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LIFESTYLE AND CORONARY PRONE BEHAVIOUR PATTERN (TYPE A) IN UNIVERSITY ADMINISTRATORS

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Abstract

The prevalence of Type A behaviour pattern and its relationship to specific lifestyle factors were investigated in 180 male university administrators aged 25 to 65. One hundred and twenty respondents were Afrikaans speaking; 60 were English speaking. All respondents were volunteers and were recruited from 16 different universities in South Africa.

Information on lifestyles were obtained by questionnaires. Type A behaviour pattern was assessed using the Jenkins Activity survey.

The Afrikaans group obtained significantly higher Type A scores than the English group. Factors involved were not clear. Other factors which were significantly related to Type A and/or other JAS scores were: the number of people individuals were responsible for at work; the organizational rank and managerial achievement quotient of respondents; the number of promotions and the number of times respondents changed their line of work; the educational level of respondents; their Alcohol Consumption Index; feelings of loneliness; the number of hours they worked per week; their experience of subjective distress; whether they had a wife who worked outside the home or not; marital status of respondents, and their smoking behaviour.

Results imply significant differences between culturally different groups leading different lifestyles but doing the same kind of work.

Limitations of the study are looked at, and recommendations made for further research.

CHAPTER 1

Coronary Heart Disease and Coronary-Prone Behaviour

Modern Western industrialized societies are witnessing an alarming increase in the incidence of coronary heart disease (CHD). Not only is it increasing in frequency, it is also increasingly afflicting younger individuals and groups who were previously free of the disease (Bakal, 1979). In non-Western countries, the incidence of CHD tends to increase with an increase in affluence. The increase however cannot be explained as simply being due to longevity, genetic predisposition, or improved diagnoses (Rosenman & Chesney, 1982), because it has not been accompanied by appreciable changes in the standard risk factors (Rosenman & Friedman, 1974). The World Health Organisation has recognized this increase to be of the "utmost urgency" (Kavanagh, 1980) and predicted that unless the causes and prevention of CHD are isolated, we would soon be faced by the greatest epidemic mankind has known (Jenkins, 1971).

Coronary Heart Disease

Coronary heart disease occurs when the coronary arteries, which supply blood to the heart muscle, narrow to such an extent that they are unable to supply sufficient oxygen and nourishment to the muscle. The narrowing is caused by fatty plaques which line the inner walls of the arteries, which are then said to be atherosclerotic. Atherosclerosis is the kind of lesion underlying most cases of CHD.

The condition is often experienced as pain emanating from the chest towards the shoulder and left arm, but may also spread to the neck and jaw, and is known as "angina pectoris". It occurs when there is an increased demand for blood by the heart muscle which the coronary arteries are unable to meet, and can be caused by any activity that

requires an increased heart rate. Attacks usually last for a few minutes, and disappear with rest. It is not an illness in itself, but the possible symptom of other cardiac malfunctions.

If the lack of oxygen is prolonged, or the coronary arteries have become so narrowed that the blood supply to part of the heart muscle is cut off completely, a coronary thrombosis (blockage) occurs which may lead to a condition known as myocardial infarction (death of muscle tissue due to the blood supply being cut off). When these two disorders have occurred, the person has suffered a "heart attack" (or "coronary") which may have resulted in cardiac arrest (stoppage of heart). The pain associated with myocardial infarction is similar to angina, but usually more severe and prolonged, and is accompanied by cold sweating, breathlessness and faintness (Bakal, 1979; Diagram Group, 1976; Strümpfer, 1978).

Incidence of Coronary Heart Disease in South Africa

In South Africa, a leading cause of death in white, Indian and coloured groups is cardiovascular disease which affect the heart and blood vessels, and includes thrombosis, embolisms, degeneration of the blood vessels, hypertension, cerebral arteriosclerosis and cerebral vascular accidents (CVAs).

Thirty five percent of all deaths in white males in South Africa, and twenty percent of all deaths in white South African females are due to CHD. In the 25-34 year group, the death rate of white South African males is 23,1 per 100 000 , compared to 9,3 per 100 000 for American males and 6,4 per 100 000 for English males in the same group (Wyndham, 1979; 1981).

TABLE 1

Mortality rates (%) of all deaths from diseases of the circulatory system by race sex and age.

Age	25-34	35-44	45-54	55-64
Males				
Whites	15	41	52	55
Asians	16	38	53	56
Coloureds	11	20	31	38
Blacks	7	15	20	25
Females				
Whites	21	30	40	50
Asians	20	33	48	56
Coloureds	19	29	43	54
Blacks	17	25	32	37

Source: Wyndham, 1979, p.1024.

The Indian group is even more vulnerable. Between 1968-1977, the death rate from CHD for Indian males increased by 25%. The death rate for both men and women in all adult age groups is greater than for the white groups (Wyndham, 1979).

For the coloured group the death rate from CHD is increasing rapidly, especially among the urban population. CHD is the third overall cause of death in coloured males and second among coloured females.

In the black group, CHD is rare in both males and females, but an increasing number of urban blacks are suffering symptoms of cardiovascular malfunctions, e.g. angina (Wyndham, 1979).

Risk Factors Associated with Heart Disease

Extensive clinical research has shown that lifestyle factors play an important role in the pathogenesis of atherosclerosis (Bakal, 1979).

These lifestyle factors constitute risk factors for the development

of the disease, and are important as there is no "precise cause" of CHD. It is also important in that strategic intervention to modify these risk factors may help to reduce the incidence of the disease.

Epidemological studies have established that the following life-style factors affect the risk of developing atherosclerosic disease.

Hypertension (High blood pressure) (McArdle, Katch & Katch, 1981).

High serum cholestrol (Diagram Group, 1976).

Cigarette smoking (McArdle, Katch & Katch, 1981).

Heredity factors (Halhuber and Halhuber, 1978).

Obesity (Shillingford, 1981).

Sex (Bakal, 1979).

Lack of physical activity (McArdle, Katch & Katch, 1981).

Excessive alcohol consumption (Roth, 1974).

Stress (Rosenman & Chesney, 1982).

Although the relationship between the above factors and CHD has been ably demonstrated, there are many instances of CHD where in the individual has normal cholestrol levels, normal blood pressure, does not smoke, etc. In fact, the physiological risk factors are totally absent in nearly 50% of CHD cases (Jenkins, 1976; Russek, 1967). Also, although these risk factors are predictive of CHD in groups, they are far less sensitive in predicting heart disease in the individual (Jenkins, 1978). It is mainly for these reasons that attention has shifted during the last two decades from the physiological to the psychological risk facotors of CHD.

Psychological Risk Factors - a Historical Review

Physicians have long suspected that certain lifestyle factors may be implicated in CHD. As long ago as 1628, an English physician, William Harvey noted the influence on the heart of emotions accompanying plea-

sure, pain, hope, or fear (Jenkins, Zyzanski, & Rosenman, 1979). In 1868 the German physician, Von Dutsch, suggested that those who were excessively involved in their work and whose style of speaking was loud, were predisposed to the development of CHD (Rosenman & Chesney, 1980). Again, in 1892, Sir William Ossler also strongly implicated stress and hard driving behaviour when he found that heart attacks were related to high pressure living and excessive work (Rosenman & Chesney, 1980).

In 1936, the Menningers found that patients with CHD exhibited strongly aggressive tendencies (Rosenman & Chesney, 1980). Kemple also found CHD patients to be highly ambitious with goals that incorporated power and prestige, and that they tended to depend on achievements in daily living because of their inability to indulge in creative thought (Rosenman & Chesney, 1980).

During the 1950's, two cardiologists, Rosenman and Friedman, found that although a group of upper middle-class white American women ingested as much fat as their husbands, they appeared to be relatively immune to coronary artery disease (Rosenman and Friedman, 1961). However, they also found that Italians, Mexican, African, and Black American women were not as immune as their white American counterparts.

The possible factor involved was suggested by their survey of causes of heart disease: Seventy five percent of general practitioners and 100 executives surveyed, indicated that "excessive drives – meeting deadlines" were the cause of heart attacks in patients and friends (Rosenman and Friedman, 1961).

They also found that many individuals with high standard risk factors do not develop CHD, and many who do not have the risk factors, succumb to it. For these reasons and given the high personal and social cost of CHD, the search for additional risk factors increased.

Sometime later, from their clinical, laboratory, and epidemiological studies of the impact of behavioural factors on the development of CHD, Friedman and Rosenman defined a coronary-prone behaviour pattern which they called Type A, while describing people not showing such behaviour as Type B. The whole range of behaviours is often referred to as Type A/B behaviour pattern.

Type A Behaviour

Rosenman and Friedman gave the following definition of the coronary-prone behaviour pattern:

> A characteristic action-emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time, and if necessary against the opposing efforts of other things or persons in the same environment (cited in Jenkins, 1979, p.3).

The three main characteristics of Type A are:

a) Hard Driving Conscientiousness

Manifestations include a heightened pace of living; perseverence because he believes he can overcome any obstacle; aggressiveness or free floating hostility; evaluation of the worthiness of his activities in terms of numbers, and a tendency to challenge and compete with others even in non-competitive situations, e.g. leisure pursuits.

b) Time Urgency

Type A individuals react more strongly when demands are more stressful; they constantly work against deadlines – usually of their own making; they are willing to work hard and suppress fatigue although this often affects their task performance. They often have explosive and accelerated

speech and are impatient with slowness in others - he is invariably punctual and does not like being kept waiting. They are restless when sitting or standing; they walk rapidly, eat hurriedly, and are often toying with a pencil or tapping their feet or fingers. They are frequently experienced by others as "stress carriers".

Type A's anticipate what comes next and begin to react in advance e.g. getting keys out long before they reach the car, or persistently interrupting speakers.

c) Lack of Concern for Others

Interpersonal relationships of Type A's are characterized by a lack of concern for others or even hostility. At work they are often frustrated and impatient with superiors.

(The above descriptions are taken from Jenkins, 1979; Glass, 1977; Strümpfer, 1978; Rosenman & Chesney, 1982; Matthews, 1982).

Burke and Deszca (1982), in a study of managers found Type A's to be more anxious about failure; more sacrificing of friendships and family, and more socially isolated. Rosenman (1978) sees Type A's as lacking subtle adaptive responses and tending to respond to their environment in an all or nothing manner.

Type A behaviour is not genetically inherited (Rahe, Hervig, & Rosenman, 1978) and is not a trait. It is a pattern of behaviour learned through socialization (Matthews & Angulo, 1980), and allows the individual to cope with fears and anxieties generated by particular beliefs they develop about their environment (Price & Clarke, 1978). It is seen as behaviour that is elicited from susceptible individuals by an appropriately challenging environment. Not all aspects of the syndrome needs to be present for a person to be classified as Type A. Indeed, some individuals will show more or less of it under different circumstances,

although the typical level tends to stabilize through habit (Strümpfer, 1983).

Matthews (1982) suggested that escalating parental standards of performance for children might play a role in the aetiology of the syndrome. The child is generally encouraged from an early age to become competitive and to maximise his/her efforts and achievements in whatever activity they partake. For instance, they young Type A is pushed to achieve excellent results at school with the threat of parental disapproval if he/she does not. This may eventually lead to maladaptive behaviour whenever the individual is faced with uncontrollable stress (Glass, 1977), and may become associated with a belief that one should not avoid dealing with problems and difficulties (Matthews, 1982).

It is important to distinguish Type A/B pattern from the concept of stress in that it may be evoked either by stressful or pleasant situations. It should rather be seen as a style of behaviour used to confront life situations in general (Rosenman, 1978).

Vingerhoets and Flohr (1984), in a study of 100 Dutch males, found that when Type A's were confronted with stressful situations they were more prone to active problem-focussed behaviour, and were inclined to see themselves rather than the environment as a cause of their problems. They may represent an attempt on the part of the susceptible individual to maintain a sense of control at all costs over environmental events, and thereby avoid a feeling of helplessness (Glass, 1977).

When, however the stress situation really becomes intolerable, Type A's overreact to the threat of loss of control by becoming helpless and consequently making fewer attempts to reinstate control. After these episodes of helpless passivity, there follows new vigorous efforts to control the environment. This may lead to overload and burn-out.

Feelings of hopelessness and helplessness, accompanied by a negative attribution of responsibility and self-blame, then gradually become more persistent (Matthews,1982). This supports Rosenman's notion that Type A's may lack the capacity to adjust/adapt the strength of their reactions to the demands of the environment.

In keeping with the idea that Type A's tend to see life as a challenge, Burke and Deszca (1982) found that Type A's preferred and were attracted by work climates characterized by high performance standards, spontaneity, toughness, and ambiguity. When high and low productivity rates were compared, more Type A managers were found in the former group (Howard, Cunningham, & Rechnitzer, 1976).

Pittner and Houston (1980) found that Type A's tended to employ more suppression and denial when their self-esteem was threatened. This supports earlier findings by Carver, Coleman, and Glass (1976), as well as Weidner and Matthews (1978), who also found the use of denial and suppression by Type A's when they were required to attack demanding situations.

Little wonder then that Chesney, Black, Chadwick, and Rosenman(1981), found little direct relationship between Type A behaviour pattern and psychological stress. She and her colleagues found that Type A's did not report more state and trait anxiety than Type B's, nor more neurotic, somatic or depressive symptoms. The clinical picture that emerges from the above study is one characterized by many of the traits thought to be strengths in today's world, and not one characterized by distress. This has prompted Rosenman and Chesney (1982) to suggest that contemporary Western society may actually have increased the prevalence of Type A behaviour by rewarding those who communicate and perform more rapidly and aggressively.

Type B Behaviour

There is thought to be a continuum of behaviours ranging from extreme Type A through to extreme Type B behaviour. Type B's are associated with less competitiveness and impatience. Their speech tends to be slow, with frequent pauses and breaks. They tend to be more calm, relaxed and friendly, and often use humour in conversation. They do not easily become frustrated with delays, and usually take it in their stride. They tend to enjoy their leisure time more, and generally prefer to be liked for who they are rather than for what they have achieved (Jenkins, 1978 Glass, 1977; Roseman and Chesney, 1982). At work, Type B managers tend not to be hard-driving and ambitious and tend to be more satisfied with their jobs. They also tend to work less hours, travel less, and earn lower salaries.

Techniques for Assessment of Type A/B Behaviour

Type A/B behaviour was initially assessed clinically by Friedman and Rosenman, i.e. the clinical judgement of a group of cardiologists provided the basis for assessment (Jenkins, Zyzanski, & Rosenman, 1979). However, a need for specific criteria led to the development of a structured interview, as well as various other assessment procedures.

Structured Interview

The major Type A assessment procedure is the Structured Interview which evolved during Friedman and Rosenman's earlier studies (Friedman & Rosenman, 1969; Rosenman & Friedman, 1961). In these studies, selection of individuals consisted of a two-stage process, viz. 1) Type A and B behaviour patterns were described in detail to individuals who then identified associates who most closely fit the Type A description. 2) The peer-selected subjects were then interviewed to assess the degree

of Type A/B pattern. The content of this original questionaire included questions on smoking, work, excercise, sleep, etc.

In 1960, the Western Collaborative Group Study was begun to examine the role of Type A/B pattern in the pathogenesis of CHD. The interview was then standardized, and covered three themes, viz. degree of drive and ambition, degree of past and present competitive and aggressive hostile feelings, and the degree of time urgency. In 1962, the interview was shortened and the content slightly changed with emphasis being placed on challenging the subjects. This version has been used in research subsequent to 1962. Table 2 gives a listing of characteristics considered in the SI, comparing Types A and B.

TABLE 2

PROFILES OF THE TYPE A AND TYPE B BEHAVIOUR PATTERNS

CHARACTERISTICS	TYPE A	TYPE B
Speech		
Rate	Rapid	Slow
Word production	Single-word answers; acceleration at the end of sentences	Measured; frequent pauses or breaks
Volume	Loud	Soft
Quality	Vigorous; terse; harsh	"Walter Mitty"
Intonation/inflection	Abrupt; explosive speech; key-word emphasis	Monotone
Response latency	Immediate answers	Pauses before answering
Length of responses	Short and to the point	Long; rambling
Other	Word clipping; word omission; word repitition	
Behaviours		
Sighing	Frequent	Rare
Posture	Tense; on the edge of the chair	Relaxed; comfortable
General demeanour	Alert; intense	Calm; quiet attentiveness
Facial expression	Tense; hostile; grimace	Relaxed; friendly
Smile	Lateral	Broad
Laughter	Harsh	Gentle chuckle
Wrist clenching	Frequent	Rare

TABLE 2 (Cont)

PROFILES OF THE TYPE A AND TYPE B BEHAVIOUR PATTERNS

CHARACTERISTICS	TYPE A	TYPE B
Typical content		
Satisfied with job	No, wants to move up	Yes
Hard-driving, ambitious	Yes, by own and others' judgements	Not particularly
Feels a sense of time urgency	Yes	No
Impatience	Hates waiting in lines; will not wait at a restaurant; annoyed when caught behind a slow-moving vehicle	Takes delays of all kinds in stride and does not become frustrated or annoyed
Competition	Enjoys competition on the job; plays all games (even with children) to win	Does not thrive on competition and rarely engages in competitive activities
Admits to polyphasic thinking and activities	Often does or thinks two (or more) things at the same time	Rarely does or thinks two things at once
Hostility	In content and stylistics - argumentative responses; excessive qualifications; harsh generalizations; challenges; emotion-laden words; obscenity	Rarely present in any content

TABLE 2 (Cont)

PROFILES OF THE TYPE A AND TYPE B BEHAVIOUR PATTERNS

CHARACTERISTICS	TYPE A	TYPE B
Responses to the interview		
Interrupts interviewer	Often, particularly on question 13	Rarely even on question 13
Returns to previous subject when interrupted	Often	Rarely
Attempts to finish interviewer's questions	Often	Rarely
Uses humour	Rarely	Often
Hurries the interviewer ("yes,yes," "m-m", head nodding)	Often	Rarely
Competes for control of the interview	Wide variety of techniques - interruptions; verbal duets; extraneous comments; lengthy or evasive answers; questioning or correcting the interviewer	Rarely
Hostility	Often demonstrated during the interview through mechanisms such as boredom, condescension, authoritarianism, challenge	None

Source: Chesney, Eagleston and Rosenman, 1981.

The interview focuses primarily on the stylistics of Type A/B pattern, i.e. how a person responds characteristically to a variety of situations. During the interview, the interviewer creates a challenging situation and presents standardized environmental stimuli that will result in Type A behaviour if it is the person's usual mode of response.

The theory and technique must, however, be mastered before the interviewer can successfully administer the interview. (This is one reason why paper and pencil tests are often preferred.) Emphasis in the SI training is placed upon the maintenance of interviewer consistency along a number of dimensions, viz. (a) vocal style - including speed of questioning, volume, intonation, and inflection; (b) overall length of interview; (c) question content; and (d) behaviour of the person interviewed. During the interview attention is paid to rapid speech, grimacing, sighing and interruptions of the interviewer. The interview takes about 15-20 minutes to administer.

Scores on the SI are based on presence or absence of specific characteristics of Type A and Type B behaviour patterns. Although the literature usually only refers to Type A and Type B behaviour, assessment was originally made using a five point scale, viz.

Type A1 = Fully developed pattern

Type A2 = Many Type A characteristics present

X = Even mix of Type A and B characteristics.

Type B3 = Many Type B characteristics but some Type A.

Type B4 = Relative absence of Type A characteristics.

Framingham Type A Scale

This is a self-report measure, consisting of ten items related to Type A behaviour and is based on the extensive interview questionaire administered in the Framingham Heart Study (Chesney, Eaglestone and Rosenman, 1980).

The scale has been found to predict significantly both the prevalance and incidence of CHD in men and women in an eight year follow-up (Haynes, Levine, Scotch, Feinleib, & Kannel, 1978).

However, when the Framingham Type A scale was administered independent of the entire Framingham questionnaire, only a moderate relationship to CHD was found (Chesney et el., 1980). The Framingham Type A scale has also not been studied as a predictor of CHD when administered as a self-contained scale, nor has its predictive strengths been cross-validated.

Jenkins Activity Survey

Several paper and pencil self-reports were developed to assess behaviour patterns more objectively and easily. One of them, used in this study, the Jenkins Activity Survey (JAS), was developed from SI questions and clinical experience (Jenkins, Rosenman, and Friedman, 1968).

Items for the JAS were selected to discriminate between individuals classified by the SI as Type A or Type B. It was then further refined to yield as Type A scale and three subscales derived from factor analyses (Rosenman and Chesney, 1980). The following descriptions are based on Jenkins, Zyzanski, and Rosenman (1979).

Speed and Impatience (Factor S): This factor deals with the time urgency revealed in the style of behaviour of the Type A person. Those scoring high on this factor tend to eat very rapidly, become impatient with the conversation of others, hurry other people along, have strong tempers, and become irritated easily.

Job Involvement (Factor J): This factor expresses the degree of dedication to occupational activity. Typically, persons scoring high on this factor report having a challenging, high pressure job. They work overtime and confront important deadlines. They prefer promotion to pay rise,

but usually have received both in the last few years.

Hard-driving and Competitive (Factor H): This factor involves perceptions of oneself as being hard-driving, conscientious, responsible, serious, competitive, and putting forth more effort than other people. This series of traits suggests highly socialized but intense drives.

In retrospective studies in Europe and America, the JAS was found able to differentiate between controls and those with CHD (Chesney et al., 1981). When it was compared with the SI in the Western Collaborative Group Study, the Type A scale of the JAS showed 72% agreement with the SI classification (Zyzanski & Jenkins, 1970).

The three factor derived scores make relatively independent contributions to the assessment of Type A tendencies. This was confirmed by Jenkins, Rosenman, & Zyzanski (1974), who found that none of the three scales significantly related to CHD. Vickers, Hervig, Rahe, and Rosenman (1981), however, found indications of particularly high CHD risk when Type A interacts with Factor H.

Multivariate analyses comparing the relative strengths of the SI and the JAS revealed the SI to be a stronger predictor of new CHD. The association of both measures with CHD were also found to be essentially independent of other major risk factors, and the combined use of the SI and JAS gave greater strength of prediction than either procedure alone. Nevertheless, because the JAS has been found to be predictive of both primary cases of CHD, as well as increased risk of a major coronary event among individuals already having clinical CHD (Rosenman & Chesney, 1982), it has become one of the more frequently used measures of assessing Type A behaviour pattern.

Several other questionnaire scales have been developed to

assess Type A behaviour pattern, including the Bortner scale and the University of Michigan scale. There has however been little evidence so far to validate these measures of Type A against the SI. They have also not been found to correlate highly with CHD risk or incidence in either prospective or retrospective research (Chesney et. al., 1981).

The "Activity" scale of the Thurstone Temperament Schedule has also been used in predicting CHD. The scale is concerned with the pace of daily living and shows the highest correlations with Type A behaviour pattern of any psychometric questionnaire (Rosenman et. al., 1975). Results of these questionnaires are however thought to be influenced by the subject's insight and response bias (Rosenman and Chesney, 1982).

Type A Behaviour and its Relation to CHD

Many studies have demonstrated an association between Type A/B pattern and the development of clinical CHD. The most impressive data came from a longitudinal study, viz, the Western Collaborative Group Study (WCGS) in which some 3000 working men between the ages 30-59 were followed for more than eight years (Rosenman et al., 1975; Rosenman et al., 1977). Analysis of results from this study showed Type A scores to be the single strongest predictor of recurrent CHD among all the variables investigated. It was found that those who exhibited Type A behaviour pattern had 2.2 times the prevalence of clinical CHD than those with Type B behaviour pattern. The association is statistically independent of other risk factors (which may also be elevated in the Type A person).

Theorell and Rahe (1971), found that Type A's were more than three times more likely to die of CHD than Type B's; they were also more likely to have a second major coronary incident if they survived the first.

In a study of 51 post-mortem subjects who had been part of a prospective study of 3295 men, Friedman et. al. (1968), found that those men, who while living had exhibited the Type A behaviour pattern, succumbed to coronary artery disease six times more frequently than those who exhibited Type B behaviour pattern. The Type A individuals also had severe basic coronary atherosclerosis six times more frequently than the Type B individuals. Zyzanski et. al. (1976) also found that Type A's showed greater coronary artery occlusion than Type B's (Rosenman, Friedman, Strauss, Wurm, Kositchek, Hahn, & Werthessen, 1964; Rosenman et. al., 1975; Rosenman et. al., 1977).

These studies were supported by Frank, Heller, Kornfeld, Sporn, and Weiss (1978) who demonstrated an association between the severity of the coronary atherosclerotic process and the Type A risk factor. Using the SI, they assigned 147 patients with athesclerosis to one of four categories (A1, A2, B3 and B4). They found that those in categories A1 and A2 had more severe involvement of their coronary arteries (as measured by the number of arteries stenosed by 50% or more), when compared with those with a lesser degree of proneness (B3 and B4). The association was also found to be statistically independent of the traditional risk factors.

In reviewing the studies of risk factors associated with coronary artery disease, Jenkins (1978) concluded that the Type A behaviour pattern as currently measured, has about the same strength of association with coronary artery disease prevalence and incidence as do other risk factors.

He also noted the epidemiological studies on physiological risk factors have identified characteristics that help to define coronary proneness in groups rather than individuals; whereas Type A behaviour

pattern has been found to be predictive on an individual basis. The behaviour pattern of an individual is therefore significantly and independently related to his coronary health, and assessment of this pattern helps to define coronary-proneness. It also significantly enhances the predictive specificity of other more widely used risk factors.

In the same review, Jenkins noted that between 1971-1975, twenty-two out of twenty-four studies on Type A/B pattern and CHD showed positive associations between the two variables. One study showed equivocal results, and one had negative results.

In 1980, the National Heart, Lung, and Blood Institute (NHLBI) in the USA decided to review the data on the Type A/B pattern to determine the efficacy and relevance of the research to the prevention and control of CHD. Review panels were formed to look at different areas, including the association of Type A behaviour and CHD. They concluded that the available body of scientific evidence that Type A behaviour (as defined by SI, JAS and FTAS) is associated with an increased risk of apparent CHD in employed, middle-aged persons. This risk factor they saw as being greater than that imposed by age, but found it appeared to be of the same magnitude as the relative risk factors associated with hypertension, serum cholestrol levels and smoking.

Even though strength of association and consistency between Type A/B pattern and CHD need to be demonstrated, it is necessary to show that the behaviour pattern precedes CHD and is not a result of clinically undetected disease. The prospective WCGS mentioned above ably demonstrated this. Also, studies of Type A/B pattern in children (e.g. Matthews, 1978), were able to distinguish between Type A and B behaviour in adolescent boys. This lends support to the idea that Type A behaviour precedes CHD.

Type A/B Pattern and Cultural Factors

Although Type A/B pattern was defined from studies on a limited population, viz. white, middle-class, middle-age American males, several studies have found the behaviour pattern to be independent of these factors.

A 1975 Belgian study using both the JAS and SI, and involving 7000 men aged between 40 and 59 years, showed sufficient comparability to USA findings to suggest that the concept of Type A/B pattern has sufficient cross-cultural parallelism to permit the derivation of reliable measures and to make feasible the determination of whether Type A/B pattern is a risk factor for coronary disease (Zyzanski, 1978).

The Belgian study is also important in that it involved translating the JAS and SI into French and Flemish to determine whether these two measures could withstand effects of translation across languages and cultures, and still maintain a relationship to one another as in the USA (70% agreement was found in Belgium compared to 73% in the USA).

In trying to determine whether the nature of the relationship between Type A/B pattern and CHD risk was the same in other countries as was found in white American males, Kagan and his colleagues, in a study of Japanese men in Japan, Hawaii, and California found that Type A behaviour as measured by the JAS was less frequent but evenly distributed in Japanese American group (cited in Cohen, Syme, Jenkins, Kagan, and Zyzanski, 1979).

Differences were however found in the way Type A was expressed among the Japanese Americans and its relation to CHD. On analysing the three independent components of the JAS (Factors S, J, and H), different factor groupings were found, e.g. questions on "hard driving" were separated from "hard working", whereas both were part of Factor H in

American male responses. It appears that "hard driving" is not congruent with Japanese cultural values, while "hard working" is both consistent and appropriate to Japanese cultural expectations.

These findings suggest that the pattern of responses to the JAS would be different and reflective of patterns in different cultural settings.

As to the relationship between Type A/B pattern and CHD, Cohen and his colleagues found that men, who were both culturally mobile and Type A, had two to three times the risk of developing CHD, as men with either single risk characteristic. They further suggested that one would find relatively fewer Type A's in cultural settings that do not encourage Type A behaviour.

Strümpfer (1983) in a study on Type A behaviour in South African executives, found that all groups he investigated (personnel officers, MBA students, university administrators, bank employees, and different levels of managers) obtained positive Type A scores, and mean Type A scores for all samples were higher than the highest mean score of various population groups cited in the JAS manual. Also 77% of the American standardization sample obtained scores lower than the mean of all South African samples combined. What is however not clear is whether the South African culture encourages Type A behaviour more than other Western industrialized countries. Strümpfer suggested a possible reason could be the failure of South African whites to share responsibility with blacks, thus increasing their work load and making them more prone to Type A behaviour.

Possible Mechanisms Involved

Williams and Gentry (1980) acknowledged that not much information is available regarding the actual mechanism through which Type A beha-

viour pattern increased the risk of CHD. Otherwise, they suggested, intervention strategies would have been mounted with greater precision considering the high social and personal cost of CHD. The best current theory however, hypothesises that some type of endothelial injury is implicated as the initiating event in atherogenesis. The injury could result from turbulence and stresses within the coronary vascular system, from immunological processes, and from biochemical insults such as hypercholestrolaemia.

As early as 1959, Rosenman and his colleagues found that fully developed Type A's over 35 have significantly higher serum cholestrol levels than Type B's (Rosenman and Chesney, 1980). They inferred then, that although Type A behaviour has an independent influence on CHD, its influence may be mediated in part by certain traditional risk factors. In support of this, Rosenman and Friedman (1974) found significant differences between Type A's and B's in the amount of sterols and other related substances in the blood, and Glass (1977) found increased serum cholestrol concentrations in extreme Type A's as young as 19 years.

Friedman (1969) found that increased diastolic blood pressure enhanced the risk of coronary disease only when it occured in Type A's. Dembroski et al., 1979, however,showed that Type A's responded to a reaction time table with greater increases in both systolic blood pressure and heart rate than Type B's. The possible association between the behaviour pattern and increased blood pressure,however, still needs to be confirmed.

Jenkins (1978),in his review of risk factors,expressed the opinion that the central nervous system is implicated in cardiovascular regulation, and has the potential for creating malfunction and eventually pathological structural change. He argued that the known impact of

behaviour and psychological states on blood pressure, serum fatty acids, endocrine activity, and sympathetic nervous system activity (Friedman et al., 1968), strongly suggested that any behavioural predisposition too intense and frequent, and sustained central nervous system arousal which may occur in Type A individuals, would increase the possibility of cardiovascular disease.

Leading from this, Williams and Gentry (1980) claimed that there is ample evidence to show that behavioural responses to the environment are associated with distinct patterns of cardiovascular response, e.g. the fight/flight mechanism. Interestingly, they also pointed out that the same pattern is observed in association with "mental work" in humans even when there is no need for an emergency response. Supporting this, is the fact that under certain conditions Type A's engage more intensively in a mental work task (Glass, 1977), and secrete more adrenalin during active working hours (Friedman , 1969).

As pointed out earlier, Types A's, when confronted with stress tend to see themselves rather than the environment as the problem, and this may be an attempt to maintain a sense of control over the environment and thereby to avoid helplessness. Williams and Gentry (1980) suggested that this concept of perceived control may throw some light on the mechanism causing the lesion, viz. that Type A's in their need to control the physical and social environment, show greater increments in sympathetic cardiovascular activity when that control is threatened. When the threat is beyond their control, they will show increasing signs of distress even though there is nothing they can do to master the situation. In this way, the sustained arousal could increase the risk of CHD.

Objectives of this Study

The objectives of the present study were to determine:

1) Whether and to what extent the coronary-prone behaviour pattern as operationalized by means of the four JAS scores is prevalent among a sample of South African university administrators.

2) To investigate the prevalence of lifestyle factors likely to be associated with coronary-prone behaviour pattern in the sample population.

3) To investigate whether and to what extent a relationship exists in this sample between any particular lifestyle factors and coronary-prone behaviour pattern as measured by the JAS.

CHAPTER 2

METHOD

Subjects

One hundred and eighty white male volunteers took part in the study. Ages ranged from 25-65 (mean 43.42). All subjects were employed in university administration, and were recruited from 16 universities in South Africa.

Materials

Each subject was requested to complete a set of questionnaires consisting of:

(a) A biographical information questionnaire (Appendix 1).

(b) A lifestyle factors questionnaire (Appendix 2).

(c) The Jenkins Activity Survey (JAS).

Included in each set was a covering letter thanking subjects for their cooperation and assuring them confidentiality and anonymity.

Procedure

Registrars of respective universities distributed sets of questionnaires to those subjects who volunteered to participate in the study. On completion, each set was returned in a sealed envelope to the registrar who forwarded the unopened envelopes to the researchers.

The JAS's were scored by computer.

From the biographical data questionnaire, the following categories were created and indices calculated:

Language (Q1)

Questionnaires were numbered and sorted into categories according to home language. One hundred and twenty respondents were Afrikaans speaking; sixty were English speaking. Respondents with any other home language were not included in this study as they were too few.

Data for the English and Afrikaans groups were analysed together

and separately to investigate whether any differences existed between the two groups.

Age (Q2)

The age of the person was calculated from the year of birth. Although not generally found to be related to Type A/B pattern, Sparacino (1979) suggests that the clinical significance of Type A pattern may shift radically in old age, i.e. Type A's may be at lesser risk of CHD and death than Type B's as age advances. Zyzanski (1978), on the other hand, found higher Type A levels at younger ages. The age variable in the present sample was analysed to investigate whether any relationship existed with the JAS scores.

Job Title (Q3)

The occupational level of both respondent and respondent's father were coded using Schlemmer and Stopforth's guide (1979). Several studies (e.g. Hall and Donnell, 1979) have reported higher occupational levels to be associated with higher Type A scores. A positive correlation between the individuals' occupational level and the JAS scores was therefore hypothesized, and data analysed to investigate whether this existed.

Responsibility (Q4)

Parkes, Benjamin, and Fitzgerald (1969) found that jobs of people at high risk for CHD usually entailed a high degree of responsibility for others. In the present sample, the number of people respondents were responsible for varied from one to over 100. Data were analysed with JAS scores to investigate whether the results confirmed previous findings.

Organizational Rank (Q5)

A "managerial achievement quotient" (MAQ) was calculated for each respondent. This is a formula developed by Dr Benjamin Rhodes, and

first reported by Blake and Mouton (1978), by which an evaluation of an individual's career progress can be made. It takes into account the person's chronological age, the number of career moves necessary to reach the top of the organization, and the age span related to career planning (Hall and Donnell, 1979).

The following formula was used to calculate the quotient:

$$MAQ = 5 \frac{(9 - RANK)}{AGE} \times 100$$

"5" is a constant progression factor indicating intervals of time in rank that would move an individual from the bottom to the top of an eight level organization in 40 years in the absence of other forces such as politics, seniority, etc. (Blake and Mouton, 1978).

Data were analysed to investigate if any association existed between MAQ's and scores on the JAS.

Number of Years in University Administration (Q6)

The number of years worked in university administration were converted into months to facilitate analysis of data in investigating whether any relationship existed with the JAS scores.

Data from Q7 and Q8 (change of employer and change in line of work respectively), were also analysed to see whether any association existed with JAS scores.

Education Q10 and Q11

The number of years of formal education for both respondents and fathers of respondents were calculated using various prospectuses of the universities and technikons, and the Human Science Research Council publication for converting foreign degrees to South African equivalents. Part-time post-Matric courses were converted to the number of years study

the equivalent full-time course would have taken. Data were then analysed to investigate whether any relationship existed between the number of years of formal education and JAS scores.

Lifestyle Questionnaire

The following categories were created and indices calculated from the lifestyle questionnaire.

Height and Weight (Q's 1 and 2)

In the Western Collaborative Group Study (Rosenman et. al., 1977), it was found that shorter,stockier individuals were slightly more likely to score in the Type A direction. To investigate if this was true for the present sample, a Quetelet's Index (Khosla and Lowe, 1967), based on height and weight (mass) was calculated for each respondent. The following formula was used:

$$\text{Index} = \frac{W}{H^2} \times 100$$

Data were analysed to investigate any relationship of the index with the JAS scores.

Sleep (Q's 3,4,5,6)

Short sleepers have been shown to have significantly higher levels of anxiety than longer sleepers (Hicks and Pelligrini, 1977).Because the amount of REM sleep is directly proportional to the total habitual sleep duration, it was hypothesized that they may be chronically deprived of REM sleep. Vogel (cited Hicks and Pellingrini, 1977) suggested that the outstanding consequence of REM deprivation is an increase in general energy level. From this, Hick and Pelligrini postulated how Type A behaviour may be formed: When an individual finds himself in a high demand situation, he works longer and consequently sleeps less in order to achieve; but contrary to expectations, he finds that less sleep

makes him more energetic, which reinforces his behaviour. As the hypothetical cycle continues, the person experiences both more time to work, and a greater level of energy with which to work. Furthermore as Type A's are less able to cope with stress (Glass, 1977), this stress-proneness may in part be mediated by acquired patterns of shortened sleep.

Hicks and Pelligrini 1977), also found that in experimental situations, individuals lose "fluid intelligence and flexibility", i.e. choosing unthinking agressive responses to stress over more reflective alternatives.

Data were analyzed to investigate how sleep patterns related to JAS scores.

Eating Habits (Q's 7, 8 and 9)

Data were analysed to find possible frequencies or patterns and to investigate whether any relationship existed with JAS scores.

Drinking Habits (Q's 10 to 17)

Nell and Strümpfer (1978) showed that a high need for power is related to high drinking frequency, high alcohol consumption, and taking the first drink at age 16 or less.

In the present study the age at which respondents started drinking Q10 was categorised as follows:

16 or under

over 16

Couldn't recall

no response

Data were analysed to see whether any association between the above categories and JAS scores existed.

An "alcohol consumption index" for each respondent was calculated from responses to Q's 12 to 17 (Mehrabian and Russell, 1978). This

is a formula based on factor scores, and gives a single overall measure of a person's habitual alcohol consumption level, and provides a measure of the individual's dependence on alcohol.

Respondents were asked about their habitual use of various types of alcoholic beverages, and the following formula was used to calculate the index.

Alcohol consumption index = respondents answers to Q's 12 + Q13 + Q14 + (4 x Q15) + Q16 + (0.2 x Q17).

It was hypothesized that (i) alcohol index scores would be positively correlated with JAS scores; (ii) there would be a difference between teetotallers and drinkers' scores on the JAS.

Loneliness (Q's 18, 19,20)

Burke and Deszca (1982) found Type A's to be more socially isolated and to sacrifice friendships more easily for their career. An index of loneliness (Bahr and Harvey, 1979), and the frequency of loneliness was calculated using responses to three questions. It was hypothesized that there would be a positive relationship between loneliness and JAS scores.

Working Hours (Q21)

Theorell and Floderus-Myrhed (1977) found that workload was significantly related to myocardial infarction in a two year follow-up of their sample, and suggested that work load was of specific importance in the acceleration of pathological processes leading to myocardial infarction. Several other researchers, e.g. Howard et al. (1976), found that Type A's worked more hours per week than Type B's.

For this study, working hours per week were categorised as follows:

Below 40 hours

41-50 hours

51-60 hours

61 + hours

Data were analysed to investigate differences among the various categories on JAS scores.

Sunday Hours Worked (Q22)

The number of Sunday hours worked were categorised as follows:

0

1-4 hours

5-8 hours

8+ hours

Data were analysed to investigate differences among the various categories on JAS scores.

Subjective Distress (Q's 23 to 27)

As stated earlier, Type A's employ more suppression (as psychological defense) in threat conditions generally, and denial in threat to self-esteem conditions (Pittner and Houston, 1980); i.e. Type A's would tend to cope with threatening situations by employing more denial and consequently experiencing less subjective distress, even though they are actually enduring more stress. This supports Glass' (1977) results, that Type A's tend to endure stress longer. The ability to withstand stress longer could ultimately have an adverse effect on the individual's cardiovascular system and the denial of negative features of experience may delay Type A's from seeking medical help for early symptoms (Hackett and Cassem and Wishnie, 1968).

From the present study, two subjective distress indices were calculated viz.

(1) Karasek Index (Q23 & 24) (Karasek, 1979).

(2) Reeder Index (Q24-27) (Reeder,Schrama, and Dirken, 1973).

Data were analysed to investigate relationships between the indices and the JAS scores.

Marital Status and Marital Satisfaction (Q's 28 to 31)

Type A's have been found to have more problems in marital and family areas because of the negative impact of their behaviour on marital satisfaction (Burke and Deszca, 1982). Also, skirmishes in the marriage often lead to divorce - a pattern which can be repeated several times (Parkes, Benjamin, and Fitzgerald, 1969).

From this it is hypothesized that divorced, and divorced and remarried respondents will have higher Type A scores. Data were also analysed to investigate any relationship between marital status and marital satisfaction of respondents and JAS scores.

Number of Children (Q32)

Data were analysed to investigate any relationship between the number of children respondents had and their JAS scores.

Working Wife (Q33 and 34)

The wives' occupations were coded, using the Schlemmer and Stopforth's (1979) guide.

Haynes et. al., (1983), found that men who were married to white-collar workers were three times more likely to develop CHD than those married to clerical workers, blue-collar workers and housewives.

Data were analysed to investigate any differences in JAS scores between respondents whose wives were employed outside the home, and those who were not.

Family Constellation (Q35)

Sampson (cited in Strümpfer, 1973) found first born individuals had a higher achievement motivation than those who were born later, although Strümpfer in his sample did not find any relationship. It is not clear whether other variables were involved.

In the present sample, birth positions of respondents were catego-

rised as follows:

Only child

First born

Middle born (3 child families only)

Youngest

Later born (excludes 1st born only)

No response

Two-child families were categorised as follows:

Male first born/female second born

Male first born/male second born

Female first born/male second born

Female first born/female second born

Strümpfer (1973) also did not find any relationship between sex/ordinal relationship dyads and achievement motivation.

Data were analysed to determine whether any differences existed among the JAS scores of the various categories in the present sample. The relationship between family size and JAS scores were also investigated.

Religious Affiliation (Q36 and 37)

Responses to both questions were categorised as follows:

Protestant Churches

Roman Catholicism

Other

Data were analysed to investigate whether any differences in the JAS scores existed among the various categories.

Smoking (Q's 41 to 45)

It is fairly well established that smoking is a high risk for CHD (e.g. McArdle, Katch & Katch, 1981). Jenkins (1978), found that

Type A personality and smoking interact to produce a particularly high risk. Caplan and Jones (1975) found ex-smokers to score lower on Type A and to have less stress than those individuals who never smoked; they however, had a higher CHD risk than those who never smoked. These authors also found that Type A's were less likely to stop smoking than Type B's. Shekelle, Schoenberger, and Stramler (1976), however, found cigarette smoking to correlate only weakly but positively to Type A.

In the present study, smoking behaviour was categorised as follows:

Current smokers

Previous smokers

Never smoked

No response

The amount of tobacco smoked per week was counted in number of cigarettes or converted to "cigarette equivalents".

Physical Activity (Q's 46 to 50)

As noted earlier, Type A's tend to derive less pleasure from sport than Type B's - i.e. if they find time for any. Furthermore, Type A's would possibly have difficulty in participating in an exercise programme because it is likely to be seen as interfering with their job by using up valuable time which they always seem to lack (Roth, 1974). Also, their need to challenge would make it difficult to avoid over-exertion when faced with strong competition. Hickey, Mulcahy, Bourke, Graham, and Wilson-Davis (1975), found that heavy leisure activity in young and middle-aged men was associated with lower levels of certain coronary risk factors, and therefore lower risk of physical activity can also lead to reduction of anxiety and stress, and create a general feeling of well-being (e.g. Shephard, 1983).

Blumenthal, Williams, Williams and Wallace, (1980) found that

Type A's lowered their Type A scores on the JAS after a 10-week exercise programme. This represented a reduction in the magnitude of the Type A behaviour pattern rather than a shift from Type A to Type B.

Responses to questions on physical activity were converted to KCAL/min./kg (amount of energy expended) using the table shown in Appendix 3

Data were analysed to investigate if any relationship existed between the amount of energy expended by the individual and his scores on the JAS.

CHAPTER 3

RESULTS AND DISCUSSIONS

The aim of this investigation was to try and identify social and cultural factors of lifestyle which are related to the incidence of Type A behaviour pattern in a sample of university administrators. Results from this study confirm some previously known factors which have been associated with Type A behaviour pattern. Several factors however showed no association to Type A or other JAS scores.

Language

A significant difference between the English and Afrikaans groups on Type A scores only were found, with the Afrikaans group scoring much higher on Type A (See Table 3).

Results suggest that cultural factors may be contributing to the formation of Type A pattern behaviour in the Afrikaans group. A possibility that is raised is that the organization of Type A pattern behaviour is different in the Afrikaans group as was found to be in the American-Japanese group (Cohen et. al., 1979).

Another possibility is suggested by Strümpfer (1983). In comparing Type A scores of various white South African executive groups, he found that, with the exception of English university administrators and personnel officers/managers of a large firm, all samples, which included a group of Afrikaans university administrators, obtained mean Type A scores higher than the mean scores that were available to the JAS authors up to 1979. He also found that 77% of the American standardization sample obtained lower scores than the mean of all the South African samples combined. This, he suggested showed excessive Type A behaviour in South African executives in general. Although results from the present study support those found by Strümpfer, further research on Type A

TABLE 3

Differences on JAS scores between

English and Afrikaans groups

Score	Group	Mean	SD	t	p
Type A	E	249.17	72.80	-2.92	.004
	A	281.76	65.60		
Factor S	E	185.02	66.23	- .78	.43
	A	192.80	61.53		
Factor J	E	240.48	39.44	- .51	.62
	A	243.51	36.68		
Factor H	E	126.88	22.99	-1.68	.09
	A	133.84	31.50		

pattern behaviour on all other groups in South Africa is imperative, as specific factors which increase Type A behaviour in some groups, and possible protective mechanisms in others, need to be identified.

Age

Table 4 shows mean ages and SD's for the three groups. A non-significant association was found between age of subjects and all JAS scores.

Job Title

Job titles of respondents, as coded, using Schlemmer and Stopforth's (1979) guide, varied from 11 (clerk) to 2 (director). Mean and SD's for all groups are shown in Table. However, because of difficulty in using the coding guide, results cannot be meaningfully interpreted.

Caplan, Cobb and French (1975), suggested that in coding job titles, the respondents should be asked to indicate their main occupation,

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR ENGLISH/AFRIKAANS/ALL SUBJECTS

VARIABLE	AFRIKAANS		ENGLISH		ALL	
	MEAN	S/D	MEAN	S/D	MEAN	S/D
AGE	42.92	9.03	43.42	10.46	43.08	9.50
POSITION	6.06	1.89	4.31	1.96	4.15	1.91
NO. OF PEOPLE RESPONSIBLE FOR	25.46	29.34	20.01	26.83	23.7	28.
MONTHS IN JOB	141.20	97.31	105.73	82.18	129.37	93.82
PROMOTIONS	2.57	1.88	2.36	1.76	2.50	1.84
EDUCATION (No of years)	15.27	2.11	15.44	2.16	15.32	2.12
FATHER'S OCCUPATION (CODE)	11.27	5.13	8.10	5.61	10.24	5.48
FATHER'S EDUCATION (No of years)	10.08	2.67	12.53	3.31	10.86	3.10
QUETELETS INDEX	3.13	1.54	3.27	.97	3.17	1.37
SLEEP - AMOUNT OF HOURS/NIGHT	6.86	1.01	7.30	.85	7.01	.98
AGE STARTED DRINKING	18.23	6.06	17.08	6.69	17.85	6.28
NO OF CHILDREN	2.43	1.32	1.91	1.41	2.26	1.37
WIFE'S OCCUPATION (CODE)	6.48	8.39	6.30	4.36	6.42	7.28
FAMILY SIZE	3.88	2.26	2.81	1.70	3.52	2.14
HOURS WORKED/WEEK	48.97	9.37	44.80	11.68	47.46	10.34
REEDER INDEX	4.56	2.53	4.48	2.26	4.53	2.44
KARASEK INDEX	1.96	1.09	2.06	1.03	1.99	1.07
SICK DAYS	2.91	7.52	2.16	3.51	2.66	6.47
ALCOHOL INTAKE	6.81	7.04	10.83	8.57	8.08	7.76
ALCOHOL C. INDEX	14.10	10.79	18.36	10.27	15.42	10.78

TABLE 4 (Cont)

MEANS AND STANDARD DEVIATIONS FOR ENGLISH/AFRIKAANS/ALL SUBJECTS

VARIABLE	AFRIKAANS		ENGLISH			
	MEAN	S/D	MEAN	S/D	MEAN	S/D
FREQUENCY DRUNK	1.59	1.17	1.53	1.08	1.57	1.14
YEARS SMOKED	13.37	12.27	13.55	13.81	13.43	12.76
AMOUNT SMOKED	9.09	14.45	7.28	10.85	8.48	13.36
ENERGY EXPENDED	2658.31	2652.11	3255.88	2770.24	2857.50	2699.13
MAQ	144.42	69.66	145.05	64.67	144.63	67.85
RANK	5.83	1.43	5.53	1.53	5.73	1.47

the section of the organization where they worked, and a brief description of the things they did as part of their job. Using these three pieces of information, they suggested is a far superior method of coding occupations.

Responsibility

The number of people administrators were responsible for ranged from one to over 1000 (mean = 23.72; SD = 28.60).

A significant relationship between Type A and Factor H scores and responsibility for the English group was found ($r = .33$, $p < .05$; and $r = .33$, $p = < .05$). All other results were non-significant.

Responsibility for persons at work can be seen as another measure of psychological stress, and has been shown to be associated with higher CHD rates (Parkes et. al., 1969). However, investigating possible reasons for the difference between English and Afrikaans groups, it was found that individuals responded in two ways. Some saw it as referring to direct responsibility while others saw it as overall responsibility. This was particularly so with respondents from certain English speaking universities. Here again, results should be viewed with caution, and in future research questions about responsibility should be clarified.

Organizational Rank

The organizational rank of all respondents were found to be significantly related to Type A and Factor J scores, $r = .21$ and .26 resp., both $p < .01$ (Table 5).

The managerial achievement quotient (MAQ) was also found to be significantly related to Type A and Factor J scores, $r = .21$ and .28 resp., both $p < .01$ (Table 5).

The rank and MAQ results support each other in that they are both

TABLE 5

CORRELATION MATRIX FOR AFRIKAANS, ENGLISH AND ALL SUBJECTS

VARIABLE		TYPE A	SPEED & IMP.	FACTOR J	FACTOR H
AGE	Afr	.03	-.01	-.00	-.00
	Eng	.03	.17	-.04	.04
	All	.03	.05	-.02	.00
JOB TITLE	Afr	-.21	-.16	-.01	-.06
	Eng	-.08	.13	.04	-.02
	All	-.17	-.06	.01	-.05
RANK	Afr	.22	.00	.31	.07
	Eng	.20	-.09	.30	.14
	All	.21	.01	.26	.07
MAQ 2	Afr	.03	-.02	.27	.06
	Eng	.20	-.09	.30	.14
	All	.21	-.04	.28	.09
NO OF MONTHS IN PRESENT POSITION	Afr	.13	.01	-.05	.00
	Eng	-.10	-.11	-.10	.28
	All	.09	-.01	-.06	.08
NUMBER OF JOB CHANGES	Afr	.01	.10	-.03	.08
	Eng	.05	.21	.03	-.29
	All	.02	.14	-.00	-.02
NUMBER OF CHANGES IN LINE OF WORK	Afr	-.03	-.11	.03	-.20
	Eng	.00	.09	.08	-.10
	All	.01	-.05	.04	-.17

SIGNIFICANCE LEVELS.

Afrikaans Ss	.19 = $p<.05$	.25 = $p<.01$
English Ss	.27 = $p<.05$	.35 = $p<.01$
All Ss	.15 = $p<.05$	.20 = $p<.01$

TABLE 5 (Cont)

CORRELATION MATRIX FOR AFRIKAANS, ENGLISH AND ALL SUBJECTS

VARIABLE		TYPE A		SPEED & IMP		FACTOR J		FACTOR H
PROMOTIONS (PRESENT POSITION)	Afr	.18	Afr	.06	Afr	.10	Afr	.07
	Eng	.28	Eng	.18	Eng	.27	Eng	.09
	All	.22	All	.10	All	.16	All	.08
SON'S NUMBER OF YEARS FORMAL EDUCATION	Afr	.11	Afr	.05	Afr	.42	Afr	-.17
	Eng	-.00	Eng	.08	Eng	.50	Eng	-.40
	All	.06	All	.06	All	.44	All	-.23
FATHER'S OCCUPATION (CODED)	Afr	-.12	Afr	-.03	Afr	-.03	Afr	-.14
	Eng	.23	Eng	.14	Eng	-.04	Eng	.05
	All	.06	All	.05	All	-.02	All	-.05
FATHER'S NUMBER OF YEARS FORMAL EDUCATION	Afr	.15	Afr	.09	Afr	.06	Afr	.06
	Eng	-.18	Eng	-.01	Eng	.12	Eng	-.05
	All	-.07	All	.00	All	.06	All	-.01
NUMBER OF HOURS SLEPT/ NIGHT	Afr	-.14	Afr	-.11	Afr	-.16	Afr	-.10
	Eng	-.01	Eng	.01	Eng	-.12	Eng	-.17
	All	-.14	All	-.08	All	-.15	All	-.13
ALCOHOL CONSUMPTION/WEEK	Afr	.03	Afr	.22	Afr	-.33	Afr	-.04
	Eng	.22	Eng	.16	Eng	.27	Eng	.17
	All	.01	All	.19	All	-.12	All	00
ALCOHOL CONSUMPTION INDEX	Afr	-.02	Afr	.28	Afr	-.26	Afr	.00
	Eng	.03	Eng	.23	Eng	.27	Eng	.21
	All	.03	All	.26	All	-.10	All	.03

SIGNIFICANCE LEVELS.

Afrikaans Ss	.19 = $p<.05$	.25 = $p<.01$
English Ss	.27 = $p<.05$	.35 = $p<.01$
All Ss	.15 = $p<.05$	.20 = $p<.01$

TABLE 5 (Cont)

CORRELATION MATRIX FOR AFRIKAANS, ENGLISH AND ALL SUBJECTS

VARIABLE		TYPE A		SPEED & IMP		FACTOR J		FACTOR H
NO OF HOURS WORKED/WEEK	Afr	.17	Afr	.31	Afr	.02	Afr	.18
	Eng	.05	Eng	-.04	Eng	.23	Eng	.17
	All	-.05	All	.11	All	.00	All	-.13
QUETELET'S INDEX	Afr	-.05	Afr	.04	Afr	.06	Afr	-.12
	Eng	.04	Eng	.01	Eng	-.16	Eng	.11
	All	-.03	All	.03	All	.00	All	-.08
FREQUENCY OF FEELINGS OF LONELINESS/WEEK	Afr	.16	Afr	.24	Afr	.02	Afr	.02
	Eng	.22	Eng	.30	Eng	-.07	Eng	-.06
	All	.14	All	.25	All	-.02	All	-.02
REEDER INDEX	Afr	.22	Afr	.41	Afr	-.13	Afr	.20
	Eng	.22	Eng	.22	Eng	.16	Eng	.18
	All	.22	All	.35	All	-.03	All	.19
KARASEK INDEX	Afr	.05	Afr	.30	Afr	-.23	Afr	.16
	Eng	-.16	Eng	-.10	Eng	.00	Eng	-.21
	All	-.02	All	.15	All	-.15	All	.06
NUMBER OF DAYS SICK LEAVE	Afr	.03	Afr	.14	Afr	-.08	Afr	.17
	Eng	.12	Eng	.16	Eng	.09	Eng	.16
	All	.06	All	.14	All	-.04	All	.17
PILL CONSUMPTION	Afr	-.01	Afr	.13	Afr	-.13	Afr	-.13
	Eng	.14	Eng	.01	Eng	.25	Eng	.03
	All	.04	All	.09	All	.01	All	-.07

SIGNIFICANCE LEVELS.

Afrikaans Ss	.19 = $p<.05$	.25 = $p<.01$
English Ss	.27 = $p<.05$	.35 = $p<.01$
All Ss	.15 = $p<.05$	.20 = $p<.01$

TABLE 5 (Cont)

CORRELATION MATRIX FOR AFRIKAANS, ENGLISH AND ALL SUBJECTS

VARIABLE		TYPE A		SPEED & IMP		FACTOR J		FACTOR H
NUMBER OF YEARS SMOKED	Afr	-.05	Afr	-.07	Afr	.02	Afr	.12
	Eng	.24	Eng	.22	Eng	.06	Eng	.32
	All	.05	All	.03	All	.03	All	.00
NUMBER OF CIGARETTES SMOKED/DAY	Afr	.11	Afr	.11	Afr	-.02	Afr	.15
	Eng	.16	Eng	.16	Eng	.08	Eng	.19
	All	.14	All	.18	All	.01	All	.17
ENERGY EXPENDITURE/WEEK	Afr	.03	Afr	.08	Afr	.01	Afr	.15
	Eng	.11	Eng	.00	Eng	.06	Eng	.14
	All	.03	All	.04	All	.01	All	.13
NERVOUSNESS	Afr	.27	Afr	.40	Afr	-.07	Afr	.19
	Eng	.26	Eng	.10	Eng	.19	Eng	.23
	All	.27	All	.31	All	.01	All	.20
STRESS	Afr	.16	Afr	.33	Afr	-.00	Afr	.23
	Eng	.32	Eng	.11	Eng	.14	Eng	.30
	All	.22	All	.26	All	.04	All	.26
TENSION	Afr	.24	Afr	.35	Afr	-.09	Afr	.15
	Eng	.06	Eng	.21	Eng	.10	Eng	-.08
	All	.19	All	.31	All	-.03	All	10
AGE STARTED DRINKING	Afr	.06	Afr	.10	Afr	.13	Afr	06
	Eng	.13	Eng	.26	Eng	-.25	Eng	10
	All	.11	All	.16	All	-.00	All	08

SIGNIFICANCE LEVELS.			
	Afrikaans Ss	.195 = p<.05	.254 = p<.01
	English Ss	.273 = p<.05	.354 = p<.01
	All Ss	.159 = p<.05	.208 = p<.01

significant for the same two factors. Results do not show the MAQ to be necessarily a more sensitive measure.

On analysing the data for the two groups respectively, a significant relationship between the English group and only Factor J was found, $r = .30$, $p < .05$. For the Afrikaans group, a significant relationship was found with Type A scores, $r = .22$, $p < .05$, and Factor J, $r = .31$, $p < .01$.

Results are consistent with previous research by Burke and Deszca (1982), who found Type A's usually positively valued by organizations (and hence more likely to be promoted) because they exhibit traits which are seen as strengths in Western society, and because they are so involved in their job. Results also support the description of Type A individual as being a hard-working and goal-directed person who is very ambitious and compulsively strives to achieve goals that incorporate power and prestige (Rosenman and Chesney, 1980).

Number of Years in University Administration

The length of time respondents had held their present positions ranged from six months (one individual) to 456 months (one individual), mean = 129.38, SD = 93.82.

Respondents from the English group tended to have held their posts for fewer months (mean = 105.73, SD = 82.19) than the Afrikaans group (mean = 141.20, SD = 97.31).

A non-significant relationship between the length of time respondents had held their present positions and the JAS scores were found.

Job History

For all subjects, and the Afrikaans group, the number of changes in line of work and Factor H were negatively significantly related, r = .17, $p < .05$; r = -.20, $p < .05$ resp. (Table 5).

This suggests that those individuals who were less hard driving and competitive were more likely to change their line of work. Although the reason why this is so is not clear, it is suggested that a non-competitive individual may be handicapped in a work environment that rewards hard work and competitiveness. The role of commitment should also be considered in future research trying to isolate specific factors.

The number of promotions during the past ten years for all subjects and the English group were significantly related to Type A scores, r = .22, $p < .01$; r = .28, $p < .05$ resp. Non-significant results were found for the Afrikaans group (Table 5).

Results confirm previous research and supports the description of the Type A person who is seen as a hardworking competitive individual (Matthews et. al., 1977).

Education

The number of years of formal education of respondents ranged from 10 years (equivalent to Std. 8), to 23 years. Table 4 shows means and SD's for all groups.

For all respondents the number of years of education was positively related to Factor J scores , r =.44 , $p < .01$, and negatively related to Factor H scores, r = -.23, $p < .01$.

For the English group only, a positive significant relationship was found with Factor J, r =.50, $p < .01$, and a negative relationship with Factor H, r =-.41, $p < .01$.

For the Afrikaans group only, there was a significant relationship with Factor J, $r = .42$, $p < .01$.

Non-significant results were found for all groups and Type A scores.

Results imply that the more formal education English respondents had, the more lilely they were to become involved in their job, and the less likely they were to be hard driving and competitive. Afrikaans respondents were only more likely to become involved in their jobs.

Results are however not very clear, and need confirmation. It would therefore be important for future research to try and isolate specific factors involved for the various groups.

Quetelet's Index

Table 6 shows means and SD's for all groups.

TABLE 6. Means and Standard Deviations of Quetelet's Index for all groups

	Means	SD's
All respondents	3.18	1.38
English group	3.28	.97
Afrikaans group	3.13	1.54

A non-significant relationship between the Quetelet's Index and JAS scores was found

Sleep

Table 7 below shows means and SD's of number of hours slept for all groups.

TABLE 7. Means and Standard Deviations of number of hours slept for all groups

	Means	SD's
All respondents	7.01	.99
English group	7.31	.85
Afrikaans group	6.87	1.02

Afrikaans respondents tended to sleep marginally less than English respondents, but not enough for there to be a significant difference. No negative relationship was found between the number of hours slept and the JAS scores as hypothesised.

Hicks et. al. (1979) found the incidence of Type A was significantly less in variable sleepers. This suggests that variability of the sleep pattern may be a more important correlate of level of Type A behaviour pattern than actual sleep duration. According to Hartmann and Brewer (1976), Type A's show an inability to adjust to their environment generally, hence their sleep pattern is set. Conversely, variable sleepers show their ability to adjust to stressfulness in life. For future research the variability of the sleep pattern and its relationship to JAS scores should be investigated.

Eating habits

Thirty three respondents (18.3%) skipped breakfast and lunch for five or more days per week, compared to 2 (1.1%) who skipped supper for five or more days per week.

Analysis of data revealed a non-significant relationship between meal skipping and JAS scores.

Drinking habits

Nineteen respondents (10.5%) were teetotallers compared to 161 (89.5%) who consumed alcohol regularly. Seven of the 19 who were now teetotal

were former drinkers.

Thirty three (18.3%) started drinking at age of 16 or less compared to 136 (75%) of present drinkers who started over the age of 16 (one respondent only started drinking at age 43).

Table 8 shows means and SD's of the alcohol consumption index for the three groups.

TABLE 8

Mean Alcohol Consumption Index for all groups

	Mean	SD
All respondents	15.42	10.78
Afrikaans group	14.10	10.80
English group	18.37	10.28

The mean index was higher for the English group i.e. they consumed more alcohol per week than the Afrikaans group.

For all respondents, the index was significantly related only to Factor S, $r = .26$, $p < .01$. For the English group, the index was significantly related only to Type A scores, $r = .30$, $p < .05$. A non-significant relationship was found for the Afrikaans group.

Results suggest that those who scored high on Factor S were more likely to have high alcohol consumption levels. Furthermore they suggest that English respondents were more liley to have a high level of alcohol consumption if they scored high on Type A. Why this is so is not clear.

Factor S also reflects a neuroticism factor. This may explain why Afrikaans Type A's did not have significant higher rates of alcohol cinsumption. What needs to be done in future research is to investigate differences between the two groups to try and isolate

specific factors involved. A possible line of research indicated by this study is the relationship between Type A behaviour pattern, alcohol consumption and religious affiliation of the individual. In the present sample, all high scoring Type A's were affiliated to the Protestant Churches. What part it plays in lowering alcohol consumption is however not clear.

In analysing the JAS scores of teetotallers and drinkers, a non-significant result was found which suggests that alcohol consumption is not necessarily associated with Type A, i.e. teetotallers are not more likely to have lower Type A scores.

Loneliness

Both the "loneliness index" and "frequency of loneliness" were significantly related to Factor S scores for all respondents, $r = .25$, $p < .01$; for the English group, $r = .30$, $p < .05$; and the Afrikaans group, $r = .24$, $p < .05$. A non-significant relationship was found with Type A and other JAS scores (Table 5).

Results suggest that it is the style of behaviour (i.e. time urgency, characterized by impatience, strong tempers, and irritability) of the person that is related to the experience of loneliness. It implies that the individual's behaviour could be alienating him socially. This result together with the fact that in this sample alcohol consumption was related to Factor S scores appear to suggest that some kind of vicious circle may be operating, viz. the individual, because his behaviour alienates him socially, may be turning to alcohol in order to overcome any feelings of loneliness he may be experiencing. There could, however, be another more general factor of which all this could be part e.g. neuroticism. Further research is however needed to tease out specific factors.

Working hours

Of the 117 individuals who responded to this question, 48 (27.1%) worked less than 40 hours per week; 83 (46.9%) worked between 41 and 50 hours per week; 31 (17.5%) worked between 51 and 60 hours per week; and 15 (8.5%) worked more than 60 hours per week.

Tables 9 and 10 show analyses of results.

The main significant difference found was between those who worked less than 40 hours per week and those who worked more than 40 hours per week. Results suggest that those individuals who worked less than 40 hours per week were less likely to score high on Type A. Furthermore it appears not to be of any significance how many hours over 40 the individual worked for him to be more likely to score higher on Type A. However, results may also of course imply that those individuals who scored low on Type A were less likely to allow themselves to work more than the standard 40 hours per week.

Results support a previous study by Theorell and Floderus-Myrhed (1977), who found that work load is significantly related to Type A behaviour pattern.

Non significant results were obtained when the number of Sunday hours worked per week and JAS scores were analysed. This may have been due to the smaller number of cases which were broken down as follows: 46 (82%) worked one to four hours; 5 (8.9%) worked five to eight hours; and 2 (3.6%) worked more than eight hours.

Subjective Distress

One hundred and eighty (all) respondents scored on the Reeder Stress Index compared to 146 (81%) who scored on the Karasek Stress Index. A non-significant relationship between the two indices were found. This implies that they do not necessarily measure the same feelings of subjec-

TABLE 9

ONE WAY ANALYSIS OF VARIANCE - RAW DATA

WORKING HOURS AND JAS SCORES

GROUP 1 = Below 40 hours/week

GROUP 2 = 41 - 50 hours/week

GROUP 3 = 51 - 60 hours/week

GROUP 4 = 61+ hours/week

NO ,OF CASES PER GROUP: 1 - 48

2 - 83

3 - 31

4 - 15

TOTAL 177 (3 = no response)

MEANS (WORKING HOURS/JAS SCORES)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
TYPE A	242.10	283.26	272.32	288.20
FACTOR S	168.00	193.48	204.00	209.40
FACTOR J	226.77	250.33	245.19	244.26
FACTOR H	122.58	133.85	132.87	143.53

TABLE 9 (Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA (Cont)

TYPE A — WORKING HOURS AND JAS SCORES (Cont)

t- TEST MATRIX FOR GROUP MEANS (WORKING HOURS)(DF = 173) (with probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	3.39 (.0008)		
GROUP 3	1.96 (.0512)	-.77 (.4375)	
GROUP 4	2.33 (.0208)	.26 (.7926)	.75 (.4508)

F VALUE = 4.2608 p = .0062

FACTOR S

t -TEST MATRIX FOR GROUP MEANS (WORKING HOURS) (DF = 173) (with probabbilities in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	2.28 (.0233)		
GROUP 3	2.54 (.0118)	.81 (.4168)	
GROUP 4	2.27 (.0239)	.92 (.3567)	.27 (.7801)

F VALUE 3.1789 p= .0254

TABLE 9 (Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA (Cont)

FACTOR J — WORKING HOURS AND JAS SCORES (Cont)

t-TEST MATRIX FOR GROUP MEANS (WORKING HOURS) (DF = 173) (with probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	3.54 (.0005)		
GROUP 3	2.18 (.0304)	-.66 (.5056)	
GROUP 4	1.61 (.1083)	-.59 (.5556)	-.08 (.9360)

F-VALUE 4.2828 p = .0060

FACTOR H

t-TEST MATRIX FOR GROUP MEANS (WORKING HOURS) (DF = 173) (with probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	2.17 (.0313)		
GROUP 3	1.55 (.1208)	-.16 (.8704)	
GROUP 4	2.47 (.0143)	1.20 (.2300)	1.18 (.2381)

F-VALUE 2.64 p = .0508

TABLE 10

ONE WAY ANALYSIS OF VARIANCE - RAW DATA

SUNDAY WORKING HOURS AND JAS SCORES

GROUP 1 = 1-4 Hours

GROUP 2 = 5-8 Hours

GROUP 3 = 8+ Hours

NO OF CASES/GROUP: GROUP 1 = 46

GROUP 2 = 5

GROUP 3 = 2

TOTAL = 53

MEANS (JAS SCORES OF SUNDAY WORKERS)

	GROUP 1	GROUP 2	GROUP 3
TYPE A	288.65	299.20	248.50
FACTOR S	201.04	226.40	229.00
FACTOR J	248.93	257.40	224.50
FACTOR H	131.82	143.40	162.50

TABLE 10(Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA. SUNDAY WORKING HOURS AND JAS SCORES (Cont)

SUNDAY WORKING HOURS/TYPE A SCORES

t-TEST MATRIX FOR GROUP MEANS (SUNDAY HOURS WORKED) DF 50 (Probability in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	.35 (.7274)		
GROUP 3	-.86 (.3885)	-.94 (.3476)	

F-VALUE .46 p = .63

SUNDAY WORKING HOURS/ FACTOR S

t-TEST MATRIX FOR GROUP MEANS (SUNDAY HOURS WORKED) DF 50 (Probability in brackets)

	GROUP 1	GROUP 2	GROUP 3
GROUP 1			
GROUP 2	.77 (.4432)		
GROUP 3	.55 (.5810)	.04 (.9646)	

F-VALUE .42 p = .65

TABLE 10 (Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA. SUNDAY WORKING HOURS AND JAS SCORES (Cont)

SUNDAY WORKING HOURS AND FACTOR J SCORES

t-TEST MATRIX FOR GROUP MEANS (SUNDAY HOURS WORKED) DF 50 (Probability in brackets)

	GROUP 1	GROUP 2
GROUP 1		
GROUP 2	.54 (.5888)	
GROUP 3	-1.02 (.3108)	-1.19 (.2396)

F VALUE .71 p =.49

SUNDAY WORKING HOURS AND FACTOR H SCORES

t-TEST MATRIX FOR GROUP MEANS (SUNDAY HOURS WORKED) DF 50 (Probability in brackets)

	GROUP 1	GROUP 2
GROUP 1		
GROUP 2	.76 (.4486)	
GROUP 3	1.31 (.1930)	.70 (.4814)

F-VALUE 1.10 p = .34

tive distress.

Table 5 shows analyses of the indices with JAS scores.

For the Afrikaans group and Reeder Index, a significant relationship was found with Type A, $r = .22$, $p < .05$; Factor S, $r = .41$, $p < .01$ and Factor H, $r = .20$, $p < .05$

Non-significant results were found for the English group and Reeder Index.

For all respondents the Reeder Index was significantly related to Type A, $r = .22$, $p < .01$; Factor S, $r = .35$, $p < .01$ and Factor H, $r = .19$, $p < .05$.

On the Karasek Index and Afrikaans group, a significant relationship was found with Factor S, $r = .29$, $p < .01$ and a negative significant relationship with Factor J, $r = -.23$, $p < .05$.

Non-significant results were found for the English group and all respondents.

Results imply that those in the Afrikaans group who scored on Type A and Factors H and S tended to experience more stress.
This does not support previous studies which found Type A's to experience less subjective distress even though they endured more (Pittner and Houston, 1980).

The fact that the Afrikaans group were found to consume less alcohol may be relevant in their experience of more stress. Higher alcohol consumption in the English group could be a means whereby stress is relieved leading them to report less subjective stress.

Job involvement has been found to act as a slightly protective factor in CHD studies (e.g. Vickers, et. al., 1981). The negative r with the Karasek index points in this direction too.

TABLE 11

ONE WAY ANALYSIS OF VARIANCE - RAW DATA

MARITAL STATUS AND JAS SCORES

GROUP 1 : Married

GROUP 2 : Divorced

GROUP 3 : Divorced and Remarried

GROUP 4 : Widowed

GROUP 5 : Single

NO OF CASES PER GROUP:

Group 1: 163
Group 2: 3
Group 3: 3
Group 4: 2
Group 5: 9
TOTAL : 180

MEANS FOR JAS SCORES (GROUPS 1-5 MARITAL STATUS VARIABLES)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5
TYPE A	270.17	330.66	296.00	267.50	256.33
FACTOR S	190.39	245.33	209.66	222.00	154.77
FACTOR J	242.65	246.00	215.33	225.50	251.33
FACTOR H	131.38	140.66	136.00	113.00	133.55

TABLE 11(Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA. MARITAL STATUS AND JAS SCORES (Cont)

MARITAL STATUS AND TYPE A SCORES

t-TEST MATRIX FOR GROUP MEANS. DF 175 (Probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
GROUP 1				
GROUP 2	1.48 (.1387)			
GROUP 3	.63 (.5263)	-.60 (.5438)		
GROUP 4	-.05 (.9571)	-.99 (.3229)	-.44 (.6552)	
GROUP 5	-.57 (.5632)	-1.59 (.1120)	-.85 (.3951)	-.20 (.8381)

F-VALUE .7504 p .55

MARITAL STATUS AND FACTOR S SCORES

t- TEST MATRIX FOR GROUP MEANS. DF 175 (Probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
GROUP 1				
GROUP 2	1.50 (.1345)			
GROUP 3	.52 (.5985)	-.69 (.4870)		
GROUP 4	.70 (.4796)	-.40 (.6841)	.21 (.8297)	
GROUP 5	-1.65 (.0990)	-2.16 (.0317)	-1.31 (.1910)	-1.37 (.1721)

F-VALUE 1.4897 p .20

TABLE 11(Cont)

ONE WAY ANALYSIS OF VARIANCE - RAW DATA. MARITAL STATUS AND JAS SCORES (Cont)

MARITAL STATUS AND FACTOR J SCORES. t- TEST MATRIX FOR GROUP MEANS.DF175 (Prob. in brackets)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
GROUP 1				
GROUP 2	.15 (.8792)			
GROUP 3	-1.24 (.2153)	-.99 (.3206)		
GROUP 4	-.63 (.5233)	-.59 (.5522)	.29 (.7681)	
GROUP 5	.67 (.5324)	.21 (.8322)	1.43 (.1539)	.87 (.3820)

F-VALUE 1.4987 p .2046

MARITAL STATUS AND FACTOR H SCORES

t-TEST MATRIX FOR GROUP MEANS . DF 175 (Probabilities in brackets)

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
GROUP 1				
GROUP 2	.54 (.5872)			
GROUP 3	.27 (.7872)	-.19 (.8455)		
GROUP 4	-.88 (.3787)	-1.03 (.3021)	-.86 (.3908)	
GROUP 5	.21 (.8290)	-.36 (.7161)	-.12 (.9005)	.89 (.3705)

F-VALUE .3024 p .87

Marital Status and Marital Satisfaction

One hundred and sixty three (90.5%) of respondents were married (Group 1), three (1.7%) were divorced (Group 2) and three (1.7%) were divorced and remarried (Group 3). Two (1.1%) were widowed and nine(5.0%) were single.

Table 11 shows analyses of results.

The divorced group had the highest mean Type A scores, followed by divorced and remarried group, the widowed group and the single group.

The divorced group also had the highest mean for Factor S and Factor H, whilst the single group had the highest mean for Factor J.

There were no significant differences among the groups except between the divorced group and the single group on Factor S scores. This could imply that if an individual scores high on Factor S, his style of behaviour could have a detrimental effect on his marriage. This supports previous studies, e.g. Parkes et. al. (1969).

Analysis of data on marital satisfaction revealed a non-significant relationship with JAS scores.

Number of children

Twenty eight (15.5%) of respondents had no children. Fifteen(8.3%) had only one child. One hundred and nine (60.5%) had two or three children and 28 (15.5%) had more than three children.

Analysis of data revealed non-significant differences among the groups.

Working wife

Sixty (33.3%) of the married men who responded to this question had working wives. This included divorced men who mentioned a working, presumably ex-wife. One hundred and six (58.9%) of respondents had wives

who were not working outside the home. Fourteen (7.7%) did not respond to the question. This included the nine single individuals.

Analysis showed a significant difference between those who had working wives and those who did not, on Factor H scores, (p .05). Those with working wives scored significantly higher. Results do not make it clear what tje precise role is that a working wife plays in the individual's competitive and hard-driving needs. Further research is needed, however, to clarify the specific factors involved.

Family constellation

Eighty one respondents (45.2%) were first-born or only children. Ninety-eight (54.8%) were middle-born and i was last born (Table 12).

Analysis of dara showed non-significant differences among the groups on the JAS scores.

Forty three (23.8%) respondents were from two child families. Analysis showed non-significant differences among sex/ordinal position dyads and JAS scores.

Religious affiliation

Of the 176 who responded to this question, 169 were affiliated to Protestant Churches compared to four who were Roman Catholic and three who were affiliated to other religions (Table 13). Because of the low numbers involved in two of the groups, analysis of data produced no meaningful results.

One hundred and sixty one (89.4%) of respondents were still affiliated to the religion they were born in, while 5 (2.7%) had changed affiliation. Analysis of data showed no meaningful differences. Future research should look at the respondents active participation in religion and its relation to JAS scores.

TABLE 12

TWO CHILD FAMILIES AND JAS SCORES

Group 1 = Male 1st born/female 2nd born. N = 19

Group 2 = Male 1st born/male 2nd born. N = 18

Group 3 = Female 1st born/male 2nd born. N = 5

JAS MEANS FOR GROUPS 1, 2 AND 3

	Group 1	Group 2	Group 3
Type A	248.26	257.22	279.40
Factor S	183.32	206.50	200.80
Factor J	232.21	243.83	244.80
Factor H	125.58	123.67	140.20

ANALYSIS OF VARIANCE: TWO CHILD FAMILIES AND JAS SCORES

df 39. p in brackets

		Group 1	Group 2
Group 2	A.	.39 (.70)	
	S.	1.19 (.28)	
	J.	.79 (.43)	
	H.	- .22 (.82)	
Group 3	A.	.90 (.38)	A. .64 (.53)
	S.	.55 (.59)	S. - .18 (.86)
	J.	.56 (.59)	J. .04 (.97)
	H.	1.12 (.27)	H. 1.26 (.22)

	F	p
A.	.89	.45
S.	.49	.70
J.	.35	.79
H.	1.16	.34

TABLE 13

RELIGION AT BIRTH AND JAS SCORES

Group 1 = Protestant. N = 169

Group 2 = Roman Catholic N = 4

JAS MEANS FOR GROUPS 1 AND 2

	GROUP 1	GROUP 2
Type A	273.30	237.30
Factor S	191.98	186.00
Factor J	242.91	234.25
Factor H	131.53	127.00

ANALYSIS OF VARIANCE: RELIGION AT BIRTH AND JAS SCORES

	df 173	p in brackets	
		F	p
Type A	-1.03 (.30)	.54	.58
Factor S	- .19(.85)	1.10	.34
Factor J	- .46(.65)	.26	.77
Factor H	- .31(.76)	1.00	.35

Smoking

Of the 179 respondents who replied to questions on smoking, 65 (36.3%) were current smokers, 59 (32.9%) were previous smokers, and 55 (30.7%) were non-smokers. No significant differences were found among the groups on JAS scores (Table 14).

The mean number of years respondents had been smoking was 13.43, SD 12. A non-significant result was found with JAS scores.

The mean number of cigarettes (or equivalents) respondents smoked per day, was 8.50, SD 13.36. A significant relationship was found between the number of cigarettes smoked per day and Factor S, $r = .18$, $p < .05$; and Factor H, $r = .17$, $p < .05$ (see Table 5).

Results imply that the irritable, hard-driving, competitive individuals (i.e. those who scored high on Factor S and Factor H) were likely to smoke more. Cigarette smoking is one of the standard risk factors of CHD, and these individuals may in this way be enhancing their risk of CHD.

Sick Leave

The mean number of days taken off because of sickness was 2.67, SD 6.47. Analysis revealed a non-significant relationship with JAS scores.

Pill Consumption

One hundred and sixty six (92.2%) participants did not take any sleeping tablets or tranquilizers during the two weeks prior to answering the questionnaire. Ten (5.5%) had taken sleeping tablets one to two times, compared to 8 (4.4%) who had taken tranquilizers one to two times. Only four (2.2%) took sleeping tablets regularly, while 6 (3.3%) took tranquilizers regularly.

Analysis of data showed non-significant relationships between pill consumption and JAS scores

TABLE 14

SMOKING BEHAVIOUR AND JAS SCORES

No of cases = 179

GROUP 1 = Current smokers

GROUP 2 = Previous smokers

GROUP 3 = Never smoked

NO OF CASES /GROUP: GROUP 1 = 65

GROUP 2 = 59

GROUP 3 = 55

TOTAL = 179

MEANS (SMOKING BEHAVIOUR AND JAS SCORES)

	GROUP 1	GROUP 2	GROUP 3
TYPE A	278.80	262.90	268.20
FACTOR S	198.33	186.32	184.49
FACTOR "J"	243.53	242.83	241.02
FACTOR "H"	133.87	126.44	133.82

Physical activity

The mean amount of energy in Kcal/gm expended per week in some kind of physical activity was 2857.5, SD 2699.14. A non-significant relationship was found between the amount of energy expended and JAS scores.

The measure of energy expenditure used in this study was found to be inadequate. Some respondents reported every single bit of physical activity. This inflated their amount compared to those individuals who only reported specific activities.

Ideally, the measurement of energy expenditure should only take into account those activities where the pulse rate of the individual is above a certain level (determined by the individual's resting pulse rate and level of fitness). It is only this type of activity that may be beneficial, and possibly lower stress levels and risk of CHD. In practice this is very difficult to record accurately without appropriate equipment.

On the questionnaire many responses to Q50 (pulse rate) were wildly inaccurate. The question appears to have been misinterpreted by many. Because of this, no meaningful analysis could be carried out on it.

The effect of physical activity on JAS scores should preferably be investigated on its own so that specific and accurate measures can be taken.

In summary, it is possible to identify certain lifestyle factors associated with high Type A and other JAS scores, and hence increased risk of CHD in the present sample.

An important result from the present study is the significantly higher Type A scores found among the Afrikaans group compared to the

English group doing the same type of work. For the Afrikaans group,high Type A scores were also significantly associated with increased subjective distress.

High Type A scores for the English group were found to be significantly related to increased responsibility for others, the number of promotions the individual had in the past ten years, and increased alcohol consumption.

For all respondents, high Type A scores were significantly associated with a high managerial achievement quotient (a reflection of the individual's competence, capability, and hierarchical rank), the number of promotions in the past ten years, and increased feelings of subjective distress. Individuals who worked more than 40 hours per week were also found to score high on Type A.

High Factor S scores for both English and Afrikaans groups were significantly associated with increased feelings of loneliness. For all respondents high Factor S scores were significantly related to increased alcohol consumption and increased frequency and feelings of loneliness. Also the more hours per week over 40 the individual tended to work, the higher they tended to score on Factor S.

For all three groups, high Factor J scores were significantly associated with the individual's managerial achievement quotient and educational level, i.e. the higher the individual's managerial competence, capability and hierarchical rank, and the more years of formal education he had, the more likely he was to became involved in his job.

For the Afrikaans group, high Factor H scores were significantly associated with the number of times the respondent had changed his line of work and his experience of subjective distress, i.e. the more changes in his line of work, and the more subjective distress he experienced, the more likely he was to score high on Factor H.

For all respondents high Factor H scores were significantly associated with their educational level and feelings of subjective distress.

In conclusion it is however, important to note that, as shown repeatedly by various studies, Type A beviour pattern results from an interplay between personality, lifestyle, and cultural and environmental factors, and hence increased risk of CHD should be seen as an individual's response to this environmental milieu. Furthermore, although many of the results in this study supported those found in previous studies, it is important to realise that specific factors associated with increased Type A behaviour pattern cannot necessarily be generalised from one work environment to another. Further research on similar populations is therefore indicated to provide a clearer understanding of factors involved in increasing Type A behaviour pattern, and hence to eventually lead to the fostering of healthier lifestyles in that population.

Limitations of this study and further recommendations for future research

The limitations imposed on any study using questionnaires need to be recognized. The percentage response to any questionnaire biases the sample in a known direction, but to an unknown degree - the direction of bias being towards those who are interested in the subject matter (Chesney et al., 1981). Although the questionnaire in the present study used only volunteers, and guarenteed anonymity, it is not known what percentage of individuals who exhibit Type A behaviour pattern refused to volunteer to complete the questionnaire for some specific reason e.g. seeing it as time wasting.

It is also not known to what degree the Type A individuals who

completed the questionnaire, suppressed answers relating to Type A behaviour. Furthermore, not all groups respond equally well to questionnaires. The inflexibility of the method presents no opportunity to probe beyond the given answer or to clarify an ambiguous one. In the present study, several respondents misinterpreted questions and/or did not respond to certain questions. This was particularly apparent in a number of questions on the lifestyle questionnaire, with the result that certain data could not be analysed in any meaningful way.

For further research, questions would therefore need to be kept simple and straightforward with more structured questions, and in order to be understood more clearly, it may be helpful to have printed instructions and definitions to lessen misinterpretation.

A further helpful device would be to leave space for comments. Not only could this act as an incentive to complete the questionnaire in that it allows respondents to write what they want rather than only answer questions, but it may also clarify responses for the researcher.

The disadvantage of this, however, is that the questionnaire will take longer to complete, and it is known that longer questionnaires have a lower response rate (Moser and Kalton, 1972).

Ideally, a pretest of any questionnaire is useful, and usually highlights defects. It may therefore be useful to use the present project as a pilot study for further research on Type A behaviour pattern in a similar population.

Although there are many difficulties inherent in the questionnaire method of research, it still has many advantages in that it is cost-effective and enables the researcher to obtain a widely spread sample as has been the case in this study. The questionnaire also avoids problems associated with interviewers and interviewer errors which may seriously undermine the reliability and validity of results.

Related problem areas and further ideas for future research

Several ideas have already been put forward as to how the questionnaire used in the present study could be modified for further research on the similar populations.

Future research might also profitably focus on the relationship between psychosocial events and Type A behaviour pattern, (e.g. changes in group/peer relationships, residence, education, financial situation, health, etc.), as a high number of psychosocial changes over any yearly period have been found to be associated with the onset of disease or injury in the following two years (Mules et al., 1977). It would also be important to assess if Type A's have altered perceptions of the significance of life events, i.e. what may be significant to non-Type A's may not be perceived as such by those scoring high on Type A.

The relationship between Type A and the physical and mental health of respondents, and whether they have had any treatment for it, needs to be investigated. This may highlight moderator variables that buffer or exacerbate Type A behaviour in individuals. Ideally, research on these aspects should be carried out with the assistance of medical practitioners.

As job satisfaction has proved to be significantly related to longevity (Shephard, 1981), it may be useful to assess the effects of satisfaction at work on individuals, and its relation to Type A behaviour pattern. This may isolate specific psychological experiences associated with the objective event of work and its possible protective effect against Type A behaviour pattern.

Further research is also imperative on females and other groups doing similar work in South Africa, to investigate whether lifestyle factors relate differently to Type A behaviour pattern for the various groups,

and if so, why.

Finally, it is important to note that any information about variables that buffer or exacerbate Type A behaviour pattern, and therefore probably the health of the individual, might be useful to organizations in providing relevant information for subsequent organizational interventions.

UNIVERSITY OF CAPE TOWN APPENDIX 1

DEPARTMENT OF PSYCHOLOGY

BIOGRAPHICAL INFORMATION

1 Home Language _____ 2 Year of Birth 19____

3 Job Title _____

4 How many people are responsible to you in their duties? ____

5 Indicate your rank in the university administration by putting an X at what you consider your point along the scale below

: 8 : 7 : 6 : 5 : 4 : 3 : 2 : 1 :

Bottom: Top:

Administrative Assistant, Clerk — Registrar

6 Number of years in university administration: _____

7 How many times did you change employer during the past 10 years? _____

8 How many times did you change your line of work during the past 10 years? _____

9 How many promotions have you had during the past 10 years? ____

10 Education (list all qualifications):

Academic	Technical	Professional
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

11 What is/was your father's occupation? _____

12 What is/was your father's highest educational qualification?

_____

APPENDIX 2

UNIVERSITY OF CAPE TOWN

DEPARTMENT OF PSYCHOLOGY

JOB-RELATED HABITS AND CHARACTERISTICS

Please answer all questions. All information will be used for research purposes only and will be treated with utmost confidentiality.

1 Height (without shoes) [ ] cm

2 Weight [ ] kg

3 How long, on average, do you sleep at night? [ ] hrs

4 How consistent is this pattern of sleep?
Check one

Very consistent	[1]
Consistent	[2]
Irregular	[3]
Very irregular	[4]

5 How long have you been sleeping this number of hours? [5] yrs

6 How satisfied are you with your sleep?

Very dissatisfied	[1]
Dissatisfied	[2]
Satisfied	[3]
Very satisfied	[4]

7 How many days of the week do you skip breakfast? [ ] days

8 How many days of the week do you skip a midday meal? [ ] days

9 How many days of the week do you skip supper? [ ] days

10 At what age did you take your first real drink? [ ] yrs

Never [ ]

11 If you are a teetotaller, check here; then go to Question 18. [ ]

For Questions 12-17, please consider your habitual use of alcoholic beverages for the last six months.

12 How many glasses (4 oz., 125 ml) of wine do you have in a week, in total?

13 How many beers (350 ml) do you have in a week, in total?

14 How many drinks (tots) of liquor do you have in a week, in total?

15 When you do drink, how fast do you drink? (Here a drink is a glass of wine, a beer, or one drink of liquor - straight or mixed) Check one:

- 7 or more drinks per hour
- 6 drinks per hour
- 5 drinks per hour
- 4 drinks per hour
- 3 drinks per hour
- 2 drinks per hour
- 1 drink per hour
- 1 drink in 2 hours
- 1 drink in 3 or more hours

16 How many times have you gotten drunk in the last 6 months? (By drunk we mean loss of coordination, nausea and/or inability to speak clearly)

17 What percentage of the times that you do drink do you get drunk? %

18 During the past week, how often did you feel very lonely or remote from other people?

- Not at all
- Once
- More than once

19 How often do you have a feeling of being apart from other people when you are at a party or social gathering?

- Never
- Occasionally
- Frequently
- All the time

20 Are you as involved in community life as you would like to be?

- Yes
- No

21 What are your average working hours per week? [ ] hrs

22 What are your average working hours Sundays? [ ] hrs

For Questions 23-27, please indicate how well the description fits you.

23 I find it very difficult to get up and going in the morning

Describes me very well 1
fairly well 2
somewhat 3
not at all 4

24 At the end of the day I am completely exhausted, mentally and physically

Describes me very well 1
fairly well 2
not very well 3
not at all 4

25 There is a great deal of nervous strain connected with my daily activities

Describes me very well 1
fairly well 2
not very well 3
not at all 4

26 My daily activities are extremely trying and stressful

Describes me very well 1
fairly well 2
not very well 3
not at all 4

27 In general, I am unusually tense and nervous

Describes me very well 1
fairly well 2
not very well 3
not at all 4

28 Marital status:

Married 1
Divorced 2
Divorced and remarried 3
Widowed 4
Single 5

If you are divorced, widowed or single, go to Question 35.

29 Everything considered, how happy would you say your marriage has been?

Very happy	1
Happy	2
Average	3
Unhappy	4
Very unhappy	5

30 Everything considered, how happy would you say that your wife has found your marriage to be?

Very happy	1
Happy	2
Average	3
Unhappy	4
Very unhappy	5

31 About marriage, are you more satisfied, as satisfied, or less satisfied than most of your close friends are with their marriages?

More satisfied	1
As satisfied	2
Less satisfied	3

32 How many children do you have? ____

33 Is your wife currently employed?

Yes	1
No	2

34 What type of work does your wife do, or did she do?

Describe _____

35 Please indicate the birth order of your brothers, sisters, and yourself in the family

No.	Indicate positions of brothers, sisters and yourself
(1)	_____
(2)	_____
(3)	_____
(4)	_____
(5)	_____
(6)	_____
(7)	_____

36 Into which religious group were you born? _____

37 What religion do you practise? _____

38 How many days of sick leave did you take during the past 12 months? [ ] days

39 During the past two week, did you find it necessary to take any sleeping tablets or drugs?

No	1
Yes, 1-2 times	2
Yes, regularly	3

40 During the past two weeks, did you find it necessary to take any tranquilizers to help you get through a difficult situation?

No	1
Yes, 1-2 times	2
Yes, regularly	3

41 Are you currently a smoker?

Yes	1
No	2

42 If no, did you every smoke?

Yes	1
No	2

If no, go to Question 46

43 In which year did you start smoking? 19[ ]

44 If you have stopped smoking, in which year did you stop? 19[ ]

45 What do you smoke and how much?

Cigarettes	[ ]	About how many a day?	[ ]
Pipe	[ ]	About how many pipesful a day?	[ ]
Cigars	[ ]	About how many a day?	[ ]

46 How many flights of stairs do you climb up each day? (using 10 steps as one flight) [ ]

47 How many kilometres of brisk walking (about 6 km/h) do you do per day? [ ] km

How many days per week? [ ] days

48 What sports do you actively play, and how many hours per week?

	Sport	Hrs/week
(1)	_____	_____
(2)	_____	_____
(3)	_____	_____
(4)	_____	_____
(5)	_____	_____

49 What other forms of exercise - e.g. running, swimming, cycling, keep-fit exercises, or physical work for at least ½ hr at a time - do you get regularly, and how many hours per week?

	Exercise	Hrs/week
(1)	_____	_____
(2)	_____	_____
(3)	_____	_____
(4)	_____	_____
(5)	_____	_____

50 As a special favour, next time you participate in any of the activities you listed in Question 49, please stop halfway through and take your pulse

[ ] beats/min

Thank you for your cooperation and time in completing these questionnaires. May I once again assure you that all responses will be treated confidentially.

DJWS

APPENDIX 3

APPROXIMATE ENERGY COST (IN KILOCALORIES) OF VARIOUS PHYSICAL ACTIVITIES

ACTIVITY	kcal/min /kg	ACTIVITY	kcal/min/kg
Archery	0.065	Coal mining	
Badminton	0.097	drilling coal,rock	0.094
Bakery, general (F)	0.035	erecting supports	0.088
Basketball	0.138	shoveling coal	0.108
Billiards	0.042	Cooking(F)	0.045
Bookbinding	0.038	Cooking(M)	0.048
Boxing		Cricket	
in ring	0.222	batting	0.083
sparring	0.138	bowling	0.090
Canoeing		Croquet	0.059
leisure	0.044	Cycling	
racing	0.103	leisure, 5.5mph	0.064
Card playing	0.025	leisure, 9.4mph	0.100
Carpentry, general	0.052	racing	0.169
Carpet sweeping(F)	0.045	Dancing	
Carpet sweeping(M)	0.048	ballroom	0.051
Circuit-training	0.185	choreographed	
Cleaning(F)	0.062	"twist","wiggle"	0.168
Cleaning(M)	0.058	Digging trenches	0.145
Climbing hills		Drawing (standing)	0.036
with no load	0.121	Eating(sitting)	0.023
with 5-kg load	0.129	Electrical work	0.058
with 10-kg load	0.140	Farming	
with 20-kg load	0.147	barn cleaning	0.135
		driving harvester	0.040

APPENDIX 3 (Cont.)

APPROXIMATE ENERGY COST (IN KILOCALORIES) OF VARIOUS PHYSICAL ACTIVITIES

ACTIVITY	kcal/min/ kg	ACTIVITY	kcal/min/kg
Farming(cont)		Forestry(cont)	
driving tractor	0.037	weeding	0.072
feeding cattle	0.085	Furriery	0.083
feeding animals	0.065	Gardening	
forking straw bales	0.138	digging	0.126
milking by hand	0.054	hedging	0.077
milking by machine	0.023	mowing	0.112
shoveling grain	0.085	raking	0.054
Field hockey	0.134	Golf	0.085
Fishing	0.062	Gymnastics	0.168
Food shopping(F)	0.062	Horse-grooming	0.128
Food shopping(M)	0.058	Horse-racing	
Football	0.132	galloping	0.137
Forestry		trotting	0.110
axe chopping,fast	0.297	walking	0.041
axe chopping,slow	0.085	Ironing(F)	0.033
barking trees	0.123	Ironing(M)	0.064
carrying logs	0.186	Judo	0.195
felling trees	0.132	Knitting,sewing(F)	0.022
hoeing	0.091	Knitting,sewing(M)	0.023
planting by hand	0.109	Locksmith	0.057
sawing by hand	0.122	Lying at ease	0.022
sawing, power	0.075	Machine-tooling	
stacking firewood	0.088	machining	0.048
trimming trees	0.129	operating lathe	0.052

APPENDIX 3 (Cont.)

APPROXIMATE ENERGY COST (IN KILOCALORIES) OF VARIOUS PHYSICAL ACTIVITIES

ACTIVITY	kcal/min/ kg	ACTIVITY	kcal/min/kg
Machine-tooling(cont)		Plastering	0.078
operating punch press	0.088	Printing	0.035
tapping and drilling	0.065	"Physical" work	0.092
welding	0.052	Running,cross-country	0.163
working sheet metal	0.048	Running, horizontal	
Marching, rapid	0.142	11 min,30s per mile	0.135
Mopping floor (F)	0.062	9 min per mile	0.193
Mopping floor (M)	0.058	8 min per mile	0.208
Music playing		7 min per mile	0.228
accordian(sitting)	0.032	6 min per mile	0.252
cello(sitting)	0.041	5 min,30s per mile	0.289
conducting	0.039	Sailing	0.143
drums(sitting)	0.066	Scrapping paint	0.063
flute(sitting)	0.035	Scrubbing floors(F)	0.109
horn(sitting)	0.029	Scrubbing floors(M)	0.108
organ(sitting)	0.053	Shoe repair,general	0.045
piano(sitting)	0.040	Sitting quietly	0.021
trumpet(standing)	0.031	Skiing, hard snow	
woodwind(sitting)	0.032	level,moderate speed	0.119
Mowing lawn		level, walking	0.143
by hand	0.011	uphill, max.speed	0.274
power	0.054	Skiing, soft snow	
Painting, inside	0.034	leisure(F)	0.111
Painting, outside	0.077	leisure(M)	0.098
Planting seedlings	0.070		

APPENDIX 3 (Cont.)

APPROXIMATE ENERGY COST (IN KILOCALORIES) OF VARIOUS PHYSICAL ACTIVITIES

ACTIVITY	kcal/min/ kg	ACTIVITY	kcal/min/kg
Machine-tooling(cont)		Plastering	0.078
operating punch press	0.088	Printing	0.035
tapping and drilling	0.065	"Physical" work	0.092
welding	0.052	Running,cross-country	0.163
working sheet metal	0.048	Running, horizontal	
Marching, rapid	0.142	11 min,30s per mile	0.135
Mopping floor (F)	0.062	9 min per mile	0.193
Mopping floor (M)	0.058	8 min per mile	0.208
Music playing		7 min per mile	0.228
accordian(sitting)	0.032	6 min per mile	0.252
cello(sitting)	0.041	5 min,30s per mile	0.289
conducting	0.039	Sailing	0.143
drums(sitting)	0.066	Scrapping paint	0.063
flute(sitting)	0.035	Scrubbing floors(F)	0.109
horn(sitting)	0.029	Scrubbing floors(M)	0.108
organ(sitting)	0.053	Shoe repair,general	0.045
piano(sitting)	0.040	Sitting quietly	0.021
trumpet(standing)	0.031	Skiing, hard snow	
woodwind(sitting)	0.032	level,moderate	
Mowing lawn		speed	0.119
by hand	0.011	level, walking	0.143
power	0.054	uphill, max.speed	0.274
Painting, inside	0.034	Skiing, soft snow	
Painting, outside	0.077	leisure(F)	0.111
Planting seedlings	0.070	leisure(M)	0.098

APPENDIX 3 (Cont.)

APPROXIMATE ENERGY COST (IN KILOCALORIES) OF VARIOUS PHYSICAL ACTIVITIES

ACTIVITY	kcal/min /kg	ACTIVITY	kcal/min/ kg
Skindiving, as frogman		Table tennis	0.068
considerable motion	0.276	Tailoring	
moderate motion	0.206	cutting	0.041
Snowshoeing, soft snow	0.166	hand-sewing	0.032
Squash	0.212	machine-sewing	0.045
Standing quietly(F)	0.025	pressing	0.062
Standing quietly(M)	0.027	Tennis	0.109
Steel mill, working in		Typing	
fettling	0.089	electric	0.027
forging	0.100	manual	0.031
hand rolling	0.137	Volleyball	0.050
merchant mill rolling	0.145	Weightlifting(av.)	0.127
removing slag	0.178	Walking, normal pace	
tending furnace	0.126	asphalt road	0.080
tipping moulds	0.092	fields and hill-sides	0.082
Stock clerking	0.054	grass track	0.081
Swimming		plowed field	0.077
backstroke	0.169	Wallpapering	0.048
breast stroke	0.162	Watch repairing	0.025
crawl, fast	0.156	Window cleaning(F)	0.059
crawl, slow	0.128	Window cleaning(M)	0.058
side stroke	0.122	Writing(sitting)	0.029
treading, fast	0.170		
treading, normal	0.062		

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