individual now has a far greater range of responsibilities, has direct accountability for the functioning of the department, has to interact directly with the senior, is responsible for budget matters, and so on. The strong SOC person perceives the same problems, but with greater clarity, with more specificity, and with more precise differentiation. The problems are not only seen as being more comprehensible and manageable, but also as challenges rather than burdens.

The discussion so far has covered issues surrounding stressors, tension and stress. The question that raises itself is: "How does the individual resolve this tension?" A very important and fundamental point made

by Antonovsky (1987) is that a strong SOC is not a particular coping style. This he argues is the heart of the matter. The stressors of life are many and varied, positive or negative, brief or enduring, controllable or not, and so on. To adopt one pattern of coping consistently is precisely to fail to respond to the nature of the stressor and hence to decrease the chances of successful coping. According to Antonovsky:

What the person with a strong SOC does is to select the particular coping strategy that seems most appropriate to deal with the stressor being confronted. Or, as I would rather put it, he or she chooses from the repertoire of the generalized and specific resistance resources at his or her disposal, what seems to be the most appropriate combination. (1987, p.138; Italics deleted from first sentence.)

Meaning


A crucial factor involved in the process of mobilising resources is a strong sense of meaningfulness. Therefore when confronted with a stressor a person who has a strong SOC is more likely to feel a sense of engagement, of commitment, of willingness to cope with the stressor.

However, before any resources are mobilised, it is essential to define the nature and dimension of the problem, to make sense of it. And it is at this point where the comprehensibility component of the SOC comes into play. The person who has a strong SOC believes that problems can be ordered and understood, and one can set about turning chaos into order, and confusion into clarity.



What the above is saying is that the core components contribute largely towards making sense of the stressors, the individual then mobilises the available and appropriate GRR to deal with the stressor. An important point to be borne in mind here is that the individual does not choose which coping strategy, but how many (s)he is flexibly able to employ within different strategies.

Antonovsky defined a coping strategy as an "overall plan of action for overcoming stressors" (1979, p.112). According to him there are three major variables that enter into every coping strategy: rationality, flexibility, and far-sightedness.

He defined rationality as "the accurate, objective assessment of the extent to which a stressor is indeed a threat to one, given who one is, in the broadest sense" (1979, p.112).

Flexibility refers to "the availability of contingency plans and tactics and of a willingness to consider them"; however, "receipt of new information and readiness to change one's course does not mean that one necessarily will do so" (1979, p.113).

Far-sightedness "is linked to rationality and flexibility but it goes beyond them in that it seeks to anticipate the response of the environment, inner and outer, to the actions envisaged by the strategy" (Antonovsky, 1979, p.113). He concluded his discussion by adding that a coping strategy is the way the individual organizes his/her thinking prior to behaviour, not the behaviour that eventually results to cope with the stressor. The behaviour that occurs is shaped by different variables, one of which would include coping strategies.

SOC and Health

The previous discussion has endeavoured to motivate how the SOC would lower the probability of tension being transformed into stress. The impact of the SOC on the health-ease/dis-ease continuum has not been discussed yet. The point of the above discussion is that by managing tension well, the person with a strong SOC will reinforce or improve his or her own health status.

Antonovsky hypothesizes that the stronger a person's SOC is, the more likely will (s)he be able to maintain her/his position on the health-ease/dis-ease continuum. However, he is also aware that at present only influences and specification of hypotheses are possible, "for I know of no data that point directly to the link between SOC, coping and health" (1987, p.152).

Antonovsky hypothesizes that someone with a strong SOC is more that likely than someone with a weak sense of coherence;

- To perceive a stressor in such a way that one is able to make sense of it cognitively, and to order the information in such a way that it becomes **clear**, consistent and structured - instead of **succumbing** to it as noise, chaotic, and inexplicable. Consequently one will seek out activities which promote health and actively avoid those which endanger health.

- To understand one's own resources, perceive them as being adequate, and be able to select an appropriate one to meet the demands posed by stressors. In this way the individual feels that (s)he is able to manage an deal with the stressors that (s)he is constantly being bombarded with.

- To be motivated to view stressors in a positive way, worthy of investing time and energy in them and to view them as welcome challenges, which will provide promising rewards - rather than seeing them as threats and responding negatively on the basis of self-fulfilling prophecies.

An important point that needs to be clarified is that whilst GRR's are available, it is up to the person to actuate them in combating and overcoming pathogens and stressors. In other words, they represent a potential availability but it is up to the individual to mobilise these resources and convert them into a means of managing the stressors and pathogens. What makes a difference is the strength of the individual's SOC; people with a stronger SOC are more likely to show a "readiness and willingness to exploit the resources that they have at their disposal" (Antonovsky, 1984b, p.121).

SOC and Work

Antonovsky has indicated that one's SOC is influenced by life experiences. Many people spend a major portion of their life at work, and therefore this major life experience does have an influence over one's SOC. Work conditions clearly influence development of one's SOC. The core components of one's SOC can be influenced in the following way.

Antonovsky (1987) maintains that continued experience of participation in socially valued decision-making is the source of feeling meaningfulness in one's work. He maintains that social valuation operates at two levels. The first one is the valuation of the enterprise within

which one is engaged. Such a valuation is expressed in the resources allocated by the society to the collectivity. Secondly, he believes that the more one perceives the social valuation of one's work as meeting one's criteria of equity, the more one is likely to feel pride and joy, and consequently ownership. Another feature contributing towards meaningfulness in one's work is the discretionary freedom, or decision latitude that the individual worker can exercise in his or her job. In other words, whether the individual has the power to influence what (s)he does or what goes on around him/her.

Experience of an appropriate load balance is seen by Antonovsky (1987), as decisive in determining the sense of manageability. He maintained that the load balance refers to the availability of resources to the individual and to the collectivity within which there is an interaction to get the job done well. A key feature here is that there should be, not only too much, but also not too little work to do. In addition, the work situation should have room for allowing potential to be utilised in substantively complex work.

"To experience, time and time again, things that fit together, unknowns that are explained to one's satisfaction, and ordered patterns strengthen one's sense of comprehensibility (Antonovsky, 1987, pp.113-114). This refers to a consistency which one's work situation allows, whilst also fostering the clarity of seeing the entire work picture. Through it one is able to see where one fits in; in this way one's own role, as well as others' roles, are clear and the individual thus has a clear vision of how jobs are linked together. Where the work picture provides confidence in job security, and supports communicability and feedback in social relations in the workplace, it will also have the effect of strengthening comprehensibility.

The major focus of Antonovsky's writing is about the relationship between SOC and health. However, his references to work are in the context of work experiences that strengthen the SOC. Strümpfer (1988, p.19) argued that it seems evident that this must be a two-way street and that the SOC must also impact significantly on how work is approached and performed. He maintains that, since the majority of adults spend the largest portion of their waking hours in the workplace, it is a dominant source of external, as well as internal stimulation. A strong SOC would thus, in all likelihood, result in the person:

- making cognitive sense of the workplace, perceiving its stimulation as clear, ordered, structured and predictable information;
- perceiving her/his work as consisting of experiences that are bearable, with which (s)he can cope and as challenges that (s)he can meet, by availing her/himself of personal resources or resources under the control of legitimate others;
- and making emotional and motivational sense of work demands, as welcome challenges, worthy of engaging in and investing her/his energies in. (Strümpfer, 1989, p.19)

Clearly on its own, without the appropriate ability, skills, development and training, a high degree of SOC would be of no avail (Strümpfer, 1988).

It is therefore of considerable importance that organisations take cognisance of and evaluate the SOC construct. If research can support the theory, the implications of this concept can make a considerable impact on

organisations. Not only would industrial/organisational psychologists approach the management of stress at all levels differently, but by introducing this concept into their thinking, they will approach issues like personnel selection, training, performance appraisal, career development, succession planning and organisational development in a different way.

Role of Moderators in Stress

This study will be examining the relationship between stressors and outcomes from the point of view that the construct of SOC acts as a moderator between the two. Therefore a brief discussion on moderators is necessary. Ivancevich and Matteson (1980, p.167) defined a moderator in the following way: "A moderator is a condition, behavior, or characteristic that qualifies the relationship between two variables. The effect may be to intensify the relationship or to weaken it."

According to Schuler (1982), organisational stress moderators can affect the stress-strain relationship in at least three ways: they influence firstly, subjective perceptions of objective stressors; secondly, coping with perceived stressors; and thirdly, outcomes of the stressors. According to Ivancevich and Matteson (1980), if one looks at the organisational stress literature the range of potential moderator variables is practically infinite. Bluen (1986) identified four classes of organisational stress-strain moderator variables, viz. physiological, physical, demographic and situational moderators; for a very detailed review of these moderators the reader is referred to his thesis.

Research on Data Processing Personnel

The limited literature on stress among data processing personnel will be briefly reviewed to conclude this chapter. A study undertaken by Ivancevich, Napier and Wetherbe (1985) endeavoured to examine the relationship between occupational stress, attitudes and health among information systems personnel. This research was done in the United States of America and a total of 580 respondents from 18 different companies participated. The focus of the study was to examine the way in which Type A and Type B respondents perceived stressors and outcomes. The hypotheses of the authors was as follows:

Among information systems personnel the Type A behavior pattern will be a significant moderator between work environment, stressors and outcomes. Therefore, Type A information systems personnel, when compared to Type B counterparts, will report significantly:

- a) higher levels of stress
 - b) more job-related tension
 - c) less ability to discharge job-related tension
 - d) lower levels of job-satisfaction
 - e) higher levels of organizational commitment
 - f) fewer health disorders
 - g) more severe health disorders
- (p.80).

The results indicated that hypotheses b, c, and f were supported. Partial support was found for hypothesis a. Hypotheses d and e were rejected. The authors argued that information systems (IS) managers should take into account the Type A factor when addressing IS employees' stress, attitudes, health symptoms and

health behaviours. They argued that the Type A employees appear to experience more adverse consequences of job stress than their Type B counterparts.

Dittrich, Couger and Zawacki (1985) examined the perceptions among data processing personnel to equity, job satisfaction and their intention to quit. The perceptions of 1 224 system analysts, programmers and operation employees from data processing departments in nine companies were obtained by means of a questionnaire. The results obtained from this study were also compared with a similar one done six years before, which studied clerks in a municipal office. Broadly speaking, the purpose of this study was to explore the relationship between perceived fairness and job satisfaction and intention to quit. The findings indicated a significant relationship between perceived fairness and job satisfaction ($r=0.632$, $p<0.001$). These findings were consistent with previous research. A significant relationship ($r=.387$, $p<0.001$) was found between perceived fairness and intention to quit. Again these findings were consistent with the 1979 study. To describe the factors that lead to the perception of fairness would be too lengthy for this discussion. However, this research study highlighted issues for IS managers which they need to keep in mind that would enhance perceptions of equity for their staff, which would, in turn, contribute towards increased job satisfaction and decreased propensity to leave.

The study undertaken by Couger (1988) examined the views of IS executives as compared with human resource (HR) executives. The purpose of the study was to:

- (1) identify the 10 most important issues in management of Human Resources in the 1990's,
- (2) determine the relative importance of these issues,
- (3) ascertain the degree of agreement about these issues (p.161).

He argued that the value of comparing these views was that HR management is also supposed to be a support organisation, assisting other departments to improve the quality of HR management in those departments. Furthermore, the management of IS departments believe that they are not receiving sufficient support from the HR department, as is evidenced by the number of IS executives who have now acquired their own HR personnel. (Incidentally, this is exactly what has happened with the organisation which participated in the present study.) In addition, HR personnel are likely, on account of their training and experience, to have a different perspective from IS management.

The Delphi technique was used to identify the key factors and obtain a consensus about their relative importance. The results indicated that the IS and HR executives agreed on six of the top 10 issues. These would include issues like, better human resource planning, increasing business knowledge, keeping up-to-date technologically, increasing productivity/motivation, need for new compensation/reward programmes and retention and motivation of maintenance personnel. However there were also significant differences between the two groups. The issue of "improving leadership and management skills" was ranked second by the HR executives and by the IS executives. This suggests that the IS executives were unaware of

the value of these skills to other managers in the firm. IS executives were perhaps focusing on task-related issues, as opposed to ensuring that their supervisors are properly trained and suitably equipped for their managerial roles. HR executives identified some of their own shortcomings, where they ranked an issue like "updating recruitment/selection techniques"; in comparison, IS executives did not list this among their issues at all. This suggests that they were either satisfied with the current quality of manpower recruitment, or that they were unaware of how this approach could be improved, or both.

It is interesting to observe that IS executives identified two issues, namely "better mental health provisions" and "assist employees in stress/burnout". No issue relating to stress or health was identified by HR managers. Two possible interpretations can be made from this, namely that HR executives were focusing more on work-related issues than health-related issues, or that they were not as aware of the pressure that the data processing personnel work under.

CHAPTER 3

METHODOLOGY

Sample

The subjects of this study consisted of the total population of data processing professionals from a large financial institution. Questionnaires were distributed to each of them, with an accompanying letter explaining the purpose of the research (see Appendix 1). A total of 390 questionnaires were sent out. After two weeks a follow-up letter (Appendix 2) was sent out as a reminder to those who had not yet completed the questionnaire.

A range of organisational levels was represented from divisional management and department heads to trainee programmers. Although indication of ethnic origin and language was not requested by the questionnaire, it can safely be assumed that the majority of the sample was White, interspersed with a few Coloured, Black and Indian respondents. English and Afrikaans speakers were represented in a ratio of about 60 to 40. Of the total number of questionnaires sent out 240 were returned. Of these 46 were found to be unusable, as they had been either incorrectly or incompletely answered. Analyses were therefore carried out on data for 194 subjects (50% of original sample). Of the total sample, 138 were male and 56 were female. The mean age was 32,11 years, with a standard deviation of 7,41 years and a range from 19 years to 59 years. The number of years of formal education ranged from 10 years to 19 years, with a mean of 13,34 years and a standard deviation of 1,65 years.

Research Question

The review of the literature in the previous chapter focussed on the construct of SOC. Figure 2 presents a model which identifies the stressor and outcome variables, and where the moderating variable (SOC) interacts between them.

The present study attempted to answer the following questions:

- (1) Are the stressors under investigation related to the stress outcomes under investigation?
- (2) Is the SOC related to the stressors and outcomes?
- (3) Does the SOC moderate relationships between stressors and outcomes?

Measures

Appendix 3 contains a copy of the entire questionnaire that was used in the research called "YOU, YOUR WORK AND YOUR HEALTH." Appendix 4 indicates where each of the variables can be located in this questionnaire, the sources from which they were obtained, and the method of scoring.

Independent Variables

The following scales were used to represent stressors:

Quantitative Workload (Caplan, Cobb, French, Harison & Pinneau, 1980, p.238) was measured by a

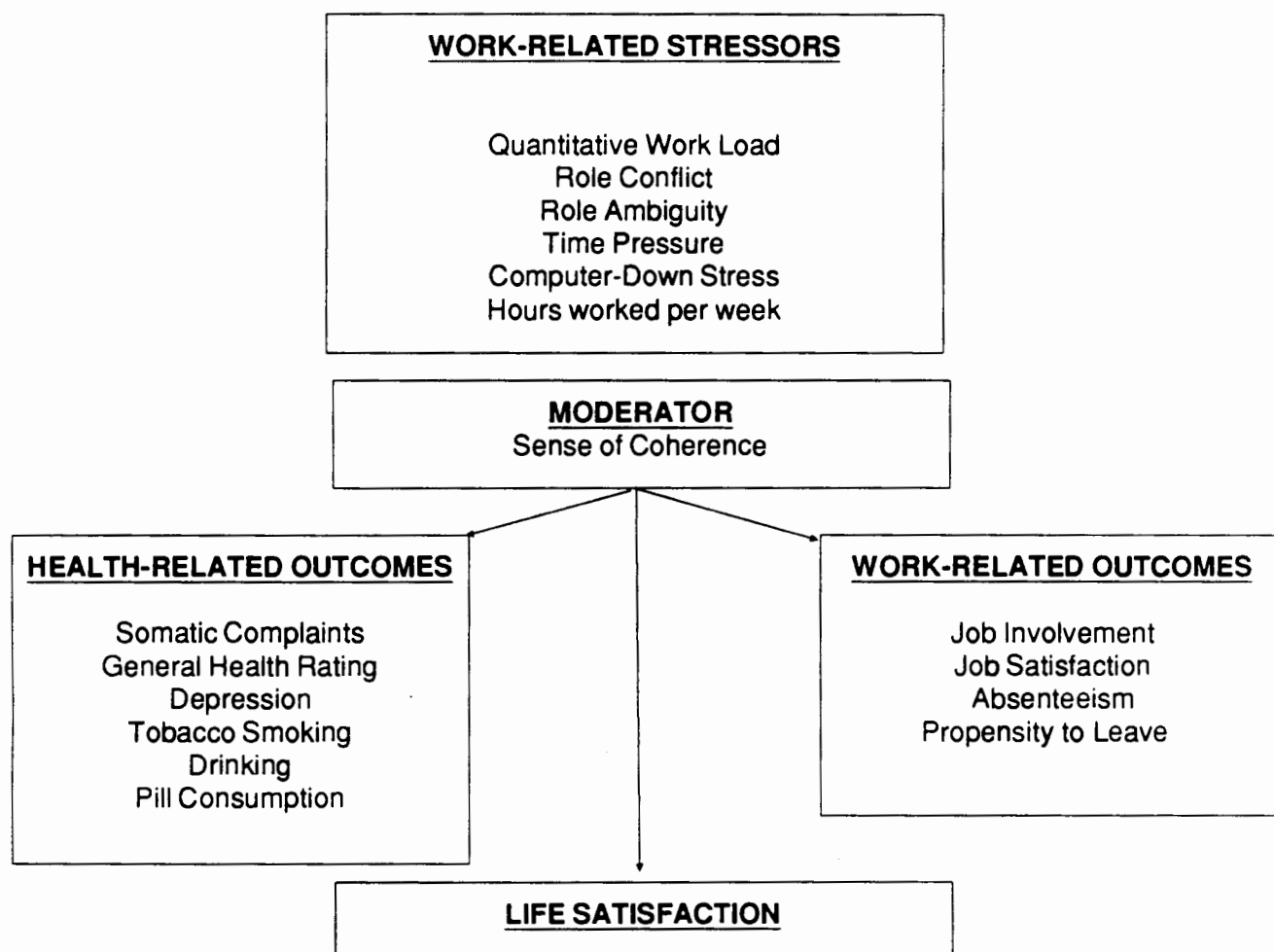


Figure 2 Research model of proposed variables

4-item index answered on a 5-point Likert scale. These questions dealt with how hard people had to work and how much work they had to do. It contained questions like: "How often does your job leave you with little time to get things done?" and "How often is there a great deal to be done?"

Role Conflict (Caplan et al., 1980, p.245) was a 3-item index which measured the level of role conflict expressed by the respondent. Items such as: "People whose requests should be met give you things which conflict with other work that you have to do?" were included. Answers were on a 4-point Likert scale that ranged from "rarely or never" to "very often".

Role Ambiguity (Caplan et al., 1980, p.245) was a 4-item index which measured how clear the incumbent was with regard to what was expected of him/her. Items like: "How much of the time are your work objectives well defined?" and "How often are you clear about what others expect of you on the job?" were included. Answers were on a 4-point Likert scale, ranging from "rarely" to "very often". It should be noted that the scoring direction was reversed in order to simplify interpretation.

Hours Worked per Week was measured by the number of **hours** that the respondent worked during the average **week**, not including the time taken off for meals.

Computer-down Stress first required respondents to estimate the amount of time lost to computer failure during the previous month. This was followed by a request to indicate on a 5-point Likert scale ranging from "not at all" to "extremely", how stressful such an event was. The product of these two answers provided the final score.

Time Pressure (Strümpfer & Scott, 1988) was a 4-item index measuring whether volume of work was disproportionate to the time available to do it in.

Items such as: "How often do you have to work against a deadline?" and "How often do you have to forgo a lunch-break due to an urgent job?" were responded to on 5-point Likert scales.

Moderator

Sense of Coherence was measured by using Antonovsky's 13-item short-form (1987, p.190-194). It contained five comprehensibility items, five manageability items and three meaningfulness items. A 7-point Likert-type scale was used for responding, with the two extremes of each scale anchored by descriptions.

Dependent Variables

The following health-related outcomes were measured:

Somatic Complaints (Caplan et al., 1980, p.271-272) was a 10-item index, which measured physiological complaints that the respondents might have **experienced** during the past month on the job. It **included** complaints such as: trembling, shortness of breath, dizziness, faster heartbeat than usual, clammy and damp hands.

General Health Rating (Garrity, Simes & Marx, 1978, p.78) was measured on a rating scale, consisting of a 10-step ladder. Step 1 indicated "the best your health could be" and Step 10 "the worst your health could be." A low score indicates the health end of the distribution and a high score the ill-health end.

Depression (Karasek, 1979, p.307) was a 10-item index, where the respondent had to choose one word out of each pair which best described his/her life at the moment, e.g. "My life is ... useless/worthwhile; full/empty; discouraging/hopeful."

Tobacco Smoking required respondents to indicate how many cigarettes, pipes or cigars they smoked in a day.

Alcohol Consumption (Kessler, House & Turner, 1987, p.58) required respondents to indicate how often they drank during the last month (how many days out of the month), and when they did drink, how many glasses of beer, wine or tots of hard liquor they had in one day. The score was obtained by the product of these two answers.

Pill Consumption (Kessler et al., 1987, p.58; see also Karasek, 1979, p.307-308) was a 2-item index requiring respondents to indicate how often (how many days out of each month) they found it necessary to take tablets or drugs to help them to go to sleep, or to take tranquillizers.

The **following** work-related outcomes were measured:

Job Involvement (Lawler & Hall, 1970; see also Lodahl & Kejner, 1965; Morrow, 1983, p.490) was a 4-item index requiring respondents to indicate how important work was to them and how much satisfaction they obtained from it. Items such as: "The major satisfactions in my life come from my job" were included. Answers were on a 4-point Likert scale which ranged from "disagree strongly" to "agree strongly".

Job Satisfaction (adapted from Beehr, Walsh & Faber, 1976, p.43) enquired how satisfied respondents were with their present job, and whether "knowing what you know now" they would take the same job again.

Absenteeism required respondents to indicate how many days they had been absent from work during the past two months. Although Mueller, Wakefield, Price, Curry and McCloskey (1987) expressed concern about the validity of self-reports of absenteeism, this was the only way available if the subject's anonymity were to be maintained.

Propensity to Leave (adapted from Abdel-Halim, 1980, p.201) was measured by asking individuals if they would seriously consider a job offer from another company, which provided exactly the same responsibilities and pay that they currently have.

An overall life satisfaction outcome measure was obtained in the following way:

Life Satisfaction (Molnar, 1985, p.149) was ascertained by asking the respondents to indicate on a 10-step ladder the position which represents how **their** life has been for the most of the past year. **Step 1** was labelled: "the worst life you might reasonably expect to have" and Step 10 as, "the best life you might expect to have."

Method of Analysis

The aim of the present research was to determine the effects of the stressors on outcome variables which

fall under health-related, work-related, and life satisfaction outcomes and to see if SOC influences these stress/strain relationships. The purpose was to determine the fit between the theoretical model and empirical data. Consequently the research entailed confirmatory analysis, where if the model is shown to fit the data, then the model is regarded as being confirmed (James, Muliak & Brett, 1983).

A theoretical model was constructed (see Figure 2) in order to determine whether SOC has a moderating effect between stressors and outcomes. To determine whether the data lend support to the model, specialized statistical techniques needed to be applied. Two methods to detect moderator effects have generally been used in organisational stress literature, namely subgroup analysis and moderated multiple regression.

Subgroup analysis, firstly, (Zedeck, 1971) involves the partitioning of a sample into subgroups, determined by their scores on the moderator variable; secondly, the degree to which the independent and dependent variables for each subgroup are associated; and thirdly, the degree to which the detected level of association differed between more among the same subgroups (Zedeck, 1971). After extensively perusing organisational behaviour, industrial psychology and organisational psychology literature, Jubiler (1988) reported that certain authors view the results of subgroup analyses as providing conflicting findings regarding the status of the variable as a moderator. Two major weaknesses regarding subgroup analysis have been identified (Cowen, 1978; Zedeck et al., 1971). According to them the subgroups are arbitrarily defined, which according to them, increase the probability of obtaining spurious

results. In addition, this method reduces the total sample, which severely decreases statistical power, due to decrease in sample size and a loss of metric information.

Specifically in this study, the total sample was split at the median of the SOC scores (97), into an upper and a lower SOC subgroup. Intercorrelations between all variables were then calculated within each of the subgroups. In the case of the pairs of correlation coefficients between each stressor and each outcome, Fisher's Z transformations were obtained (Howell, 1987, p.585; he refers to these values as r' , not Z). The difference between each pair of Z values was tested for significance (Howell, 1987, pp.240-241). Whenever these differences were significant, the SOC was considered to have acted as a moderator of the relationship.

Moderated multiple regression (MMR) is a statistical procedure that was devised by Saunders (1956). It involves, according to Bluen (1986), the calculation of prediction equations covering the total sample, rather than subgrouping individuals. This procedure assesses the interaction effects most effectively by using a hierarchical strategy which partials out a separate contribution of the independent variables or main effects (Zedeck, 1971). According to Bluen (1986), the aim of MMR is to "assess the contribution of a) the independent variable; b) the purported moderators as independent variables; and c) interactions terms to the percentage of explained variance in the dependent variable" (p.207).

For each outcome variable in the present study, stepwise multiple regressions were calculated. Those variables which made no contribution towards the explanation of interaction effects, were deleted from the final analyses. These variables were Drinking and Tobacco Smoking.

CHAPTER 4

RESULTS AND DISCUSSION

The aim of this chapter is to present the results obtained in the present study, as well as to discuss the findings. The discussion and the presentation of the results will be made; firstly, in terms of descriptive statistics; secondly, in terms of the intercorrelations between variables; thirdly, in terms of the subgroup analyses; and lastly, in terms of the moderated multiple regression analyses.

Descriptive Statistics

Table 2 presents the descriptive statistics for all the variables of this study. The variables are grouped into their major categories; namely, stressors, health-related outcomes, work-related outcomes, life satisfaction, and the moderator variable. The following data are provided for each variable; the mean, the standard deviation, the observed and possible range, as well as (where applicable) the Cronbach alpha co-efficients.

Inspection of Table 2 shows that the observed range tended to be coincident with the possible range, thereby suggesting a distribution of values and therefore few problems with the restriction of range.

Computer-down Stress, Somatic Complaints, Depression, Tobacco Smoking, Drinking, Pill Consumption and Absenteeism all have fairly large standard deviations

Table 2 Means, standard deviations, ranges and reliabilities for study variables

	VARIABLE	MEAN	SD	OBSERVED RANGE	POSSIBLE RANGE	CRONBACH ALPHA
STRESSORS	Hours Worked per Week	41.76	8.23	10-84	Any number	(1 item)
	Quantitative Workload	15.13	2.90	7-20	4-20	.80
	Role Conflict	5.57	1.86	3-12	3-12	.77
	Role Ambiguity	8.62	3.12	4-20	4-20	.87
	Time Pressure	14.61	3.82	6-20	4-20	.83
	Computer-down Stress	12.30	22.25	0-150	Any number	(product)
HEALTH-RELATED OUTCOMES	Somatic Complaints	2.10	2.21	0-10	1-10	.70
	General Health Rating	3.75	2.07	1-10	1-10	(1 item)
	Depression	1.86	1.87	0-9	0-9	.71
	Tobacco Smoking	4.89	31.19	0-1	0-1	(1 item)
	Drinking	25.27	31.91	0-4	0-4	(product)
	Pill Consumption	.38	2.15	0-1	0-1	(2 items)
WORK RELATED OUTCOMES	Job Involvement	9.84	2.05	5-16	4-20	.79
	Job Satisfaction	6.36	1.47	2-8	2-8	.81
	Absenteeism	1.51	5.05	0-3	0-3	(1 item)
	Propensity to Leave	1.86	.83	1-4	1-4	(1 item)
	Life Satisfaction	6.68	1.45	2-10	1-10	(1 item)
MODERATOR	Sense of Coherence	62.77	9.41	30-84	13-91	.77

when compared with the mean suggesting extreme values. Computer-down Stress in particular has a standard deviation of 22.6, whereas the mean is only 12.3. This suggests that some of the respondents lost many hours due to computer breakdown, which they also found extremely stressful. The same observation occurs for the other variables mentioned above.

Inspection of the distributions of some variables indicated that the obtained raw scores could not be used in further analyses. Two of these were Tobacco Smoking and Drinking. For Tobacco Smoking the raw scores were dichotomized as 0 or 1 in terms of absence or presence; in terms of the dichotomized scoring the Tobacco Smoking mean became 4.89 (SD = 31.19). The raw scores for Drinking were segmented into quintiles, and its mean became 25.27 (SD = 31.91). However, as indicated above, these two variables were subsequently excluded from further analyses on the basis of preliminary stepwise multiple regression analyses.

Pill Consumption raw scores were also dichotomized as present (=1) and absent (=0). In terms of the dichotomized scoring, the mean became .38 (SD = 2.15).

Raw scores for Absenteeism were categorized as no absence (=0), one or two days (=1) and three or more days (=3). In the organisation concerned, a medical certificate is required when a person is absent for three or more days and this cut-off point was clearly present as a piling-up on the distribution of the raw scores. The mean of the trichotomized scores was 1.51 (SD = 5.05).

Chronbach alpha reliability co-efficients were calculated for nine of the variables. The range was from .70 to .87, which indicated satisfactory internal

consistencies. The use of Antonovsky's short form measure for SOC showed a reliability of .72, which is somewhat lower than Anstey's (1989) reliability of .84 for SOC, using the same questionnaire, although he used a 5-point response format. Reliabilities could not be calculated for variables based on only one item or measures using the product of two items as scores; in the case of Pill Consumption, the ranges of the two items were so disparate that they could not be used in the coefficient alpha formula.

Intercorrelations

Table 3 contains the intercorrelations between all the variables. The variables are again broken down into their major categories. In view of the large number of coefficients involved, it was considered prudent to consider only those significant at the .01 and .001 levels.

Intra-category Intercorrelations

It is unlikely that the variables within each of the major categories will be independent and therefore it is necessary to consider high correlations between members of each category. Whenever variables within the same category show high intercorrelations, subsequent findings concerning the correlates of such intercorrelated variables cannot be interpreted independently.

Stressors

Among the stressors, Hours Worked per Week and Quantitative Workload showed a significant ($p < .001$) correlation, which is understandable as those persons who work

Table 3 Intercorrelations between variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
STRESSORS	1. Hours Worked per Week	—																
	2. Quantitative Workload	.38***	—															
	3. Role Conflict	.10	.26***	—														
	4. Role Ambiguity	-.09	-.13	.35***	—													
	5. Time Pressure	.52***	.66***	.32***	-.05	—												
	6. Computer-down Stress	-.12	.01	-.05	-.07	.05	—											
HEALTH-RELATED OUTCOMES	7. Somatic Complaints	.06	.17*	.33***	.23**	.18*	.12	—										
	8. General Health Rating	-.02	.02	.09	.21***	-.19**	.17*	.30***	—									
	9. Depression	-.01	-.06	.32***	.31***	-.19**	-.04	.28***	.15	—								
	10. Tobacco Smoking	.06	.11	.03	-.07	.16*	.06	.19**	.19**	.08	—							
	11. Drinking	.11	.01	-.06	.04	.11	.15	.11	.15*	-.04	.18*	—						
	12. Pill Consumption	.03	-.01	-.01	.02	.05	.18*	.25***	.12	.11	.04	.06	—					
WORK-RELATED OUTCOMES	13. Job Involvement	.30***	.31***	.09	-.15	.23**	.05	.01	-.05	.05	.14	.01	.02	—				
	14. Job Satisfaction	.14	.12	-.35***	-.46***	.08	-.04	-.15	-.10	-.44***	.04	-.04	-.03	.21**	—			
	15. Absenteeism	-.08	-.04	.02	-.04	-.08	.12	.30***	.12	.14	.06	-.01	-.04	-.08	-.07	—		
	16. Propensity to Leave	-.06	-.12	.12	.24***	-.02	-.04	-.07	.04	.03	-.18*	.01	.10	-.08	-.28***	.01	—	
MODERATOR	17. Life Satisfaction	.07	.11	-.26***	-.28***	.05	-.01	-.13	-.15	-.57***	-.01	-.06	-.05	-.10	.55***	-.05	-.09	—
18. Sense of Coherence	.17*	.07	-.36***	-.43***	.03	-.07	-.30***	-.19**	-.52***	.06	-.04	-.09	.12	.46***	-.12	-.18*	.49**	

* = p < .05
 ** = p < .01
 *** = p < .001

long hours are bound also to report a high workload. However, since workload could also be increased by working at a faster pace for the same length of time, these are not equivalent variables, a fact reflected in the 14.44% of common variance between them ($r^2 \times 100$).

Quantitative Workload and Role Conflict showed only 6.76% of common variance, whereas Role Conflict and Role Ambiguity showed 12.25% of common variance. Again these variances could be considered independent enough to warrant the inclusion of both members of each pair.

A more serious problem was presented by the correlations of Time Pressure with Hours Worked per Week, Quantitative Workload and Role Conflict, which represented respectively 27.04%, 43.56% and 10.24% of common variance. Results with respect to, particularly the first two pairs of these could be expected to show similarities.

Health-related Outcomes

These variables showed a number of significant inter-correlations, but since the percentages of common variance ranged only from 3.61% to 9.00%, these did not present cause for concern.

Work-related Outcomes

The only correlation in this category which provided reason for concern was that between Job Involvement and Job Satisfaction, reflecting an overlap in variance of 19.36%. Murphy and Hurrell (1987) also reported a negative relationship between these variables. Although

these variables can be distinguished on theoretical grounds, their intercorrelations indicates that a certain degree of similarity could be expected between their correlates with other variables.

The remaining significant intercorrelations within this category ranged from $-.18$ (3.24% common variance) to $-.28$ (7.84%).

Life Satisfaction

This variable was considered on its own in the model represented in Figure 2, yet its high correlations with Depression ($-.57$: 32.49% common variance) and Job Satisfaction ($.55$: 30.25%) raises the question whether it warranted inclusion as a variable or not. Since Depression and Job Satisfaction also showed a significant correlation ($-.44$: 19.36%), it is clear that these three variables probably represent components of a superordinate variable.

A controversy exists about the relationship between job and life satisfaction. Steiner and Truxillo (1989) argued that there are three major approaches to this issue. The first is the spill-over model, which argues that the two types of satisfaction are positively related and that satisfaction in one area affects the other. Secondly, the compensatory model states that a negative relationship exists, as people compensate for negative experiences in one area by enriching the other. The third, being a segmentalist approach, asserts that job satisfaction and life satisfaction are unrelated (Steiner & Truxillo, 1989). They refer to the research done by Rice, Near and Hunt (1980), which examined what they called a disaggregation hypothesis, which stated that the importance of work in a person's life could potentially influence the job satisfaction/life satisfaction relation.

Inter-category Intercorrelations

This discussion will address Research Question 1. Various health-related outcome variables were associated with stressor variables. Somatic Complaints was associated with Role Conflict ($p < .001$) and Role Ambiguity ($p < .01$). This indicates that these stressors do have an effect on the individuals where they experienced a variety of physiological complaints, such as dizziness, loss of appetite, shortness of breath and stomach aches. Although correlation does not indicate causality, on logical grounds it seems unlikely that somatic complaints could have resulted in changes in the stressor variables concerned.

The General Health Rating variable was correlated with Role Ambiguity, suggesting (again on logical grounds) that those individuals who are unsure of what is expected of them in the workplace, begin to view their health negatively. The General Health Rating also showed a significant negative correlation with Time Pressure, which implies that as time pressures increase the respondents experienced a lessening in their general feelings of health. (Of course, lowered feelings of health could also contribute to an increased awareness of time pressures.)

Depression was correlated with Role Conflict and Role Ambiguity. Although it is conceivable that depression could increase one's awareness of both forms of role conflict, it seems more likely that role conflict and role ambiguity would worsen one's feelings of depression when the enquiry is made in a work context.

The Somatic Complaints, the General Health Rating and the Depression variables all correlated with Role Ambiguity. This implies that those individuals who were

unsure of what their job requirements were, demonstrated a number of physical and psychological consequences. A study done by Ivancevich, Napier and Wetherbe (1985) showed a positive correlation between Role Ambiguity and the following variables: job-related tension, tension discharge and severity of disorders. This appears to broadly correspond with the findings of this study.

Correlations between stressor and work-related outcome variables indicate a correlation between Job Involvement and Hours Worked Per Week, Quantitative Workload and Time Pressure. These stressor variables contributed towards the individual's regarding his/her work as being pressured, having a heavy workload, and needing to work long hours. Savery and Hall (1986) argued that the number of hours worked would contribute significantly towards overload and could be a major source of stress. The findings of this research reveals the converse, where the number of hours worked per week contributed positively towards the individual's perception of their work. A possible explanation for this is that the respondents of this study were professionals, where the time worked during a week is of little concern. What is of greater concern is that they are involved in a job that is **important** to them, thereby contributing towards a **positive** view towards their job.

A correlation was observed between Role Ambiguity and the work-related outcome variable of Propensity to Leave, suggesting that those individuals who are confused with regards to what is expected from their jobs, become frustrated, whereby the likelihood of leaving the organisation is increased.

It is also notable that both the Life Satisfaction and Job Satisfaction variables both correlated negatively with Role Conflict and Role Ambiguity (this applies to the moderator variable as well. These results add to the observation by Steiner and Truxillo (1989), regarding the relationship between job and life satisfaction. It would appear that the spill-over effect has occurred, where these two variables are influenced by each other.

Correlations of SOC with Stressor and Outcome Variables

This section endeavours to answer Research Question 2.

Negative correlations were found between SOC and both Role Conflict and Role Ambiguity. In terms of two of Antonovsky's (1987) core components of the SOC, namely comprehensibility and manageability, this would be consistent with his theory. These two components refer to the need to perceive stimuli as ordered, consistent and structured, as well as having adequate resources at one's disposal to meet the demands presented by the stimuli. Therefore someone who has a strong SOC will be able to make sense of the demands that are being made of him/her.

The correlations found in this study appear to support Antonovsky's hypothesis about the relationship between the SOC and health. The health-related outcome variables of Somatic Complaints, the General Health Rating, and Depression were negatively correlated with SOC. Therefore someone with a strong SOC is likely to experience a well-being which shifts towards the health-ease end of the continuum. This is consistent

with Antonovsky (1987) who postulates that one should expect positive correlations between SOC and well-being.

Antonovsky (1987) maintained that someone who finds him/herself in a concentration camp, is unlikely to be happy, satisfied, and of high morale. Through this he was saying that the situation where one finds oneself is likely to influence how one views life. He went on to argue that, depending on the situation, a person with a strong SOC is likely to experience well-being which will lead to life satisfaction. This study confirmed his hypothesis, where a high positive correlation existed between SOC and both Life Satisfaction and Job Satisfaction, as well as an even higher negative correlation with Depression. As indicated above, these three outcome variables seem jointly to define a factor of reactions towards life in general.

Subgroup Analyses

The results of the subgroup analyses are presented in Table 4. It should be recalled that two of the health-related outcome variables, viz. Tobacco Smoking and Drinking, were excluded from further analyses, following stepwise regression analyses. In terms of the model being tested, 48 relationships were thus evaluated to determine whether SOC had an influence on stressors and outcomes (6 stressor variables and 8 outcome variables). Of these a significant relationship between stressor and outcome variables was found in seven instances, i.e. 14% of the relationships. This is well beyond the 5% that would have been found by chance alone (using the .05 level of significance, although two of the differences reached the .01 level and another the .001 level).

Table 4 Sub group Analyses

		STRESSORS																	
VARIABLES		HOURS WORKED PER WEEK			QUANTITATIVE WORKLOAD			ROLE CONFLICT			ROLE AMBIGUITY			TIME PRESSURE			COMPUTER-DOWN STRESS		
		SOC UPPER HALF	SOC LOWER HALF	Z	SOC UPPER HALF	SOC LOWER HALF	Z	SOC UPPER HALF	SOC LOWER HALF	Z	SOC UPPER HALF	SOC LOWER HALF	Z	SOC UPPER HALF	SOC LOWER HALF	Z	SOC UPPER HALF	SOC LOWER HALF	Z
		r	r		r	r		r	r		r	r		r	r		r	r	
HEALTH RELATED OUTCOMES	SOMATIC COMPLAINTS	.083	.110	-.18	.355***	.074	1.93	.341***	.233*	.74	.111	.202*	-.63	.340***	.065	1.89	.268**	.006	1.80
	PILL CONSUMPTION	.034	.052	-.13	-.350***	.007	-2.91**	-.130	.010	-.96	.015	.064	-.34	.070	.035	.240	.373***	.065	2.11*
	GENERAL HEALTH RATING	.120	-.160	1.92	.009	.029	-.14	.022	.090	-.46	.223*	.147	.52	.143	.034	.747	.058	.237*	-1.23
	DEPRESSION	.239*	-.071	2.12*	.278**	-.215*	3.38***	.209*	.235*	-.18	-.007	.312**	-2.19*	.258*	-.166	2.90**	-.044	-.086	.29
WORK RELATED OUTCOMES	JOB INVOLVEMENT	.369**	.220*	1.02	.256*	.340***	-.58	.092	.144	-.35	-.004	-.226*	1.52	.237*	.224*	.084	.033	.069	-.41
	ABSENTEEISM	-.063	-.077	0.09	.002	-.075	.53	-.070	.044	-.76	-.112	.104	1.47	.039	-.183	1.52	.139	.094	.31
	PROPENSITY TO LEAVE	.011	-.119	.89	-.140	-.098	-.29	.002	.156	-1.05	.238*	.223*	.11	-.100	.056	-1.07	-.024	-.068	.30
	JOB SATISFACTION	.068	.139	-.48	.008	.192	-1.27	-.246*	-.282**	.25	-.423***	-.381***	-.29	.052	-.027	.54	.045	-.027	.49
	LIFE SATISFACTION	-.070	.010	-1.16	-.064	.218*	-1.94	-.290**	-.090	-1.39	-.276*	-.128	1.01	-.130	.163	-2.01*	.092	-.003	.65

. p < .05
 .. p < .01
 *** p < .001

In the case of two stressors, viz. Quantitative Workload and Computer-down Stress, the SOC was found to moderate the relationship with Pill Consumption. For Qualitative Workload a significant, negative correlation ($p < .001$) was obtained with Pill Consumption in the case of the high-SOC subgroup, but for the low-SOC subgroup the correlation was not significant. This suggests that people with a strong SOC are likely to use fewer sleeping tablets or tranquillizers when they experience an increase in their workload, perhaps because they are aware of the need to be at peak level of performance. Computer-down Stress seems to have a reverse effect on Pill Consumption among high-SOC persons, resulting in a significant, positive correlation ($p < .001$) (for the low-SOC subgroup the correlation was non-significant). This implies that when they are at the mercy of this frustrating kind of stress, over which they have no personal control, they tend to rely on tranquillizing crutches. Both of these findings seem compatible with the SOC construct.

SOC also had a moderating effect on the relationship between Depression and four stressors, namely: Hours Worked per Week, Quantitative Workload, Role Ambiguity and Time Pressure. In all of these instances it is notable that the signs of the coefficients differed between the high- and low-SOC subgroups, thus cancelling out each other in the total sample and resulting in non-significant or lowered coefficients in Table 3. From Table 3 it should, however, also be noted that these stressor variables showed significant correlations with each other, so that these can only be considered as partly independent findings.

In the case of Hours Worked per Week a significant ($p < .05$), positive relationship was obtained with Depression in the high-SOC subgroup, i.e. an increase

in the number of hours worked was associated with an increase in Depression (or vice versa); perhaps this could mean that they depended on a high workload to maintain feelings of self-worth. In the low-SOC subgroup the coefficient was negative but non-significant.

In the case of Quantitative Workload a significant ($p < .01$), positive relationship ($p < .01$) obtained for the high-SOC subgroup, but a significant ($p < .05$), negative relationship for the low-SOC subgroup; this difference resulted in the most significant moderator effect in Table 4. This meant that persons with a strong SOC reacted with increased depression to an increased workload (or vice versa), whilst persons with a weak SOC did the reverse, i.e. they seemed to need a high workload to remain in a happy mood.

In the case of Role Ambiguity a significant, positive relationship with Depression obtained in the low-SOC group, but in the high-SOC group a non-significant relationship was observed. This implies that in persons with a weak SOC (but not those with a strong SOC) an increased level of role ambiguity will lead to an increase in depression. It would seem that high-SOC persons are less susceptible to the effect of role ambiguity.

For Time Pressure a significant, positive correlation with Depression obtained in the high-SOC subgroup, whilst a non-significant trend was observed in the low-SOC subgroup. For persons with a strong SOC, an increase in time pressure seems to result in feelings of depression (or vice versa), but persons with a weak SOC, the opposite trend, of increased depression with reduction of time pressure, was similar to the finding for Quantitative Workload.

The last significant Z value was found in the case of the correlation between Time Pressure and Life Satisfaction; in neither the high-SOC nor the low-SOC subgroups was the correlation coefficient significant, but due to the opposite signs, the difference was significant. The trends were towards a negative correlation in the high-SOC subgroup, i.e. high Time Pressure leading to low Life Satisfaction (or vice versa), as opposed to a positive correlation in the low-SOC subgroup, i.e. high Time Pressure leading to high Life Satisfaction (or vice versa). However, since these were only trends, the findings should not be over-emphasized.

Multiple Moderated Regression Analyses

The following section presents and discusses the moderated multiple regression (MMR) analyses. Before presenting the results and discussion, it should be mentioned again that two of the health-related outcome variables, viz. Drinking and Tobacco Smoking had been excluded from the analysis. The findings will be presented for each stressor variable in turn.

Hours Worked per Week

Table 5 presents the MMR results for the stressor variable of Hours Worked per Week. It indicates that significant interaction effects with SOC were obtained for the following variables: Somatic Complaints, Job Involvement and Propensity to Leave. Generally these findings suggest that the magnitude of the relationship between Hours Worked per Week and each of the three outcome variables changed systematically as the SOC

Table 5 Moderated multiple regression analyses for changes in Hours Worked per Week, with SOC as moderator variable and interacting with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.14				
Interaction effects					
Somatic Complaints X SOC	.16	.02	-1.15	3.64***	13/193
Pill Consumption X SOC	.16	.00	-0.14	0.21	14/193
General Health rating X SOC	.17	.01	0.34	0.85	15/193
Depression X SOC	.17	.00	0.17	0.85	16/193
Job Involvement X SOC	.18	.01	0.89	1.98*	17/193
Absenteeism X SOC	.18	.00	0.41	0.64	18/193
Propensity to Leave X SOC	.19	.01	0.66	1.93**	19/193
Job Satisfaction X SOC	.19	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.19	.00	0.00	0.00	21/193

* p < .05
 ** p < .025
 *** p < .01

scores increased. Interestingly, these moderator effects were not revealed by the subgroup analyses shown in Table 4. This was probably due to the reduced power of the statistical test when the sample size was reduced in the process of splitting the data into subgroups (Bluen, 1986). The correlation coefficients shown in Table 4 can, nevertheless, be used to clarify the directions of the relationships revealed by the MMR.

For the moderated relationships between Hours Worked per Week and Somatic Complaints, Table 4 shows a larger coefficient for the low-SOC subgroup than for the high-SOC subgroup. Therefore respondents with a high-SOC showed a weaker relationship between Hours Worked per Week and Somatic Complaints than those with a low-SOC. This suggests that the lower a person's SOC, the more likely (s)he was to react with Somatic Complaints when working hours increased. On the other hand, the higher a person's SOC, the less likely (s)he was to experience Somatic Complaints when having to work longer hours. These interpretations reflect a causative direction based on the assumption that the outcome followed the stressor, an assumption not warranted on the basis of only correlational data. However, since Hours Worked per Week is likely to be a more objective set of data, the reverse causal direction, that participants worked longer hours due to experiencing more Somatic Complaints, seems less likely.

In the case of the moderated relationship between Hours Worked per Week and Job Involvement, Table 4 shows a higher positive correlation in the high-SOC sub-group than in the low-SOC one. Therefore respondents with a high-SOC showed a stronger relationship between Hours Worked per Week and Job Involvement than those with a

weak-SOC. It seems likely that people with a strong job involvement would work longer hours, than that working longer hours would increase one's job involvement; it would therefore seem that the moderated relationship should be interpreted as meaning that people may be willing to work increasingly longer hours with increasing involvement with their work, particularly when there are also increasingly higher levels of SOC. In retrospect, it also seems doubtful whether Job Involvement should have been introduced as an outcome variable; perhaps it is more of the nature of a moderator variable.

In terms of the moderated relationship between Hours Worked per Week and Propensity to Leave, Table 4 shows a negative correlation for the low-SOC subgroup and a positive correlation for high-SOC subgroup. This suggests that respondents with a low-SOC are more likely to leave their employ when they work shorter hours, whilst those with a strong-SOC had a greater likelihood to leave when they worked longer hours. A limitation on this finding is that Propensity to Leave was measured by means of a single item, which raises the likelihood of a sizeable amount of error variance in its relationships with other variables.

Quantitative Workload

Table 6 presents the MMR results for the stressor variable of Quantitative Workload. It indicates that the SOC moderated the relationships between Quantitative Workload and both of the General Health Rating and Job Involvement variables. Inspection of Table 4 shows that these effects did not appear in the subgroup analyses; two other variables did appear in the sub-

Table 6 Moderated multiple regression analyses for changes in Quantitative Workload, with SOC as moderator variable and **Interacting** with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.16				
Interaction effects					
Somatic Complaints X SOC	.16	.00	0.48	1.29	13/193
Pill consumption X SOC	.17	.01	-0.36	0.65	14/193
General Health Rating X SOC	.18	.01	-0.94	3.71***	15/193
Depression X SOC	.19	.01	0.57	1.09	16/193
Job Involvement X SOC	.22	.03	-1.28	5.83***	17/193
Absenteeism X SOC	.22	.00	0.16	0.00	18/193
Propensity to Leave X SOC	.22	.00	0.00	0.00	19/193
Job Satisfaction X SOC	.22	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.22	.00	0.00	0.00	21/193

*** p < .01

group analyses for Quantitative Workload, but not in the MMR analyses. This combination of findings could be due to the fact that splitting the sample at the median resulted in arbitrarily determined subgroups, "which increases the probability of obtaining spurious results" (Bluen, 1986, p.207). The correlations shown in Table 4 could be used to clarify the directions of the relationship shown by the MMR.

In the case of the moderated relationship between Quantitative Workload and the General Health Rating, the two coefficients were both so small that any interpretation based on them would be inappropriate. Furthermore, the General Health Rating was based on a single item, which increases the possibility of significant error variance being introduced. If any interpretation is ventured it would be that people with a weak-SOC may have a stronger inclination to rate their General Health as better when they experience a higher workload (or vice versa) than people with a strong-SOC.

In respect to the moderated relationship between Quantitative Workload and Job Involvement, the data in Table 4 show that people with a weak-SOC had a stronger tendency to experience a positive relationship between job involvement and workload than persons with a strong-SOC. The points made above about Job Involvement as an outcome variable and about the direction of causality in its relationship with workload, should be considered here too.

Role Conflict

Table 7 presents the MMR results for the stressor variable of Role Conflict. The two significant F

Table 7 Moderated multiple regression analyses for changes in Role Conflict, with SOC as moderator and interacting with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.29				
Interaction effects					
Somatic Complaints X SOC	.29	.00	0.08	0.51	13/193
Pill Consumption X SOC	.29	.00	0.28	0.76	14/193
General Health Rating X SOC	.29	.00	0.11	0.00	15/193
Depression X SOC	.30	.01	0.51	1.51	16/193
Job Involvement X SOC	.30	.00	-0.84	1.25	17/193
Absenteeism X SOC	.31	.01	-0.85	3.82***	18/193
Propensity to Leave X SOC	.34	.03	-1.12	6.84***	19/193
Job Satisfaction X SOC	.34	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.34	.00	0.00	0.00	21/193

*** p < .01

values shown imply that the magnitude of correlation between Role Conflict, on the one hand, and both Absenteeism and Propensity to Leave, on the other hand, changed systematically as the SOC scores increased. The subgroup analysis results reported in Table 4 show that neither of these relationships had been found in those analyses.

For the moderated relationship between Role Conflict and Absenteeism, Table 4 shows a trend towards a negative relationship between these variables in the high-SOC subgroup and a trend towards a positive relationship in the low-SOC subgroup. This suggests that persons with a strong-SOC tended to react, if anything, with a reduction in absenteeism to an experience of increased role conflict. On the other hand, those with a weak-SOC tended, if anything, to increase their absenteeism in reaction to increases in role conflict. (Again, a direction of causality is suggested since the reverse, that absenteeism leads to role conflict, seems less conceivable).

In terms of the moderated relationship between Role Conflict and Propensity to Leave, Table 4 shows a practically non-existent correlation between these variables in the high-SOC subgroup and a slight trend towards positive correlation in the low SOC-subgroup. This suggests a possibly stronger tendency among the latter subgroup to react with propensity to leave when they experience increased role conflict than in the case of the former subgroup.

Role Ambiguity

Table 8 presents the MMR results for the stressor variable, Role Ambiguity. The findings presented here

Table 8 Moderated multiple regression analyses for changes in Role Ambiguity, with SOC as moderator and interacting with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.32				
Interaction effects					
Somatic Complaints X SOC	.33	.01	-1.13	2.95**	13/193
Pill Consumption X SOC	.33	.00	-0.15	0.00	14/193
General Health Rating X SOC	.34	.01	0.97	2.15***	15/193
Depression X SOC	.34	.00	0.02	0.27	16/193
Job involvement X SOC	.34	.00	0.39	0.80	17/193
Absenteeism X SOC	.37	.03	-1.35	8.92***	18/193
Propensity to Leave X SOC	.37	.00	-0.24	0.28	19/193
Job Satisfaction X SOC	.37	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.37	.00	0.00	0.00	21/193

** p < .025

*** p < .01

showed, once more, no agreement with those of the subgroup analyses in Table 4. Three significant instances of moderator effects are shown in Table 8, viz. in the case of Somatic Complaints, General Health Rating and Absenteeism, with the interaction particularly strong in the case of Absenteeism.

Both the high- and low-SOC subgroups in Table 4 showed positive correlations between Role Ambiguity and Somatic Complaints, with that for the low-SOC subgroup reaching the .05 level of significance. This suggests that those with a low-SOC were more inclined than participants with a strong-SOC to react to role ambiguity by developing somatic complaints. (Logically it seems unlikely that increased somatic complaints would lead to greater role ambiguity.)

In the case of the moderated relationship between Role Ambiguity and the General Health Rating, the subgroup analysis results in Table 4 showed that both the high- and low-SOC subgroups showed positive correlations between these variables, with the former beyond the critical value for the .05 level of significance. In terms of the scoring directions of these variables, these coefficients mean that greater role clarity was associated with perceptions of greater health, and **greater** role ambiguity with perceptions of lowered **health**. This relationship was, however, stronger in the high-SOC subgroup than in the low-SOC subgroup. This is thus the same trend as that observed in the case of Somatic Complaints.

The third moderated relationship was between Role Ambiguity and Absenteeism. The high-SOC subgroup in Table 4 showed a negative correlation between these two variables and the low-SOC subgroup a positive correlation (in the case of the total sample, these two

trends cancelled out each other and resulted in a correlation of $-.04$). Therefore persons with a strong-SOC tended to report less absence from work, i.e. perhaps applied themselves more, in response to experiences of higher Role Ambiguity, whilst persons with a low-SOC tended to report more Absenteeism in response to higher Role Ambiguity. (Logically it seems less likely that Absenteeism would increase experiences of Role Ambiguity.)

Time Pressure

Table 9 presents the MMR results for the stressor variable of Time Pressure. None of the F values were significant, indicating that the SOC did not moderate any of the relationships according to the MMR analyses. In the subgroup analyses, however, moderator effects did appear in the case of Depression and Life Satisfaction.

Computer-down Stress

Table 10 presents the MMR results for the stressor variable of Computer-down Stress, indicating that the SOC moderated the relationships between this variable and both Pill Consumption and the General Health Rating. The former relationship was also found to be moderated in the subgroup analyses (see Table 4). It showed a significant ($p < .001$), positive correlation in the high-SOC subgroup and a positive but non-significant correlation for the low-SOC subgroup. As was said in that context, the implication was that those with a strong SOC tended to rely on sleeping tablets and tranquillizers when they experienced the uncontrollable

Table 9 Moderated multiple regression analyses for changes in Time Pressure, with SOC as moderator variable and interacting with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.12				
Interaction effects					
Somatic Complaints X SOC	.13	.00	0.23	0.83	13/193
Pill Consumption X SOC	.13	.00	0.09	0.00	14/193
General Health Rating X SOC	.13	.00	-0.18	0.00	15/193
Depression X SOC	.13	.00	0.37	0.61	16/193
Job Involvement X SOC	.13	.00	-0.50	0.41	17/193
Absenteeism X SOC	.13	.00	0.29	0.20	18/193
Propensity to Leave X SOC	.14	.01	-0.57	1.42	19/193
Job Satisfaction X SOC	.14	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.14	.00	0.00	0.00	21/193

Note: None of F values significant.

Table 10 Moderated multiple regression analyses for changes in Computer-down Stress, with SOC as moderator
: variable and interacting with outcome variables.

VARIABLE ENTERING EQUATION	R ²	R ² CHANGE	beta	F	df
Main effects	.10				
Interaction effects					
Somatic Complaints X SOC	.11	.01	0.62	0.81	13/193
Pill Consumption X SOC	.13	.02	0.89	4.32***	14/193
General Health Rating X SOC	.15	.02	-1.03	3.33***	15/193
Depression X SOC	.15	.00	-.031	1.04	16/193
Job Involvement X SOC	.15	.00	-0.03	0.00	17/193
Absenteeism X SOC	.15	.00	0.24	0.21	18/193
Propensity to Leave X SOC	.15	.00	-0.20	0.21	19/193
Job Satisfaction X SOC	.15	.00	0.00	0.00	20/193
Life Satisfaction X SOC	.15	.00	0.24	0.00	21/193

*** p < .01

stressor of the computer malfunctioning, in order to get work done after having gone out of order. A similar but non-significant relationship was present in the low-SOC subgroup, implying that the trend increased systematically with increasing levels of SOC.

In the case of the General Health Rating and Computer-down Stress relationship, Table 4 shows a significant ($p < .05$), positive correlation in the low-SOC subgroup and a non-significant but also positive correlation in the high-SOC subgroup. The implication is that, as SOC levels decreased, there was a systematic increase in the tendency among the respondents to perceive their health as better when the computer forced them to do less work, an interpretation not incompatible with the SOC construct.

Overview

Of a possible 54 relationships, SOC had a significant moderating effect on 12. It is of interest to note that of these 12 interaction affects, six pertained to work-related outcomes and six to health-related outcomes.

The one outcome variable that was most often moderated by SOC was General Health Rating. This is consistent with Antonovsky's theory (1987) as the SOC construct was developed mainly around health-related factors.

It is of interest too to note that in the MMR analysis Depression was not moderated by the SOC once. This is different from the subgroup analysis, where it interacted significantly four times between stressors and

outcomes. It is only with the relationship between Computer-down Stress and Pill Consumption that SOC was found to have a moderating effect in both the subgroup analysis as well as the MMR. Bearing in mind the problems associated with subgroup analysis, namely small sample size and the division of the groups at the mean, as well as the disparity of results obtained by the two statistical methods, the researcher is inclined to question the validity of the results of the subgroup analysis.

In response to Research Question 3 it is clear that the SOC construct does moderate between some stressors and some outcomes. While it does not moderate between all the variables, it nevertheless did so in 12 out of 60, or 20 percent, of the possible relationships, a finding far beyond any chance expectations.

CHAPTER 5

CONCLUSIONS

The aim of this chapter is to discuss the implications of the findings of the present research, to identify and expand on the limitations of this study, and to conclude with suggestions for future research.

Implications

The findings of this study found partially affirmative answers to the research questions. In the first instance, the stressors were found to be related to various stress outcomes. Persons who had a large workload, experienced conflict and ambiguity about their role in their jobs, and who had to work to tight deadlines, reported physical complaints of one kind or another.

People who were unsure of what was expected of them in their jobs generally tended to view their general health in a negative way. A significant positive correlation was found between Depression and both Role Conflict and Role Ambiguity, which suggested that those individuals who were experiencing high demands from others and who were unsure as to what was expected of them were likely to be affected negatively. This, in all probability, points to a need among data processing personnel to receive clear role demands from their role senders if they are to experience a positive and healthy state of mind which could probably improve their productivity. This also applied to Propensity to Leave, which was significantly and positively correlated with Role Ambiguity. When people were clear as

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to what others expected from them, this tended to increase levels of satisfaction, it nevertheless will increase their likelihood of remaining in the organisation. The high degree of turnover amongst data processing personnel is of serious concern and for this reason, too, it is in the interest of the organisation to address the issue of role clarity.

Research Question 2 examined whether the SOC was related to the stressors and outcomes. Significant negative correlations were found between the stressor variables of Role Conflict and Role Ambiguity and the SOC. This supports Antonovsky's (1987) theoretical review that those persons with a high-SOC are more likely to be able to make sense of the world around them. Where things are unclear and vague, they will not capitulate, instead they will endeavour to establish order and see tasks ahead of them as challenges.

A significant negative correlation was found between the SOC and the health-related outcome variables of Somatic Complaints, General Health Rating and Depression, as well as Life Satisfaction. Individuals with a high SOC were likely to report fewer physical complaints, fewer negative psychological feelings, and to view both their health and life generally in a more positive way. In addition, the significant positive correlation between SOC and Job Satisfaction should be mentioned. These findings support Antonovsky's view that one can "expect positive, although not directly causal, correlation between the SOC and well-being" (1987, p.181).

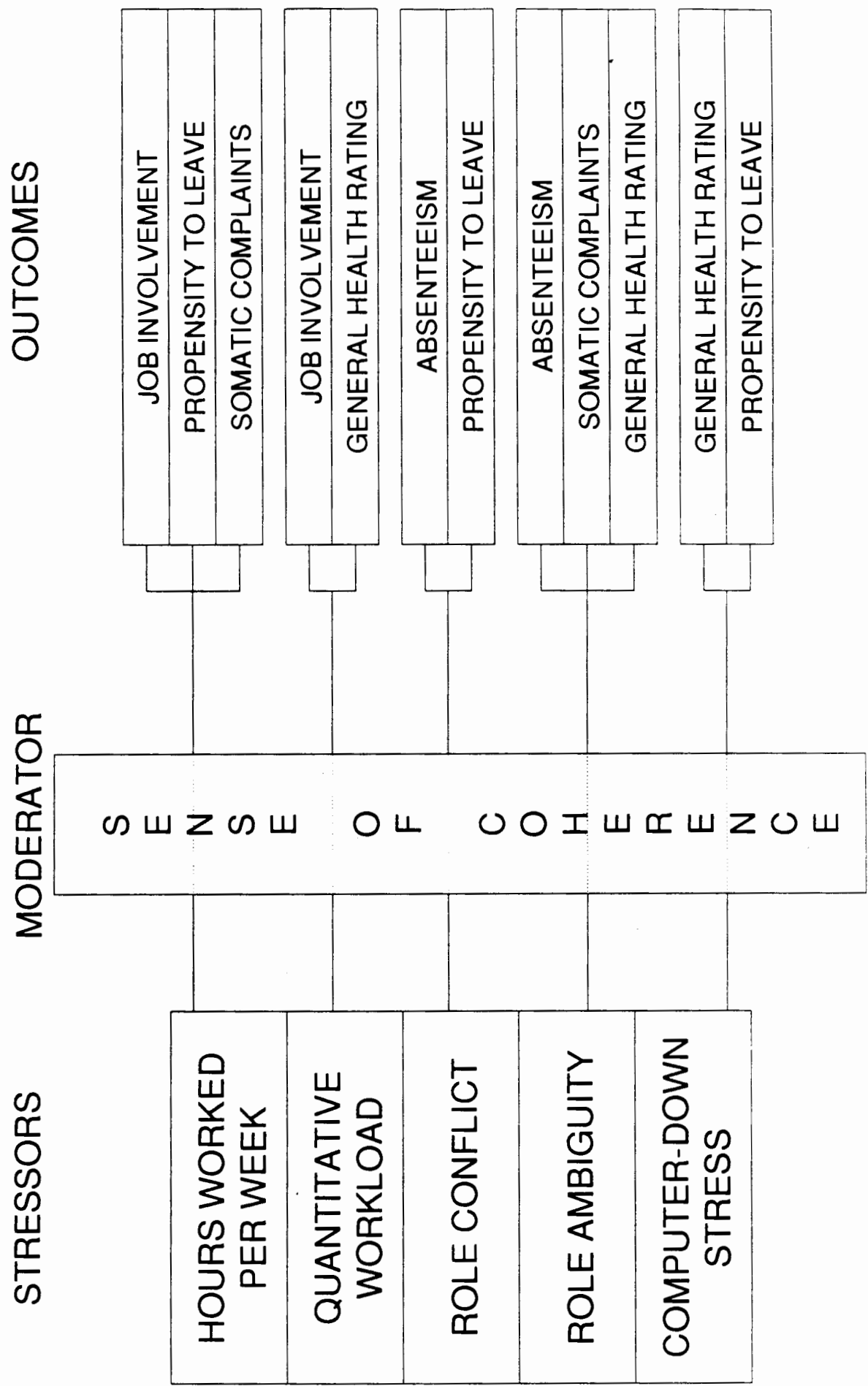
In response to research Question 3, the subgroup analyses identified seven relationships where the SOC moderated between the stressors and outcome variables.

When compared with the MMR results, only one of these relationships was replicated, viz. for the interaction between Computer-down Stress and Pill Consumption. While the findings of the subgroup analyses are not to be ignored, the strength of its credibility is questioned. The results obtained by the subgroup analyses may have been spurious due to the sample being split at the median, and thereby weakening the statistical power of the analysis.

The MMR results indicated that the SOC moderated some relationships between stressors and both health-related outcomes and work-related outcomes. On the basis of the findings, it is now possible to present a new model to summarize the relationships between stressors and outcomes which were moderated by the SOC. This model is shown in Figure 3. These findings partially confirm Anstey's (1989) research on the effects of the SOC on work stressors and outcomes among blue collar workers.

The question arises whether the SOC may also have direct or main effect relationships to stressor and outcome variables, without acting as a moderator between these classes of variable. The present findings provide little support for large main effects. Perhaps a recent publication by Hobfoll (1989) comes closest to providing light on this issue. He presented a new stress model, which he believed provides a clearer understanding of stress. He defined stress as a "reaction to the environment in which there is, (a) the threat of a nett loss of resources; (b) the nett loss of resources; or (c) a lack of resource gained, following the investment of resources. Both perceived an actual loss or lack of gain are envisaged as sufficient for producing stress" (1989, p.516). He continued by saying that resources are the single unit

Figure 3 Relationship between stressors and outcomes which were moderated by Sense of Coherence.



necessary for understanding stress. Resources were defined as, "those objects, personal characteristics, conditions, energies that are valued by the individual or that serve as a means for attainment of these objects" (1989, p.516).

Consequently he identified a model of conservation of resources, which maintains that "people strive to retain, protect and build resources and that what is threatening to them is the potential or actual loss of these valued resources" (1989, p.516).

Essentially then, when confronted by stress, individuals, as predicted by this model, strive to minimize the net loss of resources. This is somewhat similar to Lazarus and Folkman's (1984) coping model. However, he also argued that, when individuals are not confronted with stressors, they strive to develop resource surpluses in order to offset the possibility of future loss. When people develop these resource surpluses, they are likely to experience positive well-being.

In effect then, Hobfoll (1989) and Antonovsky (1979, 1987) both present the notion of resources in their theoretical perspective. The difference comes in where Antonovsky (1987) maintains that the SOC has a moderating effect, whereas Hobfoll (1989, p.521) sees resources as having a direct effect. In addition, Hobfoll is much clearer about the role of resources in the whole tension management process. He maintains that individuals endeavour to cope with stress through using strategies to utilise their resources. These strategies may require the replacement, substitution or investment of resources.

Limitations of the Study

There were several limitations in this study and these need to be made explicit.

The first consideration would be the sample. The respondents were all drawn from the same organisation, consequently no generalisations can be made towards the population of all data processing people. In addition, these findings on data processing personnel cannot be readily generalised to persons in other occupations.

Secondly, the results obtained from the subgroup analysis must be questioned. The concerns with this analysis have already been discussed in Chapter IV.

A third limitation, pointed out by Jubiler (1988), was that only one source of data was utilised, namely self-report, paper and pencil measures. She commented that stressful events are typically mentioned by self-report checklists referring to the recent past. However, subject response is subject to distortions of memory and to biases introduced by the checklist format. Consequently, there is a possibility that contamination from response style may result in spurious relationships, which are independent from the item content. The data in the present study were clearly vulnerable to such distortions.

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APPENDIX 1

Dear Colleague,

I am engaging in research for my Masters degree in Industrial Psychology at the University of Cape Town. I want to explore the influence of stress on staff who are associated with data processing in Old Mutual. Staff in this industry are fairly unique people who require special attributes to be successful, while at the same time have to contend with a number of different pressures. My interest is in exploring these pressures and trying to find out how these are experienced by you.

I would like to request your assistance in my research by completing the attached questionnaire. In order for this study to be of value, I need a fairly large number of people to have filled in this form. Therefore I would like to appeal to you to help me by returning it, completed, as soon as possible.

I am only interested in the feedback that you will give me in the questionnaire and therefore would like to confirm that your anonymity is assured. Please answer all the questions and forward your questionnaire to me in a sealed envelope.

I thank you in anticipation for the time that you may spend completing this questionnaire.

Should you have any queries about my research, please do not hesitate to call me.

Sincerely

GODFRIED FRITZ
PERSONNEL ASSESSMENT

APPENDIX 2

Dear Colleague,

I recently sent a questionnaire to you requesting that you fill it in and forward it back to me.

If you have already returned it, please ignore this letter.

However, if you haven't yet responded to the questionnaire, I would like to appeal to you to do so. It is really most important that I have an adequate sample size for me to do my research, and I am unable to complete my study without your input. I realise that you have many other pressures and deadlines, but I assure you that it will not take more than 15 — 20 minutes to complete.

Should you have mislaid your copy of the questionnaire, please do not hesitate to call me and I will gladly forward another one to you.

GODFRIED FRITZ
PERSONNEL ASSESSMENT

gf/kn

YOU, YOUR WORK AND YOUR HEALTH

Male or Female (mark one) Age: yrs. Company:

Job Title:

Highest Academic Qualification:

Highest Technical Qualification:

Instructions: This form contains questions and descriptions about work and health. For most questions there are 4 or 5 answers to choose from. Please read each question and circle the number of the answer that describes your situation best. Please give only one answer to each question and do not leave out any questions.

1. How often does your job require you to work very fast?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

2. How often does your job require you to work very hard?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

3. How often does your job leave you with little time to get things done?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

4. How often is there a great deal to be done?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

5. The most **important** things that happen to me involve my job.

Agree strongly	Agree	Disagree	Disagree strongly
4	3	2	1

6. I live, eat and breathe my job.

Agree strongly	Agree	Disagree	Disagree strongly
4	3	2	1

7. I am very much involved personally in my work.

Agree strongly	Agree	Disagree	Disagree strongly
4	3	2	1

8. The major satisfactions in my life come from my job.

Agree strongly	Agree	Disagree	Disagree strongly
4	3	2	1

For numbers 9 — 11: Conflicts can occur in any job. For example, someone may ask you to do your work in a way which is defferent from what you think is best or you may find that it is diffeicult to satisfy everyone. How often do you face problems in your work like the ones listed below?

9. Persons equal in rank and authority over you ask you to do things which conflict?

Rarely or never	Sometimes	Fairly often	Very often
1	2	3	4

10. People in a good position to see if you do what they ask give you things to do which conflict with one another.

Rarely or never	Sometimes	Fairly often	Very often
1	2	3	4

11. People whose requests should be met give you things which conflict with other work you have to do.

Rarely or never	Sometimes	Fairly often	Very often
1	2	3	4

12. How often are you clear on what your job responsibilities are?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

13. How often can you predict what others will expect of you on the job?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

14. How much of the time are your work objectives well defined?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

15. How often **are** you clear about what others expect of you on the job?

Very often	Fairly often	Sometimes	Occasionally	Rarely
5	4	3	2	1

16. During the average week, how many hours do you work (not counting the time you take off for meals)?

..... hours

17. How many days have you been absent from work during the past two months?

..... days

18. All in all, how satisfied are you with your present job?

- | | | | |
|-------------------------|-------------------|-----------------------|----------------|
| Not at all
satisfied | Not too satisfied | Somewhat
satisfied | Very satisfied |
| 1 | 2 | 3 | 4 |

19. Knowing what you know now, if you had to decide all over agin to take the job you now have, what would you decide?

1. I would definitely decide not to take the job
2. I would have some second thoughts, probable not
3. I would have some second thoughts but probably take it
4. I would decide without hesitation to take the same job

For number 20 to 29, underline the work which describes best how your life is.

Complete the sentence: "My life is "

- | | | |
|---------------------------|----|------------------------------|
| 20. boring | or | interesting |
| 21. enjoyable | or | miserable |
| 22. easy | or | hard |
| 23. useless | or | worthwhile |
| 24. friendly | or | lonely |
| 25. full | or | empty |
| 26. discouraging | or | hopeful |
| 27. tied down | or | free |
| 28. disappointing | or | rewarding |
| 29. brings out best in me | or | doesn't bring out best in me |

20. If you smoke, how much do you smoke: (If you do not smoke write 0.)

I smoke **about** cigarettes, pipes or cigars per day.

31. About how often did you drink during the last month — how many days out of 30?

..... days

32. When you drink, about how many glasses of beer or wine, or tots of hard liquor do you have in one day?

..... drinks

33. About how often in the past month did you find it necessary to take tablets or other drugs to help you go to sleep — how may days out of 30?

..... days

34. About how often did you find it necessary to take tranquilizers in the past month — how many days out of 30?

..... days

35. If another company were to offer you a job with just the same responsibilities and pay that you now have, how seriously would you consider changing companies?

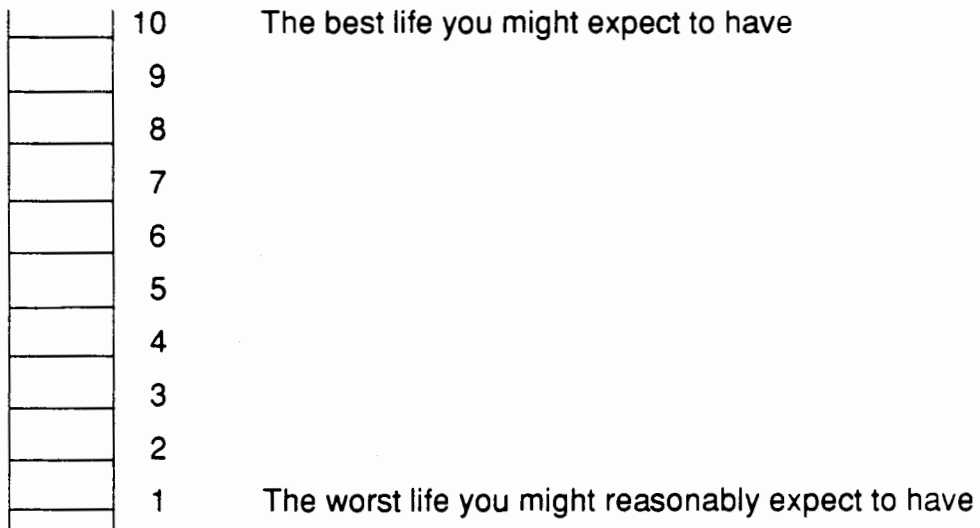
I would be very interested in such an offer and would definitely take it
4

I would be interested and perhaps take it
3

I would think about it but probably not take it
2

The offer would not interest me at all
1

36. If the "ladder" drawn below, with its 10 "steps" numbered, represents how your life has been most of the past year, indicate the "step" on which you would place yourself. Circle the number of the "step" you choose:



37. How many hours of working time did you lose due to computer breakdown during the past month? Please estimate as nearly as you can.

..... hours

38. How stressful do you generally find a computer breakdown?

Extremely
5

Quite
4

Moderately
3

Mildly
2

Not at all
1

For numbers 39 to 46: Have you experienced any of the following during the past month on the job? Make an X in front of those you have experienced during the past month:

39. Your hands trembled enough to bother you.

40. You were bothered by shortness of breath when you were not working hard or exercising.

41. You were bothered by your heart beating hard.

- 42.Your hands sweated so that you felt damp and clammy.
- 43.You had spells of dizziness.
- 44.You were bothered by having an upset stomach or stomach ache.
- 45.You were bothered by your heart beating faster than usual.
- 46.You were in ill health which affected your work.

In addition, did you experience either one of the following during the past month?

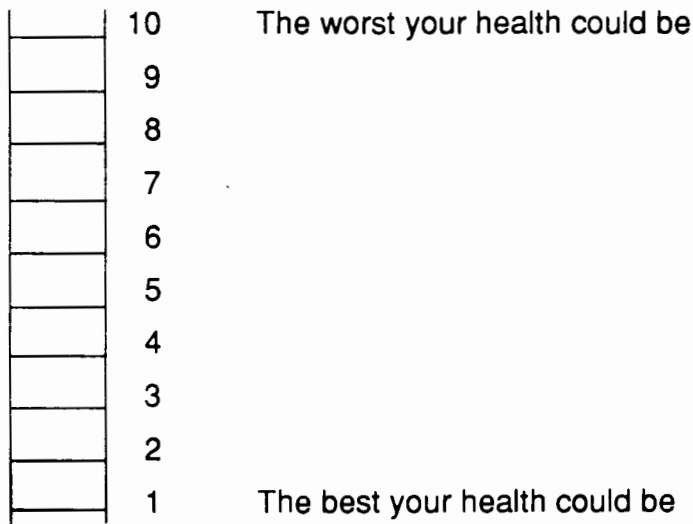
47. You had a loss of appetite.

Never	Once or twice	Three or more times
0	1	2

48. You had trouble sleeping at night.

Never	Once or twice	Three or more times
0	1	2

49. If the "ladder" drawn below, with its 10 "steps" numbered, represents your general health, indicate the "step" on which you would place yourself currently. Circle the number of the "step" you choose:



50. Do you **have** the feeling that you don't really care about what goes on around you?

Very seldom or never						Very often
7	6	5	4	3	2	1

51. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

Never happened						Always happened
7	6	5	4	3	2	1

52. Has it happened that people whom you counted on disappointed you?

Never happened							Always happened
7	6	5	4	3	2	1	

53. Until now your life has had:

No clear goals or purpose at all							Very clear goals and purpose
1	2	3	4	5	6	7	

54. Do you have the feeling that you are being treated unfairly?

Very often							Very seldom or never
1	2	3	4	5	6	7	

55. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

Very often							Very seldom or never
1	2	3	4	5	6	7	

56. Doing the things you do every day is:

A source of deep pleasure and satisfaction							A source of pain and boredom
7	6	5	4	3	2	1	

57. Do you have very mixed-up feelings and ideas?

Very often							Very seldom or never
7	6	5	4	3	2	1	

58. Does it happen that you have feelings inside that you would rather not feel?

Very often							Very seldom or never
1	2	3	4	5	6	7	

59. Many people — even those with a strong character — sometimes feel like losers or blunderers ("sad sacks" in certain situations). How often have you felt this way in the past?

Never							Very often
7	6	5	4	3	2	1	

60. When something happened, have you generally found that:

You over-
estimated or un-
derestimated its
importance

You saw things
in a balanced
perspective (in
the right
proportion)

1 2 3 4 5 6 7

61. How often do you have the feeling that there is little meaning in the things you do in your daily life?

Very often

Very seldom or
never

1 2 3 4 5 6 7

62. How often do you have feelings that you are not sure you can keep under control?

Very often

Very seldom or
never

1 2 3 4 5 6 7

63. How often does your job make it necessary for you to try to do more than one thing at a time, like talking on the phone while carrying on with a task, talking on two phones at once, eating while working, etc.?

1. Never
2. Less often than monthly
3. Monthly
4. Weekly
5. Daily or more often

64. How often do you have to work against a deadline?

1. Never
2. About once a month
3. About once a week
4. About once a day
5. Several times a day

65. How often does your job make it necessary for you to keep several tasks or projects going at the same time, by shifting back and forth rapidly between them?

1. Never
2. Less often than monthly
3. Monthly
4. Weekly
5. Daily or more often

66. How often do you have to forego a lunchbreak due to an urgent job?

- 1. Never
- 2. Every few months, perhaps for a rush period
- 3. About once a month
- 4. About once a week
- 5. Several times a week

67. How many close relatives and close friends do you have — people you can feel at ease with, can talk to about private matters, and can call on for help? Please count carefully and write down the number.

..... persons

68. At work I have the right to decide when I want to do what.

That is really how it is 4	That is close to how it is 3	That is far from how it is 2	That is not at all how it is 1
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

69. At work I am expected to learn new things.

That is really how it is 4	That is close to how it is 3	That is far from how it is 2	That is not at all how it is 1
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

70. At work I have to do the same task over and over.

That is really how it is 1	That is close to how it is 2	That is far from how it is 3	That is not at all how it is 4
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

71. At work everything is decided higher up, above me.

That is really how it is 1	That is close to how it is 2	That is far from how it is 3	That is not at all how it is 4
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

72. My job **requires** a high level of skill and training.

That is really how it is 4	That is close to how it is 3	That is far from how it is 2	That is not at all how it is 1
---	------------------------------------	------------------------------------	--------------------------------------

73. My job leaves me room for originality.

That is really how it is 4	That is close to how it is 3	That is far from how it is 2	That is not at all how it is 1
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

74. At work I have the freedom to decide how I want to do my job.

That is really how it is 4	That is close to how it is 3	That is far from how it is 2	That is not at all how it is 1
----------------------------------	------------------------------------	------------------------------------	--------------------------------------

75. Like many other jobs, mine unfortunately leaves little room for initiative.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

76. My kind of work does not require that one judges things for oneself.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

77. When I go to work in the morning, I can never really predict what decisions I will have to make during the day.

That is really
how it is
4

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
1

78. With a little bit of training, most people could learn to do my work.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

79. I have clear directions on how to do my work and I am closely supervised in doing it.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

80. Once one gets the hang of my job it becomes routine and is no longer very demanding.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

81. On the job I have to think what I am doing and keep my wits together all the time.

That is really
how it is
4

That is close to
how it is
3

That is far from
how it is
2

That is not at all how
it is
1

82. At work several of us share responsibility for what happens and it is not easy to blame anyone in particular when something goes wrong.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

83. My job requires that I plan at least several days ahead and sometimes even longer.

That is really
how it is
4

That is close to
how it is
3

That is far from
how it is
2

That is not at all how
it is
1

84. By and large, I am given a chance to think and act for myself at work.

That is really
how it is
4

That is close to
how it is
3

That is far from
how it is
2

That is not at all how
it is
1

85. My job is monotonous.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

86. My job is of a kind that does not allow workers to work at their own pace.

That is really
how it is
1

That is close to
how it is
2

That is far from
how it is
3

That is not at all how
it is
4

87. I have to make many decisions while working.

That is really
how it is
4

That is close to
how it is
3

That is far from
how it is
2

That is not at all how
it is
1

THANK YOU FOR YOUR PARTICIPATION

DJWS/1988

APPENDIX 4

YOU, YOUR WORK AND YOUR HEALTH

Variables, Scales, Sources and Scoring

1. Quantitative Work Load

Items 1 - 4

Source: Caplan et al., 1980, p.238.

Scoring: Sum of ratings circled.

2. Job Involvement

Items 5 - 8.

Source: Lawler & Hall, 1970, pp.305-312 (also see Lodahl & Kejner, 1965, Morrow, 1983, p.490).

Scoring: Sum of ratings circled.

3. Role Conflict

Items 9 - 11

Source: Caplan et al., 1980, p.245.

Scoring: Sum of ratings circled.

4. Role Ambiguity

Items 12 - 15

Source: Caplan et al., 1980, p.245.

Scoring: Sum of ratings circled. (Note - scoring direction of items changed to reverse scoring; see footnote on p.245.)

5. Hours Worked Per Week

Item 16

Scoring: Number indicated.

6. Absenteeism

Item 17

Scoring: Number indicated.

7. Job Satisfaction

Items 18 & 19

Source: Beehr et al., 1976, p.43. Item 18 given 4 responses categories, instead of original 3.

8. Depression

Items 20 - 29

Source: Karasek, 1979, p.307. Wording adapted. Item 29 added to.

Scoring: Negative answers count 1 each.
First term is negative for Items 20, 23, 26, 27, 28.
Second term is negative for Items 21, 22, 24, 25, 29.

9. Tobacco Smoking

Item 30

Scoring: Actual count, i.e. 0 to highest number, probably divided into intervals.

10. Drinking

Items 31 & 32

Source: Kessler et al., 1987, p.58, adapted.

Scoring: Product of answers to Items 31 and 32.

11. Pill Consumption

Items 33 & 34

Source: 33 adapted from Kessler et al., 1987, p.58; 34 from Kessler et al., 1987, p.58.

Scoring: Sum of Items 33 and 34.

12. Propensity to Leave

Item 35

Source: Abdel-Halim, 1980, p.201. Wording simplified; answer 4 changed from "consider taking it" to "take it"; answers 3 and 2 descriptions added.

Scoring: Circled rating.

13. Life Satisfaction

Item 36

Source: Adapted from Molnar, 1985, p.149.

Scoring: Number circled.

14. Computer-down Stress

Items 37 & 38

Source: Self-written

Scoring: Product of answers to Items 37 and 38.

15. Somatic Complaints

Items 39 - 48

Source: Caplan et al., 1980, pp.271-272.

Scoring: Count number for Items 39 - 46, add ratings indicated for 47 and 48.

16. General Health Rating

Item 49

Source: Garrity et al., 1978, p.78.

Scoring: Number circled.

17. Sense of Coherence

Items 50 - 62

Source: Antonovsky, 1979, pp.189-194. Only 13 items of short form (see p.189). Wording of Items 58, 59 and 60 (21, 25 and 26 in originals) modified slightly.

18. Time Pressure

Items 63 - 66

Source: Original pool of 12 items written by Strümpfer & Scott, 1988, factor analysis performed to select these items.

Scoring: Sum of numbers circled.