A Psychometric Evaluation of Measures of the Time Urgency Component of the Type A Behaviour Pattern

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Abstract

The literature on the relationship of the Type A behavior pattern (TABP) and coronary heart disease (CHD) is reviewed to highlight the need to examine specific components of the TABP that may be better predictors of CHD. The research on the hostility component is reviewed and the case for considering time urgency as a potentially important component is developed. Several recently developed measures of time urgency are described. The need to understand the dimensionality of time urgency and the relations among the different approaches to measuring this construct is outlined. In the present study groups of subjects scoring high and low on a self-report Type A measure were administered the Augmented Structured Interview (ASI) for component assessment of the Type A behavior pattern, several self-report measures of time urgency and related individual difference variables, and a behavioral task to assess time urgency. Behavioural observations during a "waiting period" were also made. Cluster analysis of the cases followed by discriminate analysis of the variables that differentiate the clusters were used to identify how the characteristics related to time urgency may be distributed in the population.

Four clusters of individuals were identified including a group of time urgent Type B individuals and a group of non-time urgent individuals. Cluster analysis and factor analysis of the variables were used to examine the dimensionality of time urgency and related constructs. Time urgent individuals were also found to perceive their time urgent behavior as healthy and adaptive and as contributing to an enhanced sense of control over their environment and the reinforcements they derive from it.

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A PSYCHOMETRIC EVALUATION OF MEASURES OF THE TIME URGENCY COMPONENT OF THE TYPE A BEHAVIOUR PATTERN

The Type A behaviour pattern (TABP) was defined by Friedman (1969), as an action-emotion complex exhibited by individuals who engage in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest time and, if necessary, against the opposition of other things or persons. It has been identified as an independent risk factor for coronary heart disease (CHD). (Rosenman, Friedman, Straus, Wurm, Jenkins and Messinger, 1966; Rosenman, Friedman, Straus, Jenkins, Zyzanski & Wurm, 1970; Rosenman, Brand, Jenkins, Friedman, Straus & Wurm, 1975). Glass (1977) identified three characteristics that define the TABP: competitive achievement striving, an exaggerated sense of time urgency, and aggressiveness and hostility. The Type A pattern and its opposite, Type B, represent the extremes of a continuum. Type B's are characterized by the absence of the behaviours that typify Type A's. They are relaxed and serene rather than being chronicly wound up and constantly goal-oriented and they lack the time urgency of Type A's. Both the above definitions explicitly associate time urgency with Type A's and not Type B's.

In recent years some studies have failed to support the association between TABP and CHD (e.g., Ruberman, Weinblatt, Goldberg & Chandbury, 1984; Shekelle, Hulley, Neaton, Billings, Borhani, Gerace, Jacobs, Lasser, Mittlemark & Stamler, 1985; Case, Heller, Case & Moss, 1985; Shekelle, Gale & Norusis, 1985). These recent failures to support the hypothesized association have led researchers to question either the validity of the Type A construct itself or the predictive and concurrent validity of the various global measures of the TABP or both the construct and the global measures. These failures have also led to search for specific active components.

Although an exaggerated sense of time urgency has long been considered one defining characteristic of the TABP (Friedman, 1969), it has been given relatively little attention in most of the recent literature that has focussed on individual components as predictors of CHD. Instead, much of the recent attention has been directed at measuring the hostility component using both the Structured Interview (SI: Rosenman, 1978) and self-report scales. Although there is evidence that relates measures of hostility to CHD (e.g., Williams, Haney, Lee, Kong, Blumenthal & Whalen, 1980; Shekelle, Gale, Ostfeld & Paul, 1983; Barefoot, Dahlstrom & Williams, 1983; Blumenthal, Barefoot, Burg & Williams, 1987), the contribution of the time urgency component has not been adequately studied. In part, this is due to the inadequate measures of time urgency. Wright (1988) has

argued that time urgency may yet be shown to be a component of the TABP that contributes to the development of CHD. Wright and Schmidt-Walker (1990), McCurdy and Wright (1986) (cited in Wright, 1988), and Landy, Restegary, Thayer & Colvin (1989) have developed new measurement instruments to assess this characteristic more fully than was done by either the SI or the Jenkins Activity Survey for health prediction (JAS: Jenkins, Rosenman & Friedman, 1967; Jenkins, Rosenman & Zyzanski, 1972).

Given the renewed interest in the measurement of time urgency there is a need to assess the validity of these measures and to evaluate the dimensionality of the time urgency construct. Such work is necessary prior to an assessment of the CHD risk associated with time urgency. The present research is concerned with the psychometric evaluation of recently developed measures of time urgency.

The following sections summarize the major developments in the study of the Type A behaviour pattern (TABP) and its relation to CHD. Specifically, the established measurement approaches used to assess TABP and the major findings of the research investigating the association between global measures of the TABP and CHD will be examined. The evidence for an association between hostility and CHD will also be discussed. The rationale for considering time urgency and chronic activation as potential independent risk factors for

CHD will be presented. A description of the measures currently available to assess these aspects of the TABP will be described. Lastly, the need to investigate the dimensionality of time urgency and related concepts will be explained. The necessity to discover the psychometric properties of the instruments that purport to measure aspects of time urgency will be discussed with reference to the issues of discriminant and convergent validity.

Global Assessment of the Type A Behaviour Pattern

The global assessment of the Type A behaviour pattern originated as a classification procedure. The measures discussed below are among those used for this purpose.

The original Structured Interview was developed by Rosenman and Friedman (Rosenman, Friedman, Straus, Jenkins, Zyzanski and Wurm, 1964; Rosenman, 1978) to assess the behaviour pattern of the subjects in the Western Collaborative Group Study (WCGS). According to Rosenman (1978, p. 55), "The assessment of the TABP depends on two factors: (1) the exhibition of this behaviour pattern by the subject and, (2) the ability of the interviewer and/or assessor to observe and properly judge the characteristics that comprise this behavioural syndrome. .... an effective interviewer or assessor must be able to 'bring out' the Type A behaviour in an individual whose characteristics are less overt." The SI is, according to Rosenman, an empirical instrument in that the assessment is based on the extent to

which the features that define the syndrome are observed. As Rosenman (1978) notes, the SI is not truly objective and does not provide numerical quantification. Categorical agreement with the SI has been reported at 84% by Jenkins, Rosenman, and Friedman (1965), 83.3% by Belmaker, Pollin, Jenkins, and Brensike (1976), 79% by Friedman, Hellerstein, Jones, and Eastwood (1968), 75 to 77% by Caffrey (1968), 83.5% by the Multiple Risk Factor Intervention Trial Group (1977) and 87% by Schucker and Jacobs (1977).

In the interview itself the subject is asked approximately 25 questions dealing with ambition, competitiveness, and time urgency. The interviewer purposefully asks the questions in a manner intended to evoke signs of impatience, aggressiveness, competitiveness and time urgency. The tone and manner of the respondent's answers influence the classification at least as much as their content. General appearance, body movements, explosive speech stylistics also contribute to scoring. One of four classifications is assigned: A1 (fully developed A); A2 (incompletely developed A); B2 (incompletely developed B) and B1 (fully developed B). About 10% of the population fall between A2 and B2 and are identified as Type X. The A1 typically reacts and speaks quickly, enunciates words emphatically, and anticipates what will be said next. A1's get impatient with slow speech and hesitation. They are said to show a craving for control over others and for

recognition, a strong attraction to competition and to be compulsively goal-oriented. They are said to be easily angered by people or objects they perceive to be in the way of goal attainment.

Since one-to-one interviewing is costly both to administer and to score, attempts to develop more cost-effective measures of the TABP have been ongoing for over twenty years. The earliest and most studied such measure is the Jenkins Activity Survey for health prediction (JAS: Jenkins, Rosenman & Friedman, 1967; Jenkins, Rosenman & Zyzanski, 1972).

The JAS is a 54-item self-report questionnaire measure that yields continuous scores on the A-B dimension. The A-B scale consists of 21 items. Scoring is based on optimal weightings generated from a series of discriminant function analyses predicting the SI classifications of large groups of male subjects in the WCGS (Jenkins, Rosenman and Zyzanski, 1971).

Three factor analysis derived scales have been identified as: Speed and Impatience (S); Hard Driving (H); and Job Involvement (J). These factors have been found to be poor predictors of CHD (Jenkins, Rosenman & Zyzanski, 1974; Brand, Rosenman, Jenkins, Sholtz & Zyzanski, 1986). Agreement between the JAS and the SI was reported to be 72.4% by Jenkins et al, 1971. Matthews (1982) has noted that this is only about 20% above chance agreement and even

Jenkins (Jenkins, Rosenman and Zyzanski, 1974) acknowledged that the JAS misclassifies too many subjects to justify its use in clinical settings. This is consistent with the conclusion of Byrne, Rosenman, Schiller, and Chesney (1985) that the SI is the measure that best fits the Type A construct. Rosenman, Swan and Carmelli (1988) account for the less than impressive correlations between the SI and most self-report measures of the TABP (see Matthews, 1982 for a thorough review) by noting that self-report measures are concerned mainly with the individual's perception of attitudes, attributes, and activities and do not capture the speech stylistics (e.g. explosive or pressured speech) and psychomotor behaviours (e.g. hyperactivity) that are an essential part of the assessment of the TABP.

Framingham Type A Scale

Another self-report measure that has been used as a global measure of the TABP is the Framingham Type A Scale developed for the Framingham Heart Study (Haynes, Feinleib & Kannel, 1980). It consists of ten Likert scale and true-false items. It has not been used as extensively as the JAS or the SI.

Survey of Work Styles

A more recently developed measure of the TABP is the Survey of Work Styles (SWS: Jackson & Mavrogiannis, 1987). More than just a global measure of the Type A pattern, it is a 96-item multidimensional measure developed using a construct approach (Jackson, 1971; Wiggins, 1973) to scale construction. It consists of six content scales and a seventh scale (Scale A) empirically selected to relate to the SI. The six content scales are labeled: Impatience, Anger, Work Involvement, Time Urgency, Job Dissatisfaction and Competitiveness. The definitions of the content scales are presented in Table 1. The SWS has been found to correctly classify 83% of SI-defined Type A managers (Mavrogiannis, Jackson & Howard, 1987), which was better than either the JAS (Jenkins et al, 1971) or the FTAS (Haynes et al, 1980).

Table 1 Survey of Work Styles Subscales

Impatience	**Work Involvement**
Intolerance of time delays, anything that hinders desired progress.	Preoccupation with one's work or job, to the exclusion of one's recreational or social activities.
Anger	**Job Dissatisfaction**
One's propensity to become antagonized, resulting in an emotional excitement characterized by an evident display of feelings (flushed cheeks, accelerated heart rate), and a desire or intent to punish or seek revenge.	Absence of positive emotional state resulting from the appraisal of one's job on the following dimensions: coworker friendliness and competence, supervisory styles working conditions, recognition, opportunities for promotion, and work difficulty and control of work activities.
Time Urgency	**Competitiveness**
Preoccupation with vocational deadlines and similar pressures, resulting in hurried, abrupt motor mannerisms and style.	Tendency to struggle to win over others in order to achieve recognition, or obtain a "prize" even in noncompetitive situations.

Research on the Global Type A Behaviour Pattern

Early findings: Type A and Coronary Heart Disease

Predictive Validity

The Western Collaborative Group Study (WCGS) (Rosenman, Friedman, Straus, Jenkins, Zyzanski and Wurm, 1964) was a double-blind, prospective, longitudinal investigation that studied a sample of 3,524 men aged 39 to 59 over a period of $8\ ^1/_2$ years. The Type A/Type B behaviour pattern was assessed using the SI and the interviewers did not participate in the subsequent diagnosis of the presence or absence of CHD. The cardiologists had no knowledge of the behaviour pattern of the subjects or of any other risk factors for CHD. Data were collected at intake and annually over eight to nine years from the 3,154 subjects who completed the study.

The incidence of CHD after $2\ ^1/_2$ and $4\ ^1/_2$ years (Rosenman, Friedman, Straus, Wurm, Jenkins and Messinger, 1966; Rosenman, Friedman, Straus, Jenkins, Zyzanski & Wurm, 1970) showed that healthy Type A's at intake had a 1.7 to 6.0 times greater risk of CHD than did the type B's with the greater risks found for the younger subjects. Even after controlling for traditional risk factors such as family history or serum cholesterol levels, the relationship still held. In the final follow-up report (Rosenman, Brand, Jenkins, Friedman, Straus & Wurm, 1975) it was concluded

that more than twice as many Type A's as Type B's had developed new cases of CHD. Further, Type A's with CHD at intake were five times more likely to have a second heart attack than Type B's with CHD. This study provided the first epidemiological evidence that the TABP is an independent risk factor for CHD.

Jenkins, Rosenman and Zyzanski (1974) administered the JAS to 2750 subjects from the WCGS during the last four years of that study and found that those in the top third on the A-B scale had a 1.7 times greater incidence of new CHD 4 years later than did those in the lower third. They also found a significant, continuous positive relationship between JAS scores and incidence of CHD. The factor-analytically derived H, S, and J scales failed as predictors of CHD.

Further evidence of the predictive validity of the TABP was provided by the Framingham Heart Study (Haynes et al, 1980). It included 1,674 subjects (both males and females) between the ages of 45 and 65 from both white-collar and blue-collar occupations who were free of CHD at intake. The results of that study showed that Type A behaviour as measured by the Framingham Type A scale (FTAS) was an independent predictor of CHD in members of both sexes.

Concurrent validity: Degree of atherosclerosis

Support for the concurrent validity of the TABP was provided by a study by Blumenthal, Williams, Kong, Thompson, Jenkins and Rosenman (1975). This was a double blind study on 156 patients referred for angiography at Duke University Medical Center. Subjects were classified as Type A/Type B using the structured interview. Of the 72 who showed at least 75% narrowing of at least one coronary artery, 59 or 82% were Type A's. Of the 70 patients without significant CHD, 44 or 63% were Type B's. The overall severity of CHD was significantly greater in Type A's than in Type B's. This supports the observations of Friedman and Rosenman (1959) and Rosenman and Friedman (1961) that Type A1 male and female subjects showed significantly higher serum cholesterol levels than did Type B1's and similar findings by Rosenman et al (1966) in the younger subjects (39 - 49 years) in the WCGS.

The failure of Global Type A

Recent prospective epidemiological studies and cross-sectional studies of patients undergoing coronary angiography have repeatedly failed to find significant associations between TABP and various indices of CHD (Matthews & Haynes, 1986). Neither the SI or the JAS predicted new or recurrent events in the prospective epidemiological studies, particularly when the samples were already at greater risk of developing CHD. In considering

these negative findings, it is necessary to consider whether methodological problems may have contributed to the failure to confirm previous findings. Friedman (1988) has reviewed this literature and has identified several potentially serious flaws in the design or execution of some of these studies.

Prospective Studies

One major study that failed to confirm the WCGS results was the Multiple Risk Factor Intervention Trial (MRFIT) that followed 12,700 men, who were CHD-free at intake, for seven years. It found no relationship between TABP and incidence of CHD whether TABP was assessed using the JAS or the SI (Shekelle, Hulley et al, 1985). Similar results (using only the JAS) were found in the Aspirin Myocardial Infarction study (Shekelle, Gale & Norusis, 1985) of a sample of 2,070 males and 244 females aged 29-69 who were followed for three years following their first heart attack. These Type A patients had no greater risk of a second MI or coronary death than did Type B men. The Multicentre Post-Infarction Program study (Case, Heller, Case and Moss (1985) that studied approximately 449 male and 99 female patients who completed the JAS within two weeks of their release from intensive care following an acute MI found no relationship between the TABP and subsequent mortality. Although the populations in these studies were already at higher risk for

CHD than those in the WCGS, these negative findings suggest that there are problems with the way in which coronary-prone behaviour has been defined and/or measured. Problems with measurement accuracy (both validity and reliability) can often be traced to inadequacies in the way the characteristic has been conceptualized. Aftanas (1985) identified this as a problem in denotability, an early and important step in the process of measurement.

Friedman (1988) and Scherwitz (1988) have enumerated several serious methodological weaknesses in the MRFIT study that are worth noting. The full sample was initially assessed using a questionnaire that did not assess the free-floating hostility component that is a major component of the TABP. Recognizing this weakness, the authors assembled a set of questions based on those used in the WCGS. As noted by Scherwitz the interviewers used in the MRFIT study had less training and experience with CHD patients and could not be monitored closely or taught in person for logistical reasons. Although Shekelle, Hulley et al (1985) insist their interviewers were centrally trained and approved by Dr. Rosenman, Friedman reports that most of the training was done by two nonprofessional clerks who had been employed by him at the Brunn Institute in San Francisco. One of these had never been employed as an interviewer and the other he considered unable to function credibly in that capacity.

Scherwitz (1988) in comparing the MRFIT interviewers to those from the WCGS, found that those from the WCGS took more time to develop rapport and interviews took an average of 13.6 minutes versus 8.7 for the MRFIT. The WCGS interviewers asked more questions overall, an average of 82 versus 60 and they used more follow-up questions that encouraged subjects to answer at length, evaluating their feelings, thoughts and actions more deeply. The WCGS interviewers also used on average more non-scripted verbalizations that were made directly in response to what the subject had said. They waited longer after the subject answered before asking their next question (1.84 versus .99 seconds) and interrupted an average of only four times per interview compared to seven times in the MRFIT despite the greater length of the WCGS interviews. In fact the shortest WCGS interview was longer than the longest MRFIT interview! Of the MRFIT interruptions, 49% involved asking the next (unrelated) question whereas only 32% of such interruptions were observed in the WCGS interviews. According to Scherwitz, The effect of such "rude" interruptions was that subjects stopped expressing their feelings and started giving minimal answers to subsequent questions.

Friedman (1988) argues that the very differences noted by Scherwitz highlight the difference between a clinical assessment done by a caring, interested person and a "human questionnaire." Friedman asserts that clinical assessment whether in medicine or psychotherapy requires more listening

and thoughtful probing that is accomplished by rattling off a prescribed set of questions in rapid succession. To get a useful sample of the subject's behaviour, Friedman says that subjects must be made to feel that the person asking the questions really wants to know what the interviewee thinks and feels. This is true whether the scoring is based on the content of the answers alone or on a combination of content and speaking style.

The Case et al (1985) study was another prospective study that disconfirmed the TABP-CHD relationship. They found that JAS-defined Type A post-infarction subjects had no greater mortality than did Type B's. This study was widely publicized in the media as having exposed the "myth of Type A." This study was problematic in that the JAS fails to measure the hostility component. In addition the use <u>any</u> questionnaire that questions critically ill patients about excessive competitive drive, aggressiveness and impatience would be unlikely to yield valid results. These authors reported that for 40% of the subjects there were no JAS questionnaires available when the research materials were collected. They explained the loss of 40% of the distributed JAS questionnaires to lack of fluency with the English language. They based this explanation on retrospective reports one to three years after the fact from an unspecified number of the nurses involved at the nine hospitals. A 40% illiteracy rate does not seem reasonable in

a sample the authors claimed to be representative of the American population given that among the 1,065 subjects in the Recurrent Coronary Prevention Project (RCPP: Friedman, Thoresen, Gill, Ulmer, Powell, Price, Brown, Thompson, Rabin, Breall, Bourg, Levy & Dixon, 1986) not one was unable to complete the forms they were given. The latter sample was drawn from an urban population with at least as many non-white minorities as the cities from which the Case et al (1985) sample was drawn (Friedman, 1988). In addition, the coronary mortality among those whose JAS questionnaires were unavailable was twice that of those for whom JAS scores were available.

Friedman (1988) also points out that many of the subjects in the WCGS who were classified as Type B in 1960 and 1961 were those who exhibited hostility and several physical signs that were later recognized as indicating the presence of the TABP. If they had been evaluated according to current criteria, Friedman suggests over 95% of those who subsequently died of clinical CHD would have been diagnosed as Type A.

The most recent follow-up of the prospective WCGS study (Ragland, Brand & Rosenman, 1986; Ragland & Brand, 1988) evaluated the long-term health outcomes of the subjects from that study. The results show that despite the significant prediction of CHD at the end the 8 $^{1}/_{2}$ years, the effect size diminished over longer periods. One criticism of this

follow-up has to do with the failure to reassess subjects' A/B status. Thus the problems in classification resulting from a failure to recognize the importance of hostility alluded to above, and the possibility that their Type A/B status could have been modified in the longer intervening interval (i.e., 1960 to 1986) could account for the diminished effect size of the follow-up.

Lastly, Friedman (1988) raises a somewhat tangential but interesting question concerning the Ragland et al (1988) study. In 1982-1983 these authors reported on the vital status of all but 38 of the 3,154 subjects who entered the WCGS in 1960-1961. Given that at the 4 $^{1}/_{2}$ year follow-up all but 45 (only 98.6%) could be located (Rosenman, Friedman, Straus, Wurm, Jenkins and Messinger, 1966) and after 8 $^{1}/_{2}$ years, all but 228 (only 92.8%) could be traced (Rosenman, Friedman, Straus, Jenkins, Zyzanski & Wurm, 1970) it is hard to understand how after 22 years and 14 years of no clinical contact Ragland et al (1988) were able to locate 98.8% of the cohort mainly by telephone or postcard. Friedman's point is that the results reported by Ragland and colleagues are hard to believe and may be suspect.

Cross-sectional Studies

Turning to the cross sectional studies, the results show that at least with younger angiography patients, SI defined Type A behaviour is a significant predictor of CHD, whereas among patients over 55 SI-defined Type B's have significantly more severe CHD (Williams, Barefoot, Haney, Harrell, Blumenthal, Pryor & Peterson, 1986). Two conclusions can be drawn from these findings. The first is that there is an opposite relationship between Type A/Type B classification and severity of CHD for younger and older patients. This may be explained as a survival effect. That is, Type A's who are at greater risk for CHD when younger are less likely to live to be over 55. The Type B's in the older group then, have a greater risk for CHD than the surviving Type A's. The second conclusion is drawn from the finding that the JAS showed no relation to CHD risk among angiography patients regardless of age. As Williams and Barefoot (1988) correctly point out, many of the negative studies (e.g., Dimsdale, Hackett, Block & Hutter, 1978; Dimsdale, Hackett, Hutter, Block, Catanzano & White, 1979; Krantz, Schaeffer, Davia, Dembroski, MacDougall & Shaffer, 1981; Scherwitz, McKelvain, Laman, 1983; Bass & Wade, 1982; Kornitzer, Magotteau, Degre, Kittel, Struyven & van Thiele, 1982) cited by Matthews and Haynes (1986, Table 5, p. 942-945) either used samples too small to have adequate power to detect the effect of TABP on CHD or used questionnaire measures of TABP that showed no effect even with large

samples such as the Duke University (Williams et al, 1986) study. Nevertheless, the effect size, even in that study, was relatively small.

Matthews and Haynes (1986) and Haynes and Matthews (1988) suggested that population-based studies support the contention that the TABP is a risk factor for CHD whereas studies of high-risk individuals do not. They base this conclusion on the negative results of the Shekelle, Hulley et al (1985) and the Case et al (1985) studies discussed above. Given the serious methodological problems with these studies enumerated by Friedman (1988), one must question the soundness of the conclusion that high-risk studies disconfirm the TABP-CHD link.

Measurement of the Components of the TABP and their relation to CHD

One frequent conclusion that has been drawn from the negative findings in recent research is that global measures of TABP are not sufficiently specific to be good predictors of CHD (e.g., Siegman, Dembroski & Ringel, 1987; Hecker, Chesney, Black & Frautsch, 1988, Dembroski & Costa, 1987). In other words it is necessary to distinguish between TABP and Coronary-Prone Behaviour (Williams & Barefoot, 1988). This distinction recognizes that the TABP consists of multiple components, not all of which are coronary prone. Some may in fact be protective while perhaps only a small number are "toxic" (Dembroski, MacDougall, Shields, Pettito

& Lushene, 1978). Global measures of TABP may be thought of as containing considerable amounts of "noise" besides the coronary-prone "signal" (Williams & Barefoot, 1988).

Hostility

One component that has received much recent attention as a potential risk factor for CHD is hostility (e.g., Siegman et al, 1987, Dembroski et al, 1987, Hecker et al, 1988). The argument (Dembroski & Williams, 1989) that the hostility/anger component is the 'major' if not the 'only' coronary-prone element is based largely on studies that used the JAS and/or the SI (Wright, 1988). The scoring of both these measures is strongly influenced by the presence of signs of anger/hostility. Another reason for singling out hostility was the assumption that the speed and impatience component and the job involvement component have social utility (i.e., they are reinforced in the person's environment) and would be difficult to modify although the anger and hostility components are potentially maladaptive and might be modifiable (Ivancevitch & Matteson, 1988).

Measurement of hostility

Cook-Medley Ho Scale. Williams and the research team at Duke University have been using the Cook-Medley Ho scale (Cook & Medley, 1954) as a measure of hostility. That scale consists of 50 MMPI items. Williams, Haney, Lee, Kong, Blumenthal & Whalen (1980) evaluated the relationship

between the severity of coronary artery disease (CAD) and both SI-based assessment of the TABP and Ho-based hostility scores. Both were found to correlate significantly with CAD severity in a sample of 424 male and female patients. The effect size for Ho was larger than for the TABP. This was a case of a questionnaire measure showing a stronger effect than the interview-based global measure of Type A behaviour. This led this group of researchers to conclude that hostility is the only component of the TABP that is coronary-prone. Another equally plausible interpretation is that the SI-based global Type A measure taps both coronary prone components (of which hostility may be but one) and other non-coronary components (such as characteristic motor components). The error variance contributed by the non-coronary components may weaken the predictive validity of the global Type A measures. It seems premature to discard all other aspects of the TABP just because one component has been shown in some studies to be a better predictor than the global measure. Based on clinical observation, Wright argues, "that either there are two active ingredients (anger and time urgency) or that these are separate manifestations of a single phenomenon." (Wright, 1988, p. 4)

One advantage of using the Ho scale was that it enabled researchers (Shekelle, Gale et al, 1983) to use data that had previously been collected. Using the data collected on 1,877 men in the Western Electric Study, it was found that

among those with high Ho scores, the CHD mortality rate after ten years was significantly higher than for those with the low Ho scores. Barefoot, Dahlstrom and Williams (1983) in a study of 255 physicians who had completed the Ho scale 25 years earlier while in medical school, found that those who scored above the median had a four- to five-fold higher CHD event rate than those at or below the sample median. Thus Ho scores have been found to correlate highly with CAD severity in cross sectional studies and to be predictive of increased CHD rates in both young and middle-aged men over follow-up periods of 25 years.

Similar survival effects to those noted by Williams et al (1988) were observed with the research using the Ho data in that the effect size was larger in the study of the physicians (Barefoot et al, 1983) than among the Western Electric Study (Shekelle et al, 1983) subjects.

SI-based hostility measures. Matthews, Glass, Rosenman and Bortner (1977) used a component scoring system derived from an approach originally developed by Bortner (Bortner & Rosenman, 1967) to reanalyze interviews from the WCGS. They found that some components (e.g., competitive drive, Potential for Hostility and impatience) were more predictive of CHD than others. The component scoring system was further developed by Dembroski and associates (Dembroski, 1978; Dembroski & MacDougall, 1983, 1985). It provides ratings of speech stylistics such as loudness, explosiveness, rapidity

and acceleration, and response latency. It also provides a measure of Potential for Hostility (PoHo), the relatively stable tendency to react with psychological and/or behavioural responses indicative of anger, irritation, disgust, contempt, and resentment to a broad range of frustration-inducing events. This component scoring system also measures anger-in, an anger-coping style characterized by an inability or unwillingness to confront the source of a frustration.

Unlike the self-report Ho scale, the PoHo is conceptually based on overt behavioural responses. It is distinct from anger that is a basic emotion. It is also distinct from the cynical mistrust attitude measured by the Ho scale. The significant but modest correlation between Ho and PoHo reported by Dembroski and MacDougal (1985) confirms that the concepts are not identical. Williams and colleagues continue to study the subcomponents of each of these measures.

Dembroski and Macdougall (1985) reanalyzed 131 taped SIs from the Williams et al (1980) sample and found a significant positive correlation between PoHo and anger-in and CHD severity even after controlling for age, sex and traditional risk factors. A similar reanalysis of SI data from the Massachusetts General Hospital (MGH) study (Dimsdale, Hackett, Hutter, Block, Catanzano, & White, 1979) by MacDougall, Dembroski, Dimsdale & Hackett (1985) also

found a significant positive correlation between PoHo and anger-in and CHD severity. Both these studies found that globally defined TABP was not significantly related to CAD severity. Matthews et al (1977) found that PoHo and anger-out (not anger-in) predicted CHD. The apparent contradiction concerning anger-in versus anger-out between the Matthews et al (1977) and the MacDougall et al (1985) may be explained (Williams and Barefoot, 1988) by considering that those with more severe CHD (and associated chest-pain) were frequently admonished to learn to inhibit the expression of anger and avoid emotional upsets.

The MacDougall, Dembroski, Dimsdale & Hackett (1985) study, also found a significant negative correlation between the severity of CHD and the time pressure component that presumably measures an aspect of time urgency. Williams and Barefoot (1988) interpret this last finding to mean that after controlling for hostility, the relationship between time pressure as indicated by "enthusiastic" speech and speed in accomplishing goals and CHD may be negative, suggesting that such a characteristic may be protective rather than "toxic." Another explanation is that this narrow definition of time pressure may not capture all or even most of what is referred to by the notion of time urgency. This concept and its definition are discussed more fully in a later section.

Thus, it may be concluded that research has shown that the hostility component is associated with CHD risk. It is important to note, however, that these results do not clearly indicate what aspects of hostility, as measured by the Ho scale, are related to the development of CHD. A study examining the psychological correlates of hostility as measured by the Ho scale (Blumenthal, Barefoot, Burg and Williams, 1987) suggests that the Ho scale taps four general dimensions including anger and hostility, coping styles, neuroticism and social maladjustment. Given the multidimensionality of this measure, the conclusion that hostility is the only "toxic" component requires refinement since some dimension of hostility may be more important than others. Our knowledge about the causal mechanisms by which the components of the TABP influence the risk of CHD is still inadequate; as a result, it is possible that components other than hostility may play a causal role in the development of CHD.

Time urgency

As noted above, in a recent theoretical article, Wright argued that there are at least two active ingredients involved in the link between the TABP and CHD, namely anger and time urgency. Time urgency and chronic activation, Wright suggests, represent an aggressive approach to tasks while anger/hostility represents an aggressive interpersonal approach. The responses at the neuroendocrine level may be

indistinguishable and the outward expression of them share many similar observable features including facial grimaces, dramatic movements, forceful speech, short response latencies, frequent sighing, repetitive movements, intense and humourless facial expressions and a distinctive wide-eyed look. Wright states that anger itself may frequently be secondary to time urgency. For example, time delays, interruptions and other time-related obstacles to getting things done (such as slow drivers or long queues) may be responsible for the anger frequently observed in Type A's.

Defining time urgency

According to Wright's (1988) definition, time urgency is not concern over large amounts of time. The person who says "Life is so short and there's so much I want to accomplish" is not necessarily time urgent. Time urgency is concern about saving relatively small amounts of time (often measured in minutes or seconds). For example, a driver who plans a route within the city to minimize delays who will nonetheless change the route to avoid waiting at a light or for heavy traffic to proceed, demonstrates time urgency. In fact, time urgency is best defined by reference to such behavioural examples. A related concept is Chronic Activation. This is defined as a tendency to stay keyed-up or active for most of the day, every day. Multiphasia, or being multiphasic refers to the tendency to work on more than one task at once, such as reading while in the

bathroom. These three related characteristics were noted by Wright and associates in their work with coronary patients in a hospital setting.

Measuring time urgency

In order for time urgency to be properly evaluated as a risk factor in CHD, valid and reliable measures of this construct are required. The terms "valid" and "reliable" are each commonly used to refer to several distinct aspects of measurement accuracy (Aftanas, 1985). Therefore the issue of measurement accuracy must be discussed at this juncture so that issues to be addressed in the present study can be clearly explained.

If time urgency is to be useful, it would be best to know if it is unidimensional or multidimensional. If it is multidimensional and there are a few underlying dimensions, then these must be identified and methods of measuring them must be devised.

Assessing measurement accuracy. To discuss the concept of measurement accuracy, it is necessary to introduce a brief summary of a relatively new theory of measurement developed by Aftanas (1985, 1988). This theory of measurement considers not only what is being measured, but also what it is that actually does the measuring. This approach identifies the four components of the measurement process, provides a useful typology of seven categories of

measurement situations and provides a framework for evaluating measurement accuracy.

The measurement process includes a complex series of events that can be analyzed into four components, although in practice one or more of them may not be separable as distinct steps. The first component of the measurement process is called denotability, the process by which the property of interest is specified. Before measurement can occur it must be possible to designate the extent of the property. The second component is what Aftanas calls identifying the standard system. This involves specifying what will be used to reflect the magnitudes of the property. The third component is deriving metric information (numerical quantification) from the assessment provided from the standard system. The last component is to assess measurement accuracy.

Aftanas (1988) identifies seven categories of applied measurement. The first three categories are termed elementary standard systems because the human being is the standard system. Each of these categories involves a different task for the human standard system. Category one is the elementary assessment of stimuli. It consists of situations in which a human observer estimates the magnitude of a stimulus property or a non-behavioural attribute of another organism. Category two is the elementary assessment of overt behaviour. This involves the human standard system

directly observing behaviour that may be counted or dimensionalized in some way. Category three is the assessment of latent attributes. This involves the human standard system making inferences about latent attributes of another person from that person's behaviour.

The next two categories are termed devised standard systems. They are constructed by psychologists to denote and determine magnitudes of certain characteristics of individuals. Category four is the devised assessment of ability and achievement. These are typically multi-item tests. Category five is the devised assessment of behaviour. The standard system is a physical instrument that reflects or records the magnitude of some behaviour as in electrophysiological recording.

The last two categories are dual-process standard systems. One element is a constructed standard system such as a questionnaire. The respondent's interaction with this independent standard system requires self-assessment that is itself another standard system. Category six is the dual-process assessment of personality as in a self-report personality test. Category seven is the dual-process assessment of preferences. It's major difference from category six is that it is less a self-evaluation and more a personal evaluation of some object, situation or activity.

In this study, time urgency is the property of interest. Several different standard systems will be used and a number of different measurement categories will be employed.

For time urgency, the standard system could be a human observer either recording the frequency of time urgent behaviours (category two) or globally assessing (by inference from observable behaviour) the latent personality attribute of time urgency (i.e., determining how time urgent a given subject is) (category three).

The structured interview could be used for both category two or category three although the method of deriving the information is somewhat different. Using the SI as a category three measure of time urgency requires the human observer to consider (a sample of) the behaviour of the subject and to indicate how time urgent the subject is. This assessment is often retrospective and frequently involves the use of a rating scale that identifies a number of descriptions of various observable behaviours related to the latent attribute of time urgency. This is how the SI is usually used. Using the SI as a category two would require the human observer to record the frequency of discrete time urgent behaviours.

The development of the JAS was an attempt to make the content of the SI into a category six measure. The less than perfect agreement between the JAS and the SI may reflect both differences in how the attributes of interest are denoted in the two measures and the greater error associated with self-report (dual-process) measures.

Aftanas' theory also refines the concepts used to discuss measurement accuracy. In conventional usage the terms validity and reliability each are used to refer to more than one aspect of measurement accuracy. Aftanas (1985) proposes that it would be better to use the terms stability (when referring to consistency of behaviour over measurement occasions), veridicality (when referring to accuracy of the standard system), generalizability (when referring to the similarity of the derived metric information between equivalent standard systems such as different raters or parallel forms) and invariance (transferability of the standard system across settings or cultures) instead of the less specific term reliability. Even with a standard system that gives veridical, generalizable and invariant measures, there could still be inconsistent measures because of changes in the behaviour of the person in whom the characteristic is being measured.

Each measurement category has associated with it different problems and sources of error. Different statistical and experimental approaches are used to assess these various aspects of measurement accuracy. In dual-process standard systems (categories six and seven) the respondent must first interpret the questionnaire item and then determine their response. Error is introduced at both steps; the subject may misinterpret the item, or they may not accurately report their response. The first error may be due to a relatively low degree of denotability of the attribute being measured. Low denotability is related to content validity. The second error could reflect either a lack of valid information or some kind of bias in responding. In category three measurement the denotability problem is similar to the case of category six (or seven) but the measurement accuracy may be less subject to the kind of bias inherent in self-report measures particularly if the human being doing the assessment attaches no special value to classifying the subject as Type A or Type B.

The relevance of the distinction among different categories of measurement is highlighted by considering that the SI, as a global measure of the TABP, has repeatedly shown itself to be superior to questionnaire measures such as the JAS (Byrne, Rosenman, Schiller and Chesney, 1985). As Rosenman (1978) argued "Type A individuals often have little insight into their pattern A behaviour, and are often totally inaccurate in their responses to a written

questionnaire." Wright and Schmidt-Walker (1990) suggested that many Type B's feel apologetic for being Type B and tend to describe themselves verbally as more type A than they really are. These observations are consistent with the idea that self-report (category six) measures are perhaps more susceptible to bias and error than would be impressions (category three) gleaned by trained raters from interviews.

Construct, content, predictive and face validity should be specified rather than the broader term validity. Of particular importance to this study is construct validity. This refers to whether a given standard system relates in a meaningful and/or predictable way with other standard systems. Campbell and Fiske (1958) proposed the technique known as convergent and discriminant validation that involves measuring more than one trait or attribute (multitrait) using more than one method (multimethod) in many individuals and examining how the resulting scores inter-relate. High correlations between different types of measures of the same trait or attribute provide evidence for the veridicality of the different standard systems used and convergent evidence for the measures as measures of that particular construct. Low correlations between similar types of measures for different traits provide evidence for discriminant validity.

Another way to demonstrate construct validity is to administer measures of the attribute or trait to groups of

individuals that are expected to differ for theoretical reasons and show that the obtained scores are consistent with the differences between the groups. Factor analysis is useful in identifying the components of covariation. It provides information on whether the components are relevant to the construct being measured and to what extent (Aftanas, 1985).

Another way to show construct validity is to show that measures of time urgency correlate with other such measures and with measures of related concepts such as chronic activation and multiphasia. This would demonstrate convergent validity.

Measures of time urgency

The structured interview was developed to assess subjects and classify them as Type A or Type B. With the increased interest in the "toxic" components of the TABP, what is needed is a way to measure these components using the interview format. The SI contains only twelve items that measure time urgency, four that measure perpetual activation and five for anger-in versus anger-out.

Augmented structured interview. Wright and Schmidt-Walker (1990), point out that despite the recognized superiority of interview measures over self-report measures of the TABP and the perceived need to look at components of the TABP, there have been no new interviews developed to

TABP components. For these reasons they developed the Augmented Structured Interview (ASI). It consists of the 23 original SI items that were considered to measure specific components and 19 augmenting items. These latter items consist of 8 time urgency items, 4 perpetual activation items and 7 anger-in/anger-out items. The resulting measure consists of a total of 42 items with 20 time urgency items (the Time Urgency SI), 8 perpetual activation items (PASI) and 14 anger-in/anger-out items (AI/OSI). Keeping in mind the interview style issues raised by Friedman (1988) and described in detail by Scherwitz (1988) even this interview must be administered so as to elicit thoughtful consideration and full and frank disclosure from the interviewees. The ASI like the SI is a category three measure according to Aftanas' taxonomy of standard systems.

The TUPA: Time Urgent/Perpetual Activation scale. McCurdy and Wright (1986) (cited in Wright, 1988) have developed a self-report measure (TUPA) of time urgency (105 items) and perpetual activation (32 items). The items are statements about performing behaviours that are examples of time urgency and chronic activation. Respondents are required to rate how frequently they have engaged in those behaviours throughout their lives. This instrument was used in the present study and is discussed in more detail below. The TUPA is a category six measure using Aftanas' taxonomy of standard systems.

Time Orientation Survey. Landy and co-workers have developed an assessment package called the Time Orientation Survey (TOS: Landy, Restegary, Thayer & Colvin, 1989) that consists of two different measures of time urgency. One is a set of seven behaviourally anchored rating scale (BARS) (Smith & Kendall, 1963) and the other is a questionnaire measure that derives items from several existing questionnaires but transforms all items into 5-point Likert scales with the same format. The former is still a category six measure but it may show better veridicality than other self-reports. In general, BARS measures are considered superior to other self-reports as estimators of true performance and they are said to avoid many common forms of rating error inherent in traditional self-report measures (Landy and Farr, 1980; Landy and Farr, 1983; Landy, 1985) (the latter two cited in Landy et al, 1989). The Likert-type measure is a typical category six measure. These two methods of assessing the same characteristic also provide an opportunity to obtain construct validity information through multitrait multimethod type analyses. The TOS was used in the present study and is discussed more fully below.

DRL Task: A behavioural measure of time urgency. Glass (1977) reported the results of a study in which low rates of response were differentially reinforced. That study found that Type A's were much poorer at learning to delay responding than were Type B's. The DRL (differential

reinforcement of low rates of response) task required subjects to discover by trial and error how long to wait after a push button was illuminated before pressing it. Two indicator lights were used to denote correctly-timed responding (emitted between 20 and 25 seconds after the illumination of the button) and incorrectly-timed response. For each correct response, subjects were credited with two cents and the same amount was debited for each incorrect response. Although the results were interesting, the artificial nature of the task limits generalizability beyond the laboratory. A variation on this task that integrates the time judgment task with responding to a questionnaire is described in the method section of this paper.

This kind of task involves recording a behavioural response using a specialized instrument and is best described as a category five measurement.

Overview and Rationale

Although global measures of Type A have been found less useful as predictors of CHD, the measurement of specific components of the TABP may represent the best strategy for identifying the "toxic" elements that may underlie the positive relationship uncovered between the TABP and CHD in earlier research. Although hostility has been the most extensively studied component, time urgency may itself be an important component in the causal picture (Wright, 1988). The present research assesses and evaluates the major

instruments used to measure time urgency and chronic activation and examines the dimensionality of the time urgency concept.

An important first step in considering the possible relationship between time urgency and CHD is to establish the validity of time urgency construct. This requires that measures designed to assess time urgency show some convergence and that the dimensionality of the construct be discovered. Time urgency may have several distinct components and measures of time urgency may tap these components to different extents. In addition, it must be shown that the measures of time urgency (or its components) are veridical. Once there exists veridical measures of a valid construct, it will be possible (in future research) to evaluate the stability, generalizability and invariance of those measures.

Method

Subjects

The subjects were drawn from the introductory psychology subject pool of the University of Manitoba. Of the subjects, 45 males and 54 females were included in the final sample of complete cases. Only students whose first language was English were selected because the validity of the assessment of the measures used in this study depended (in part) on the ability of subjects to comprehend and validly respond to the test instruments. Subjects received partial course credit for their voluntary participation. Subjects scoring in the upper (Type A) and lower (Type B) third on a Type A screening measure (discussed in the procedure) comprised the pool from which subjects were selected.

Materials

Survey of Work Styles

The SWS (Jackson & Mavrogiannis, 1987), was selected for use as a self-report measure of the TABP in this study because of its higher classification agreement with the SI (Mavrogiannis, Jackson & Howard, 1987) relative to other instruments such as the JAS (Jenkins et al, 1971) and the FTAS (Haynes et al, 1980). The SWS was used to select subjects with scores in the upper and lower thirds for inclusion in the current study. The Time Urgency subscale

was also of interest and scores on it were compared to other measures used in this study. A copy of the SWS appears in Appendix A.

Waiting behaviour checklist

This checklist, developed for the present study, was designed to record the occurrence of impatience, restlessness, discomfort, multiphasic behaviour or chronic activation while waiting. All subjects were observed during a mandatory five minute "waiting" period prior to their interviews. The checklist consists of observable behaviours, considered typical of time urgent individuals, that were suggested by behavioural descriptions contained in items from several of the other measures used in this study. A copy of this checklist is included in Appendix B. The occurrence of the target behaviours was recorded once if the subject exhibited it in one of the five one-minute intervals that make up the "waiting" period that precedes the interview. Thus, each behaviour could be recorded up to five times if it occurred at least once in each minute of the waiting period.

Augmented Structured Interview

Wright and Schmidt-Walker's (1990) Augmented Structured Interview (ASI) consists of the 23 original SI items that were considered to measure specific components plus 19 augmenting items. The latter items consist of eight time urgency items, four perpetual activation items and seven anger-in/anger-out items. The resulting measure consists of a total of 42 items with 20 time urgency items (the TUSI), eight perpetual activation items (PASI) and 14 anger-in/anger-out items (AI/OSI). A copy of the ASI and the scoring key for each component is included in Appendix C.

Time Urgency Perpetual Activation

The TUPA, (McCurdy and Wright, 1990) discussed briefly above, is a 137-item self-report measure consisting of 105 time urgency and 32 perpetual activation items. The items are statements about performing behaviours that are examples of time urgency and chronic activation. Respondents are required to rate how frequently they have engaged in those behaviours throughout their lives. For this study a modified computerized version of the TUPA was developed to provide a measure of time urgency as defined by Wright (1988) and also of multiphasia or chronic activation. The computerized version was designed to be included as part of a package of machine administered and scored self-report measures and behavioural tasks. A copy of the TUPA appears in Appendix D.

To investigate some of the beliefs time urgent individuals may have about their behaviour, (up to) ten items were randomly selected from among three sets of items by the computer program, after administering the TUPA. These items were selected from the sets of items to which the respondent answered either 1) always, 2) almost always or 3) almost never. This amounted to a total of (up to) 30 items. The upper limit of the number of items selected in each response category was ten or two less than the number of such responses (where there were fewer such responses). The latter limitation was chosen so that the automated process of item selection (without replacement) when there were only a small number of remaining unselected items did not bog down. These items were then presented again at the bottom of the screen while two descriptions of possible reactions were successively presented in the middle of the screen for subjects to rate. They were asked to indicate how often they have such a reaction when they engage in the particular behaviour being displayed. The ratings were made on a seven-point Likert-type scale where one represented 0% of the time, four represented 50% of the time and seven represented 100% of the time. The first reaction was meant to tap the dimension of perceived control and was worded, "When I act this way, I feel I have more control over things around me and the rewards and benefits I get out of what I do." The second reaction was meant to tap the dimension of perceived

healthfulness or adaptiveness of the behaviour and was worded, "I believe this example describes a healthy way to act that helps me be more successful and effective at the things I do." Figure 1 illustrates how this task was presented on the computer screen.

The purpose of this follow-up task was to explore the beliefs and assumptions that Time Urgent and non-Time Urgent individuals may have about the time urgent and perpetual activation behaviours in which they engage. This exploration was suggested by the observations of Weissman (1980) concerning the dysfunctional attitudes and beliefs that not only characterize depressed individuals but are postulated to maintain depression. Strube, Berry, Lott, Fogelman, Steinhart, Moergen & Davison (1986) have suggested that there may be different sets of schemata that characterize A's and B's. If this is true, then contrasting groups (in this case time urgent and non-time urgent) should be expected to have different beliefs and assumptions about their behavioural styles.

Time Orientation Survey

Landy, Rastegary, Thayer & Colvin's (1989) TOS has two sections, each measuring time urgency in a different way.

Behaviourally Anchored Rating Scale. Section one is a set of seven behaviourally anchored rating scales (BARS). Each of the seven scales is headed by a label that describes the aspect of time covered by the scale and a definition of that aspect of time

In the lower box are descriptions of behavior you saw earlier. In the upper box are descriptions of possible reactions you may have when you behave like this. From the scale in the middle of the screen choose the number (1 - 7) that best describes how often you have such a reaction after engaging in this behavior.

When I act this way, I **feel I have more control** over things around me and the rewards and benefits I get out of what I do.[1]

I believe this example describes a **healthy way to act** that helps me be more successful and effective at the things I do. [2]

1-------2-------3--------4------5-------6-------7
0% 10% 25% 50% 75% 90% 100%
(PERCENT OF THE TIME)

Selected item from Time Urgent Perpetual Activation scale presented again here

Your Response

Figure 1

---

[1] This is question one of the two presented for each item from the TUPA

(only one at a time is presented)

[2] This is question two of the two presented for each item from the TUPA

described by the label. The description of each BARS scale is presented in Table 2. A copy of the seven BARS scales is included in Appendix E.

The behaviourally anchored rating scales are like Likert-type scales except that various points along the vertical one to seven scale are labeled with behavioural descriptors that represent points on the continuum of the construct being measured. The endpoints and midpoints of the vertical scale are also labeled (High, Average and Low).

For this study, the stimulus materials were used in their original form and were presented on paper for the subjects to select their responses but the responses were made by pressing the numeric key on the computer on which were displayed the label, definition and the seven-point scale with the midpoint and endpoints labeled as it appears on paper. This method was used because the 24 lines available on the computer screen are insufficient to represent the scales exactly as they are on paper. Using the computer allowed these seven responses to be recorded along with other data from other machine administered measures and tasks.

Likert Scale. Section two of the Time Orientation Survey is a Likert-type scale consisting of 33 items derived from the Jenkins Activity Schedule (Jenkins et al, 1971), the Framingham Type A Scale (FTAS: Haynes et al, 1980), the Thurstone Activity Scales (Thurstone, 1949) and the Bortner Scales (Bortner, 1969).

Table 2
BARS Dimensions and their definitions

Awareness of Time	**Scheduling**
The extent to which an individual is aware of the exact time of day, regardless of the environment or circumstances. The extent to which a person is aware of important dates such as birth dates, test dates, etc.	The extent to which an individual schedules activities and keeps to that schedule. The schedule might include leisure, personal, and/or work activities. This also includes the extent to which an individuals apportions time for particular activities.
Nervous Energy	**Deadline Control**
The extent to which the person can be characterized as being in constant motion, even when "resting."	The extent to which an individual creates or appears to be controlled by external deadlines.
List Making	**Speech Patterns**
The extent to which a person creates and/or maintains a list of things to do during the day or during the week.	The extent to which an individual exhibits rushed speech patterns. This would include talking fast, interrupting others, and finishing the sentences of others.
Eating Behavior	
The extent to which time plays a role in the manner by which individuals plan and/or eat various meals.	

The format of the original items from these scales offered different numbers of response alternatives (two to four for the JAS, four for the FTAS, five for the Bortner and three for the Thurstone). The labeling of the scales vary also. In the Landy et al Likert-type scale, there are five response alternatives for each item labeled 1) Strongly Disagree, 2) Disagree 3) Neutral, 4) Agree, 5) Strongly Agree. Of the 33 items, 9 come from the JAS, 6 from the FTAS, 7 from the Bortner and 11 from the Thurstone. These were selected because they dealt only with time urgency or speed. Also included were items that defined the competitive-hard-driving component derived from factor analysis of the initial pool of 65 items drawn from the four scales and converted to the uniform Likert format. The inclusion of the competitive-hard-driving items was to permit the demonstration of discriminant validity of the time urgency measure. A copy of this section of the TOS and its scoring key appears in Appendix F.

For this study, the items were presented on the computer screen and the responses were recorded when the respondent selected an appropriate numerical key. Only one item was available at a time but it was possible to back up (one item at a time) and change a response by pressing "R" on the keyboard.

DRL Task

A behavioural measure (category five) of time urgency was developed for this study. It was a variation on the DRL task used by Glass (1977) that integrated the time judgment task with responding to the Way of Life (WOL) scale (Wright, von-Bussmann, Friedman, Khoury, & Owens, 1990). The WOL scale measures a form of maladaptive social control called nonmutuality. A copy of the WOL appears in Appendix G. The purpose of nesting the DRL task within a questionnaire was to make the task more meaningful than merely estimating the duration of time intervals and to give the whole procedure a goal or fixed endpoint towards which the subjects could work. Besides answering the 43 items of the WOL, respondents also had to meet the demands of the DRL task. To time urgent individuals, the opportunity to save time and complete a task faster was expected to be reinforcing and enforced waiting to complete a task was expected to be an effective punishment. So the reinforcement for responding at the correct time in this task was the opportunity to proceed directly to the next item without delay. The penalty for premature (or late) responding or no response was a brief time-out (20 seconds) followed by compulsory repetition of the item (maximum two trials per item). Thus each item took about 30 seconds if answered at the right time, whereas having to do the maximum of two trials took between 60 and

90 seconds per item. The time taken to select the answer to the item (decision time), the time waited before entering the answer (response time) and the total number of trials required to complete the 43 items are recorded.

Figure 2 illustrates each interval in the DRL task. Interval A-B is decision time. Interval B-C is the period during which the subject had to delay responding (15 seconds). Interval C-D is the period during which responses had to be made (between the 15 and 20 second mark) to be reinforced by the avoidance of the time-out period (interval D-E).

In this behavioural measure of time urgency, the consequences of correct and incorrect performance were expected to be of special salience to time urgent individuals and Type A respondents. As such, time urgent subjects were expected to be strongly motivated to correctly time their responses. Ironically, this task requires subjects to delay responding to save small amounts of times and avoid obstacles to the completion of the task, something that was expected to be particularly difficult for time urgent individuals. Since the way to finish the whole task in the least amount of time was to not respond too quickly to each item, it was predicted that time urgent individuals would have great difficulty learning to delay responding. As a result, they would require many more trials to complete

the task and would have lower mean response time than those who are not time urgent.

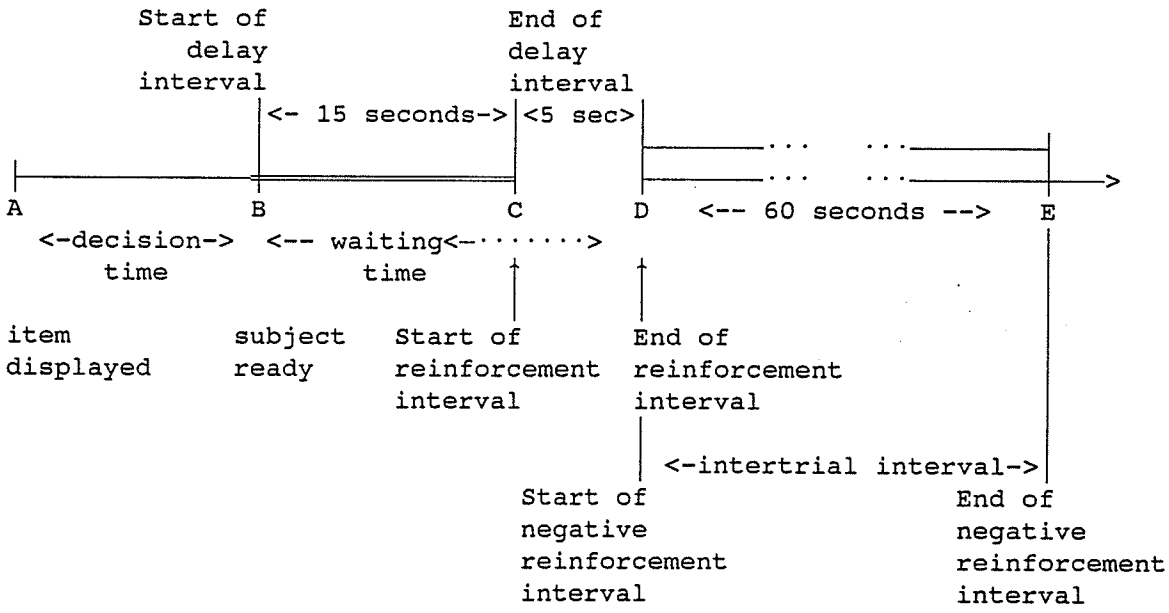


Figure 2
DRL Procedure intervals

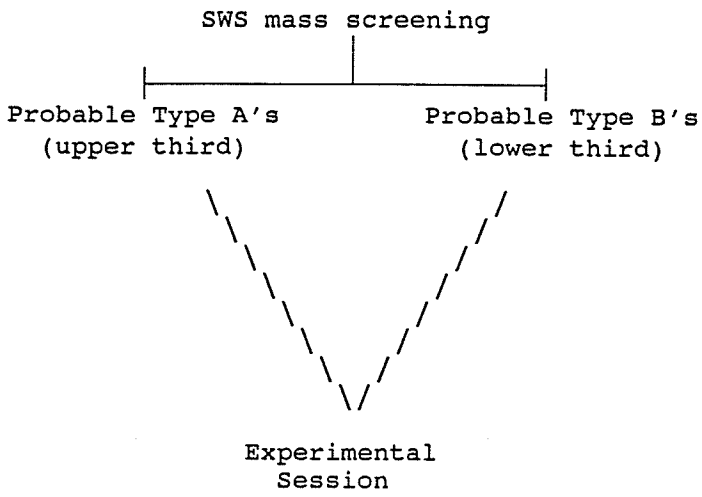
Procedure

Screening and selection of subjects

The SWS was administered to classes enrolled in introductory psychology classes. The resulting data were scored on the six subscales and on Scale A. Subjects scoring in the upper third (probable Type A's) and those in the lower third (probable Type B's) were contacted by telephone and offered an opportunity to volunteer for further testing in exchange for additional course credit. Those who agreed to participate were scheduled for a 3 hour testing session. Figure 3 provides an overview of the entire procedure including the sequence and duration of the phases of the testing session.

In-Vivo Observation

When the subjects presented themselves for their interviews, their arrival time relative to their appointed time (-5 for five minutes early, 0 for precisely on time, 4 for four minutes late) was noted by the experimenter. This was a measure of punctuality, a characteristic that presumably relates to time orientation and possibly time urgency. On their arrival they were ushered into a "waiting room", furnished with a comfortable arm chair, a table on which there were current magazines, introductory psychology



Step	Duration (minutes)	Cum. total	Assessment procedure
1			record relative arrival time
2	5	5	In-vivo observation
3	15	20	Augmented Structured Interview
4	10	30	Time Orientation Survey- BARS
5	15	45	Time Orientation Survey- Likert
6	50	95	Time Urgent Perpetual Activation
2	25	120	Rating of selected TUPA items
3	45	165	DRL procedure (takes 30-60 minutes)

Figure 3
Experimental flowchart

floor lamp. On one wall was a one-way mirror though which the subject could be observed by the experimenter. On the wall opposite the mirror, comic strips cut from daily newspapers were posted in plain view. Using the waiting behaviour checklist, the experimenter recorded the frequency of various behaviours performed by the subject during a five-minute waiting interval that was instituted for all subjects.

Augmented Structured interview

The subjects were interviewed by the experimenter or a student research assistant carefully trained by the experimenter. The experimenter was trained by D. G. Dyck, a psychologist trained by Rosenman in administering and scoring the original structured interview. The interviewers were taught to ask the questions in a natural and genuinely interested manner and to encourage the interviewee to fully express their responses to the questions. This style was consistent with the recommendations made by Friedman (1988). The interviews were audiotaped to facilitate the assessment of the accuracy and reliability of scoring.

The interview was later scored to yield subscores on Anger-In/Anger-Out (AI/OSI), Time Urgency (TUSI) and Perpetual Activation (PASI). The subscores were summed to arrive at an overall ASI score that could be treated as a Type A/Type B classification using a median split approach. The classifications using the SWS and the ASI were compared and the correlation between the SWS and ASI scores were computed.

Computer administered self-report measures

The Time Orientation Survey including both the BARS measure and the Likert-type measure were completed. For the first section, the scales were presented on paper in their original form and also on the computer screen for data recording purposes. This was followed by the computer administered TUPA and the related follow-up rating task discussed above.

DRL Task

The DRL task was administered last because it was thought to be potentially the most reactive. Although it was not designed as a manipulation, some subjects were expected to find it frustrating or irritating. It was anticipated that some subjects might even wish to abandon the task before the end. Although subjects were told that it would be preferable for all subjects to complete the entire

procedure, no one was forced to continue against their will. Of the 108 subjects tested, only two had incomplete data because of a refusal to complete the task. The other seven subjects dropped from the study were eliminated because of lost data or incomplete data due to deviations from the research protocol. A brief Likert-type rating scale was administered after this task to measure any frustration, anger, hostility engendered by the DRL task.

Debrief subjects

All subjects were fully debriefed at the end of their testing session. The purpose of the study was explained, any questions they may have had were answered frankly. They were asked not to discuss their experience in the study with other students until the study was completed and they were thanked for their participation and their experimental credit cards were endorsed. A copy of the debriefing script is included in Appendix H.

Results

The first step in examining the relationships among the dependent measures in this study was to evaluate the predicted correlations. Only correlations with a one-tailed significance less than $p < .01$ were considered significant. The variance accounted for was also considered in evaluating the size of any observed relationship. To organize the presentation of the results, the correlations will be discussed in groups as they relate to subsets of measures. For the sake of brevity the specific values of the correlation coefficients and the tail probabilities are excluded from the textual summary that follows. One-tailed probabilities in the correlation tables are denoted by a single asterisk for $p < .01$ and by two asterisks for $p < .001$. One-tailed probabilities are used because the direction of the correlations had been predicted a-priori.

Correlational analysis

Relationships involving behaviourally anchored rating scales

Table 3 summarizes the correlations among the BARS measures and the other variables used in this study. The correlations between the eating behaviour and Speech Patterns BARS and the similarly-named factors from the Likert- type section of the TOS were positive and significant as expected. The relationship between the eating

behaviour measures was particularly strong accounting for 64% of the variance in these variables.

Table 3
Correlations involving Behaviorally Anchored Rating Scales

Correlations:	BARS1	BARS2	BARS3	BARS4	BARS5	BARS6	BARS7
TUSI	.2610*	.3465**	.3373**	.2047	.2212	.3207**	.2983*
PASI	.2085	.2499*	.2776*	.1357	.1139	.3415**	.3897**
AI/OSI	-.0067	.1001	-.0047	.1901	-.1551	.0685	-.1228
TU	.3068*	.4986**	.3659**	.3939**	.2056	.3690**	.3602**
PA	.3738**	.4154**	.4399**	.3355**	.3545**	.3843**	.5086**
WOL	.2718*	.3285**	.3699**	.2126	.1448	.3340**	.3731**
SWS1	.0475	.3091**	.1891	.2738*	-.1713	.1546	-.0207
SWS2	-.1322	.2862*	-.0216	.2533*	-.1796	-.0292	-.2835*
SWS3	.0915	.1659	.1210	.0908	.0804	.2438*	.3446**
SWS4	-.0386	.3203**	.1079	.1998	-.0222	.3265**	.0885
SWS5	-.2318	.2290	-.0191	.1671	.0465	-.0310	-.1887
SWS6	-.0238	.3355**	.1438	.1633	-.2833*	.0948	.0413
SWSTOTAL	-.0695	.4140**	.1328	.2872*	-.1462	.1803	-.0056
TOS1	.3147**	.4252**	.4025**	.3045*	.2333	.3521**	.4948**
TOS2	.1831	.1560	.0401	.2727*	-.0177	.8003**	.1539
TOS3	.1890	.5453**	.2192	.3349**	-.0058	.1437	.1848
TOS4	.1380	.3029*	.1930	.3179**	.1383	.3722**	.2332
TOS5	.1607	.3354**	.2737*	.3693**	.3414**	.2452*	.3997**
FACTOR1	.3349**	.4778**	.4233**	.3630**	.2681*	.4022**	.4505**
FACTOR2	-.0521	.4155**	.1395	.2883*	-.1842	.1642	-.0238
FACTOR3	.1808	.1613	.0580	.2856*	-.0042	.8698**	.1566
FACTOR4	.3157**	.8335**	.2807*	.8242**	.5643**	.2360*	.2248
FACTOR5	-.3020*	.2098	-.0390	.1478	.0203	-.0410	-.2080
FACTOR6	.0628	.0271	.0799	-.0900	.1707	.1006	.3122**
BARS1	1.0000**	.1954	.2707*	.2129	.3377**	.1422	.3085**
BARS2	.1954	1.0000**	.2128	.5472**	.2656*	.1556	.2059
BARS3	.2707*	.2128	1.0000**	.1921	.2437*	.1183	.4754**
BARS4	.2129	.5472**	.1921	1.0000**	.1850	.2898*	.0149
BARS5	.3377**	.2656*	.2437*	.1850	1.0000**	.0494	.3502**
BARS6	.1422	.1556	.1183	.2898*	.0494	1.0000**	.1416
BARS7	.3085**	.2059	.4754**	.0149	.3502**	.1416	1.0000**

N of cases: 99 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

Variable names used in correlation analysis above
and their labels arranged by source

Wright and Schmidt-Walker;
McCurdy and Wright; Wright
Augmented Structured Interview,
Time Urgent / Perpetual Activation
Way of Life Scale

Variable	Variable Label
TUSI	ASI TIME URGENCY
PASI	ASI PERPETUAL ACTIVATION
AI/OSI	ASI ANGER IN/OUT
TU	TUPA TIME URGENCY
PA	TUPA PERPETUAL ACTIVATION
WOL	NON-MUTUALITY

Jackson & Mavrogiannis
Survey of Work Styles

Variable	Variable Label
SWS1	IMPATIENCE
SWS2	ANGER
SWS3	WORK INVOLVEMENT
SWS4	TIME URGENCY
SWS5	JOB DISSATISFACTION
SWS6	COMPETITION
SWSTOTAL	GLOBAL TYPE A (SWS)

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (BARS)

Variable	Variable Label
BARS1	AWARENESS OF TIME
BARS2	SPEECH PATTERN
BARS3	SCHEDULING
BARS4	NERVOUS ENERGY
BARS5	LIST MAKING
BARS6	EATING BEHAVIOR
BARS7	DEADLINE CONTROL

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (Likert)

Variable	Variable Label
TOS1	TOS LIKERT COMPETITIVENESS
TOS2	TOS LIKERT EATING BEHAVIOR
TOS3	TOS LIKERT GENERAL HURRY
TOS4	TOS LIKERT TASK-RELATED HURRY
TOS5	TOS LIKERT SPEECH PATTERNS

The correlations between the eating behaviour BARS and the PASI and the PA measure of the TUPA were positive and significant. The correlations between the Speech Patterns BARS and the PASI and the PA measure of the TUPA were also positive and significant but the PA measure of the TUPA correlated more strongly with these BARS than does the PASI. This may reflect the fact that the BARS and the TUPA are both self-report measures (Category six) while the ASI is a Category three measure.

While the correlation between the Nervous Energy BARS and the PASI (the PA measure of the ASI) was not significant, the correlation between that BARS scale and the PA measure of the TUPA was positive and significant as had been expected given that characteristics like restlessness and constant pacing are consistent with perpetual activation. The discrepancy between these two correlations is difficult to interpret especially given the high (r=.6188, p < .001) correlation between the two PA measures.

The correlations between the Nervous Energy BARS and both the General Hurry factor and the Speech Patterns factor of the Likert-type TOS measure were positive and significant as had been expected given that being in constant motion seems related to rapid, uninterrupted talking and general hurry.

The correlations between the Scheduling BARS and the TU scale of the TUPA and the TUSI (the TU measure of the ASI) were positive and significant as had been expected given that compulsive time allocation and time urgency seem closely related.

The correlations between the List Making BARS and the TUSI and the TU measure of the TUPA were not significant. A significant positive relationship was expected since extensive planning to save time seems related to time urgency. This BARS did however correlate significantly with the PA scale of the TUPA but not the PASI. The greater correlation with the PA measure of the TUPA may be because they are both Category six measures.

The correlations between the Deadline Control BARS and the TUSI and the TU measure of the TUPA were positive and significant as had been expected given that being controlled by external deadlines seems related both to time urgency and the perceived need to be always "on time." Plans to evaluate relationships involving the Punctuality measure were abandoned because of missing data. The precise arrival time of the subject could often not be determined because the experimenter was occupied with the previous subject or unable to monitor the arrival time of the subject.

Relationships involving TOS Likert-type Factors

Table 4 summarizes the correlations among the TOS Likert measures and the other variables used in this study. The correlation between the Likert-type TOS Competitiveness factor and the Competitiveness subscale of the SWS was positive and significant as had been expected given the similarity in content. The correlations between the General Hurry, Task-Related Hurry and Speech Pattern factors of the TOS and the PA scale of the TUPA were positive and significant as had been expected since these TOS factors seem to be aspects of the more global measures of perpetual activation. The correlations between those TOS factors and the PASI were even stronger than had been predicted. The higher correlations with the PASI than with the PA measure of the TUPA cannot be explained by a common category of measurement. A possible explanation may rest on greater similarity in the way the constructs are operationally defined in the TOS Likert scales and the ASI. The TUPA PA subscale as previously noted had a lower coefficient alpha than did the TU scale or the entire instrument. Thus it may be more heterogeneous than the TOS scales that are based on factor analysis with orthogonal rotation.

Table 4
Correlations involving Likert TOS Scales

Correlations:	TOS1	TOS2	TOS3	TOS4	TOS5
TUSI	.6365**	.3693**	.4295**	.5091**	.5963**
PASI	.6570**	.3127**	.3286**	.3731**	.5324**
AI/OSI	.1607	.0662	.3132**	.2120	.1491
TU	.6686**	.4858**	.6232**	.5816**	.6361**
PA	.7368**	.4500**	.4843**	.5220**	.6527**
WOL	.6581**	.3615**	.5632**	.4366**	.4637**
SWS1	.4383**	.2401*	.5441**	.3526**	.2914*
SWS2	.1140	.0459	.4246**	.1495	.1339
SWS3	.4513**	.2734*	.2085	.2751*	.3830**
SWS4	.4523**	.4515**	.4211**	.4738**	.4175**
SWS5	.0088	.0256	.1251	.1011	.0603
SWS6	.4033**	.2116	.4648**	.2495*	.1468
SWSTOTAL	.4689**	.3023*	.5538**	.3920**	.3491**
BARS1	.3147**	.1831	.1890	.1380	.1607
BARS2	.4252**	.1560	.5453**	.3029*	.3354**
BARS3	.4025**	.0401	.2192	.1930	.2737*
BARS4	.3045*	-.2727*	-.3349**	.3179**	.3693**
BARS5	.2333	-.0177	-.0058	.1383	.3414**
BARS6	.3521**	.8003**	.1437	.3722**	.2452*
BARS7	.4948**	.1539	.1848	.2332	.3997**
FACTOR1	.7797**	.4883**	.5889**	.6176**	.7208**
FACTOR2	.4620**	.2877*	.5890**	.3824**	.3231**
FACTOR3	.3885**	.9919**	.2161	.4775**	.3267**
FACTOR4	.4325**	.2042	.4206**	.3495**	.4612**
FACTOR5	-.0150	.0114	.1085	.0888	.0470
FACTOR6	.1599	.1210	-.1111	.0092	.1259
TOS1	1.0000**	.3817**	.4653**	.5436**	.5217**
TOS2	.3817**	1.0000**	.2257	.4847**	.3341**
TOS3	.4653**	.2257	1.0000**	.4295**	.3646**
TOS4	.5436**	.4847**	.4295**	1.0000**	.4883**
TOS5	.5217**	.3341**	.3646**	.4883**	1.0000**

N of cases: 99 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

Variable names used in correlation analysis above and their labels arranged by source

Wright and Schmidt-Walker; McCurdy and Wright; Wright Augmented Structured Interview, Time Urgent / Perpetual Activation Way of Life Scale

Variable	Variable Label
TUSI	ASI TIME URGENCY
PASI	ASI PERPETUAL ACTIVATION
AI/OSI	ASI ANGER IN/OUT
TU	TUPA TIME URGENCY
PA	TUPA PERPETUAL ACTIVATION
WOL	NON-MUTUALITY

Jackson & Mavrogiannis Survey of Work Styles

Variable	Variable Label
SWS1	IMPATIENCE
SWS2	ANGER
SWS3	WORK INVOLVEMENT
SWS4	TIME URGENCY
SWS5	JOB DISSATISFACTION
SWS6	COMPETITION
SWSTOTAL	GLOBAL TYPE A (SWS)

Landy, Restegary, Thayer & Colvin Time Orientation Survey (BARS)

Variable	Variable Label
BARS1	AWARENESS OF TIME
BARS2	SPEECH PATTERN
BARS3	SCHEDULING
BARS4	NERVOUS ENERGY
BARS5	LIST MAKING
BARS6	EATING BEHAVIOR
BARS7	DEADLINE CONTROL

Landy, Restegary, Thayer & Colvin Time Orientation Survey (Likert)

Variable	Variable Label
TOS1	TOS LIKERT COMPETITIVENESS
TOS2	TOS LIKERT EATING BEHAVIOR
TOS3	TOS LIKERT GENERAL HURRY
TOS4	TOS LIKERT TASK-RELATED HURRY
TOS5	TOS LIKERT SPEECH PATTERNS

Relationships involving SWS Scales

Table 5 summarizes the correlations among the SWS scales and the other variables used in this study. The correlation between the anger subscale of the SWS and the AI/OSI (the anger-in/anger-out measure of the ASI) was positive as had been predicted. The Time Urgency scale of the SWS and the TU of the TUPA were positively correlated and that SWS scale and the TUSI were positively correlated although it was not expected that the relationship would be more than a moderate one given the definition of the Time Urgency subscale in the SWS . Wright (1988) hypothesized about a causal linkage between time urgency and hostility. This led to the prediction of a strong positive correlations between the SWS anger subscale and both the TU score of the TUPA and the TUSI. Only the correlation involving the TU score of the TUPA was significant accounting for 8.6% of the variance. Thus the above prediction received mixed support. It may have been more applicable to a hostility measure such as the Cook-Medley (1954) than a measure of anger expression such as the SWS anger scale or the AI/OSI.

Correlations involving SWS Scales

Correlations:	SWS1	SWS2	SWS3	SWS4	SWS5	SWS6	SWSTOTAL
TUSI	.4740**	.2046	.3395**	.4506**	.0822	.3047*	.4609**
PASI	.2608*	-.0127	.3140**	.3106**	-.0641	.2226	.2562*
AI/OSI	.4351**	.4850**	-.0036	.0234	-.0312	.2698*	.3125**
TU	.6175**	.2934*	.3047*	.4614**	.0837	.5151**	.5758**
PA	.3831**	.0919	.3840**	.4533**	-.0336	.3320**	.4007**
WOL	.4785**	.1776	.3314**	.2969*	-.0671	.4478**	.4284**
BARS1	.0475	-.1322	.0915	-.0386	-.2318	-.0238	-.0695
BARS2	.3091**	.2862*	.1659	.3203**	.2290	.3355**	.4140**
BARS3	.1891	-.0216	.1210	.1079	-.0191	.1438	.1328
BARS4	.2738*	.2533*	.0908	.1998	.1671	.1633	.2872*
BARS5	-.1713	-.1796	.0804	-.0222	.0465	-.2833*	-.1462
BARS6	.1546	-.0292	.2438*	.3265**	-.0310	.0948	.1803
BARS7	-.0207	-.2835*	.3446**	.0885	-.1887	.0413	-.0056
TOS1	.4383**	.1140	.4513**	.4523**	.0088	.4033**	.4689**
TOS2	.2401*	.0459	.2734*	.4515**	.0256	.2116	.3023*
TOS3	.5441**	.4246**	.2085	.4211**	.1251	.4648**	.5538**
TOS4	.3526**	.1495	.2751*	.4738**	.1011	.2495*	.3920**
TOS5	.2914*	.1339	.3830**	.4175**	.0603	.1468	.3491**
FACTOR1	.5570**	.2195	.3861**	.4998**	.0474	.4467**	.5411**
FACTOR2	.8599**	.7789**	.3322**	.6613**	.4439**	.8248**	.9893**
FACTOR3	.2302	.0316	.2765*	.4405**	.0145	.1942	.2868*
FACTOR4	.2226	.1986	.1509	.2421*	.2070	.1400	.2868*
FACTOR5	.2711*	.4565**	-.1554	.2798*	.9973**	.1838	.4978**
FACTOR6	-.2322	-.4174**	.6328**	.3003*	-.0713	-.0708	.0183
SWS1	1.0000**	.6894**	.1661	.4131**	.2802*	.6500**	.8175**
SWS2	.6894**	1.0000**	-.0665	.3309**	.4557**	.5074**	.7440**
SWS3	.1661	-.0665	1.0000**	.5053**	-.1516	.2192	.4131**
SWS4	.4131**	.3309**	.5053**	1.0000**	.2826*	.4113**	.7111**
SWS5	.2802*	.4557**	-.1516	.2826*	1.0000**	.1857	.5026**
SWS6	.6500**	.5074**	.2192	.4113**	.1857	1.0000**	.7756**
SWSTOTAL	.8175**	.7440**	.4131**	.7111**	.5026**	.7756**	1.0000**

N of cases: 99 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

Variable names used in correlation analysis above
and their labels arranged by source

Wright and Schmidt-Walker;
McCurdy and Wright; Wright
Augmented Structured Interview,
Time Urgent / Perpetual Activation
Way of Life Scale

Variable	Variable Label
TUSI	ASI TIME URGENCY
PASI	ASI PERPETUAL ACTIVATION
AI/OSI	ASI ANGER IN/OUT
TU	TUPA TIME URGENCY
PA	TUPA PERPETUAL ACTIVATION
WOL	NON-MUTUALITY

Jackson & Mavrogiannis
Survey of Work Styles

Variable	Variable Label
SWS1	IMPATIENCE
SWS2	ANGER
SWS3	WORK INVOLVEMENT
SWS4	TIME URGENCY
SWS5	JOB DISSATISFACTION
SWS6	COMPETITION
SWSTOTAL	GLOBAL TYPE A (SWS)

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (BARS)

Variable	Variable Label
BARS1	AWARENESS OF TIME
BARS2	SPEECH PATTERN
BARS3	SCHEDULING
BARS4	NERVOUS ENERGY
BARS5	LIST MAKING
BARS6	EATING BEHAVIOR
BARS7	DEADLINE CONTROL

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (Likert)

Variable	Variable Label
TOS1	TOS LIKERT COMPETITIVENESS
TOS2	TOS LIKERT EATING BEHAVIOR
TOS3	TOS LIKERT GENERAL HURRY
TOS4	TOS LIKERT TASK-RELATED HURRY
TOS5	TOS LIKERT SPEECH PATTERNS

Relationships involving the TUPA

Table 6 summarizes the correlations among the ASI subscales, the TUPA subscales and the WOL and the other variables used in this study. The correlation between the TU scale of the TUPA and mean response time on the DRL task was not significant. A significant negative correlation (longer response times for those who can appropriately delay their responding) was expected. The apparent inadequacy of the DRL task as a behavioural indicator of time urgency is discussed more fully in a later section.

The correlation between self-reported time urgency as reflected by the TU scores of the TUPA and the number of trials required to complete the DRL task was not significant. This relationship was expected to be positive since those individuals high on time urgency were expected to fail to delay their responding and be required to redo most items on the DRL task. In fact, no consistent relationship of any kind could be identified between the dependent variables on the DRL task and any of the scales.

The correlation between the TU and the observational Punctuality measure could not be computed because of missing data on the latter measure. The correlation between the PA scale of the TUPA and the PASI was strongly positive as had been expected given that they are thought to measure the

identical characteristic. The observed correlation accounts for 38.29% of the variance.

Table 6
Correlations involving ASI, TUPA, WOL measures

Correlations:	TUSI	PASI	AI/OSI	TU	PA	WOL
SWS1	.4740**	.2608*	.4351**	.6175**	.3831**	.4785**
SWS2	.2046	-.0127	.4850**	.2934*	.0919	.1776
SWS3	.3395**	.3140**	-.0036	.3047*	.3840**	.3314**
SWS4	.4506**	.3106**	.0234	.4614**	.4533**	.2969*
SWS5	.0822	-.0641	-.0312	.0837	-.0336	-.0671
SWS6	.3047*	.2226	.2698*	.5151**	.3320**	.4478**
SWSTOTAL	.4609**	.2562*	.3125**	.5758**	.4007**	.4284**
BARS1	.2610*	.2085	-.0067	.3068*	.3738**	.2718*
BARS2	.3465**	.2499*	.1001	.4986**	.4154**	.3285**
BARS3	.3373**	.2776*	-.0047	.3659**	.4399**	.3699**
BARS4	.2047	.1357	.1901	.3939**	.3355**	.2126
BARS5	.2212	.1139	-.1551	.2056	.3545**	.1448
BARS6	.3207**	.3415**	.0685	.3690**	.3843**	.3340**
BARS7	.2983*	.3897**	-.1228	.3602**	.5086**	.3731**
TOS1	.6365**	.6570**	.1607	.6686**	.7368**	.6581**
TOS2	.3693**	.3127**	.0662	.4858**	.4500**	.3615**
TOS3	.4295**	.3286**	.3132**	.6232**	.4843**	.5632**
TOS4	.5091**	.3731**	.2120	.5816**	.5220**	.4366**
TOS5	.5963**	.5324**	.1491	.6361**	.6527**	.4637**
FACTOR1	.8496**	.6885**	.2544*	.9531**	.9126**	.7691**
FACTOR2	.4549**	.2523*	.3622**	.5968**	.3995**	.4530**
FACTOR3	.3716**	.3294**	.0690	.4777**	.4515**	.3680**
FACTOR4	.3413**	.2242	.0887	.5022**	.4858**	.3104**
FACTOR5	.0610	-.0785	-.0301	.0590	-.0609	-.0861
FACTOR6	-.0301	.1001	-.7765**	-.0177	.1601	.0267
TUSI	1.0000**	.6825**	.3152**	.7215**	.6942**	.5966**
PASI	.6825**	1.0000**	.1262	.5041**	.6188**	.5516**
AI/OSI	.3152**	.1262	1.0000**	.2708*	.1056	.2352*
TU	.7215**	.5041**	.2708*	1.0000**	.8410**	.7490**
PA	.6942**	.6188**	.1056	.8410**	1.0000**	.6557**
WOL	.5966**	.5516**	.2352*	.7490**	.6557**	1.0000**

N of cases: 99 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

Variable names used in correlation analysis above
and their labels arranged by source

Wright and Schmidt-Walker;
McCurdy and Wright; Wright
Augmented Structured Interview,
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Way of Life Scale

Variable	Variable Label
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AI/OSI	ASI ANGER IN/OUT
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WOL	NON-MUTUALITY

Jackson & Mavrogiannis
Survey of Work Styles

Variable	Variable Label
SWS1	IMPATIENCE
SWS2	ANGER
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SWS5	JOB DISSATISFACTION
SWS6	COMPETITION
SWSTOTAL	GLOBAL TYPE A (SWS)

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (BARS)

Variable	Variable Label
BARS1	AWARENESS OF TIME
BARS2	SPEECH PATTERN
BARS3	SCHEDULING
BARS4	NERVOUS ENERGY
BARS5	LIST MAKING
BARS6	EATING BEHAVIOR
BARS7	DEADLINE CONTROL

Landy, Restegary, Thayer & Colvin
Time Orientation Survey (Likert)

Variable	Variable Label
TOS1	TOS LIKERT COMPETITIVENESS
TOS2	TOS LIKERT EATING BEHAVIOR
TOS3	TOS LIKERT GENERAL HURRY
TOS4	TOS LIKERT TASK-RELATED HURRY
TOS5	TOS LIKERT SPEECH PATTERNS

The correlation between the PA scale and the total number of restless behaviours observed during the five-minute "waiting" task was not significant. A positive correlation was expected given that the observational measure was designed as a direct measure of perpetual activation. The adequacy of this restlessness while waiting measure is questionable at least as implemented in this study.

Relationships involving the ASI

The correlation between the TUSI scale and the Punctuality observational measure could not be assessed because of missing data on the latter measure. The correlation between the PASI scale and the total number of restless behaviours observed during the five minute "waiting" task was not significant (see Table 6).

The sum of the ASI subscale scores was significantly correlated with the SWS Type A score (r=.4712, $p < .001$) suggesting a moderate congruence between these measures. The classification into Type A or Type B based on a median split on both measures were compared using the SPSSPC CROSSTABS procedure. The Pearson Chi Square statistic with the continuity correction for 2 X 2 contingency tables was significant (Chi Square=11.764, $p < .001$). Only one subject out of 99 was classified differently by one approach than

the other. Where the only goal is Type A/Type B classification the SWS would be preferable because it can be group administered and computer scored.

Factor Analysis

Factor analysis of the Likert section of Landy's TOS successfully replicated three (Competitiveness, eating behaviour, and Speech Pattern) of the five factors with only minor deviations in factor composition. The two remaining factors (Task-Related Hurry and General Hurry) did not hold up as well. For example, two items originally loading positive on "General Hurry" load negatively instead on "Task-Related Hurry." Given that the present sample is just slightly more than half the size of the sample on which Landy based his paper, it would be reasonable to attribute such differences in factor composition to sources such as sampling. Overall, Landy's five scale solution bears up under scrutiny.

Factor analysis of the TUPA was problematic. To run the factor analysis, 39 of the 137 items had to be excluded because they had squared multiple correlations with all of the other variables of 1.00. This of course means that factor analysis of this instrument cannot be done meaningfully if all the items are included because some are just too highly intercorrelated. On the other hand, the

factor solution that results (after deleting the 39 items) may not adequately represent the instrument as a whole.

The factor analysis on the remaining items does not provide as satisfactory a view of the instrument as a measure of a few clear components. Rather than suggesting two main factors (Time Urgency and Perpetual Activation), factor analysis yielded 28 factors. The first accounted for only 19.57% of the variance. The subsequent four factors accounted for 6.31, 4.42, 3.64 and 3.19% of the variance. The remaining factors account for from 3.00 to 1.00% of the variance. One possible interpretation of these observations is that the TUPA items largely tap one broad domain that combines the notions of Time Urgency and Perpetual Activation and that each small factor represents a trivial dimension that may relate to a specific context (e.g., driving a car). The observation of a high correlation between both of Wright's TU measures and both PA measures, leads to the conclusion that these constructs have not been empirically distinguished.

Since the factor analysis of the TUPA as a whole could not be done and the analysis of the items remaining (after deleting those items that were too highly intercorrelated) was confusing, the internal reliability of the entire scale and of the two subscales was assessed. Coefficient alpha for the entire TUPA was .9716. This was higher than the alpha

for the 105 TU items (alpha=.9642) and the 32 PA items (alpha=.8982).

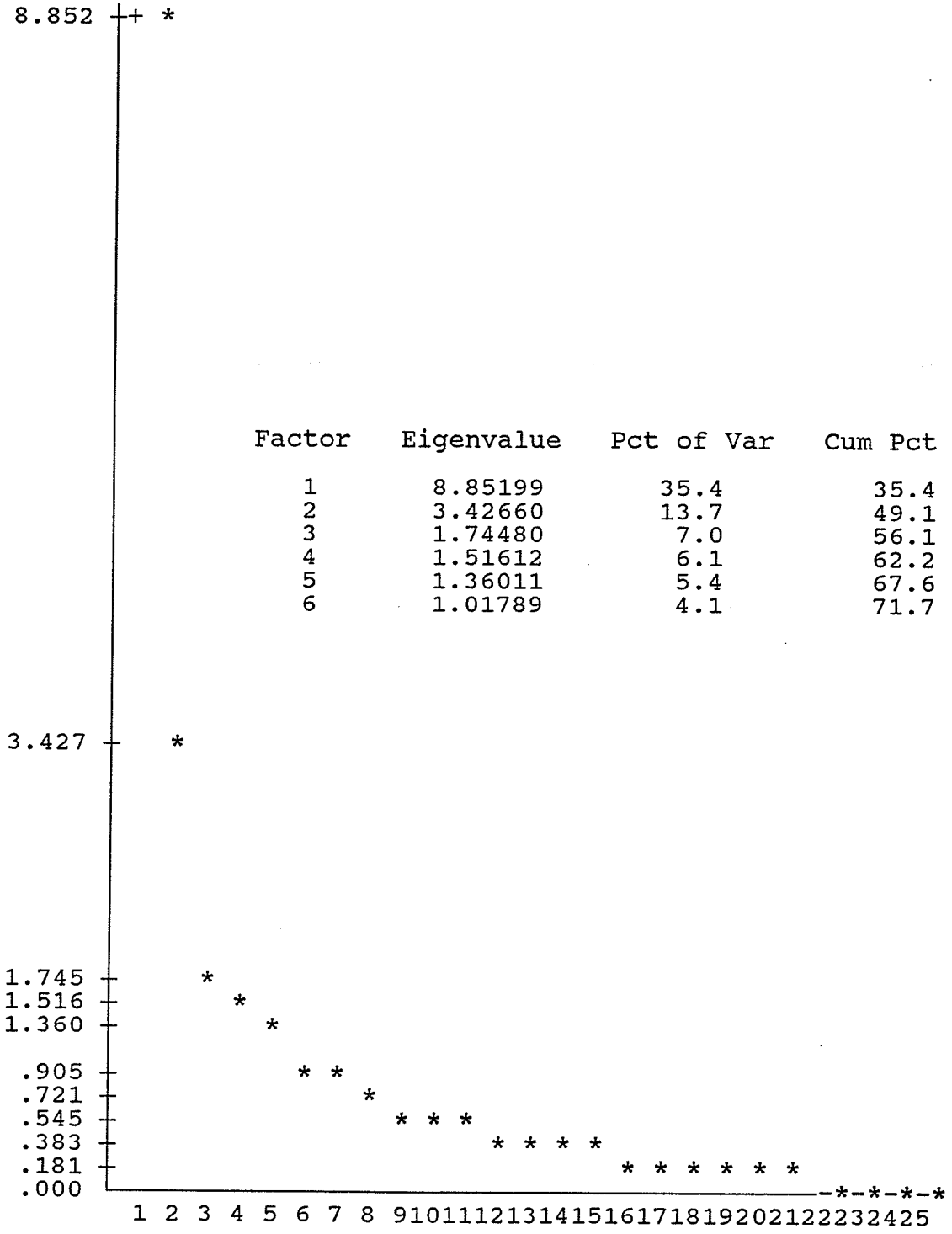
Factor analysis of all the measures of time urgency and related constructs arising from the SWS, TUPA, TOS, WOL, and ASI produced a six factor solution using varimax rotation. Table 7 shows the sorted, rotated factor loadings. Figure 4 shows the scree plot of eigenvalues and the variance accounted for by each factor.

The first factor consists of seven variables with factor loading greater than .60. All measures of time urgency and perpetual activation developed by Wright and associates both from the TUPA and the ASI are among these. In addition, the WOL scale that measures non-mutuality is among the variables loading high on factor one. Two of Landy's Likert scales (competitiveness and speech patterns) load high as well. A third such scale (Task-Related Hurry) and one BARS (deadline control) load moderately (between .40 and .59). This factor alone accounts for 35.4% of the total variance. This factor is, in the opinion of this author the one best labeled "Time Urgency/Perpetual Activation." It is noteworthy that the global Type A/B measure used in this study loads less than .30 on this factor.

Factor two consists of four of the six SWS subscales. Three of those (Competition, Impatience, Anger) load high and the fourth (Time Urgency) loads moderately. The General Hurry TOS Likert scale also loads high on this factor. In addition, the global Type A/B measure loads high on this factor. This factor accounts for 13.7% of the total variance. The label "Hard-driving, Competitive Impatience" may best describe this factor.

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
TUSI	.82183*	.21743	.15186	.07359	.05895	-.14932
PA	.77777*	.19765	.21451	.30761	-.11218	.11613
TOS5	.77300*	.00685	.13941	.20214	.21520	-.01161
PASI	.77260*	.09118	.16013	-.06021	-.10268	-.00208
TOS1	.71990*	.31533	.18077	.20997	-.12108	.16835
TU	.67904*	.43385	.23955	.33918	-.05894	-.06131
WOL	.63731*	.41264	.14751	.15113	-.28069	-.02163
BARS7	.56951*	-.08238	-.09740	.16729	-.33490	.43626
TOS4	.54041*	.16542	.41376	.16655	.14898	-.06606
BARS3	.41303+	.12204	-.19288	.34277	-.27392	.21522
SWS6	.13834	.86578*	.05543	.02834	-.01218	.07691
SWSTOTAL	.28716	.82845*	.13620	.09475	.40896	.06534
SWS1	.29407	.78069*	.06718	.10954	.13087	-.23704
SWS2	-.00012	.68016*	-.06067	.15319	.41162	-.39041
TOS3	.34919	.59502*	.06262	.35492	-.04400	-.07569
SWS4	.36794	.43847+	.37578	.00162	.43292	.34347
TOS2	.25348	.11946	.87975*	.08152	-.01795	.04844
BARS6	.21768	.00935	.85887*	.10907	-.08414	.02084
BARS4	.08686	.14281	.30973	.71941*	.11145	-.15598
BARS2	.21990	.32031	.04670	.70226*	.12576	.09789
BARS5	.41632	-.47629	-.15707	.51798*	.11154	.10841
SWS5	-.05435	.21315	-.06876	.24347	.76756*	.00714
BARS1	.22477	-.06005	.07930	.48216	-.51631*	.01849
AI/OSI	.21655	.36130	.02601	-.05888	-.05727	-.73563*
SWS3	.43099	.22796	.23235	-.15519	.00194	.51754*

Table 7
Sorted Varimax Rotated Factor Matrix:



Factor	Eigenvalue	Pct of Var	Cum Pct
1	8.85199	35.4	35.4
2	3.42660	13.7	49.1
3	1.74480	7.0	56.1
4	1.51612	6.1	62.2
5	1.36011	5.4	67.6
6	1.01789	4.1	71.7

Figure 4
Scree Plot of Eigenvalues
from factor analysis of subscales

Factor three consists of the two eating behaviour scales from the TOS, one from the BARS section and the other from the Likert section. Both load high and together they account for 7.0% of the total variance.

Factor four consists of three of the seven BARS (Nervous Energy, Speech Patterns, List-Making). These variables load high and together account for 6.1% of the total variance.

Factor five consists of the SWS scales for Job Dissatisfaction that loads high and the BARS for awareness of time that has a high negative loading. For the student sample used in this study, this factor may represent dissatisfaction with unstimulating part-time work and/or boredom/dissatisfaction with school. It seems that being aware of the passing of units of time is negatively related to this kind of dissatisfaction. This factor accounts for 5.4% of the total variance.

Factor six, although accounting for only 4.1% of the total variance, may be important because its primary component is the scale from the ASI that assesses anger-in/Out. Since it loads high but negative, it represents anger-in. The SWS work involvement scale also loads high on this factor. This factor might well be termed "Work preoccupied internalizer."

To attempt to address the question of the invariance of all the measures of time urgency and related constructs arising from the SWS, TUPA, TOS, WOL, and ASI separate factor analyses were performed for those subjects above and below the mean on the TU scale from the TUPA. If the measures are invariant then they should load together on the same factors both for subjects high on time urgency and for low time urgency subjects. The three components of the ASI and the two components of the TUPA measure and the WOL, all developed by Wright and associates meet this criterion of invariance. This is also true for the SWS Impatience and Anger subscales, the two eating behaviour scales from the TOS (one BARS and one Likert), and the Speech Patterns and Nervous Energy BARS from the TOS. Of all the measures the Likert section of the TOS has the lowest invariance, followed closely by the SWS . When one considers that the factor accounting for the most variance (34.9%) in the entire sample is the one that consists mainly of invariant measures, it leads to the conclusion that factor one could be the best single measure of the characteristic of time urgency/perpetual activation.

Since the proposal for the present study was approved, the author has become familiar with techniques of hierarchical cluster analysis that are better suited (than the techniques originally proposed) to discovering the relationships among measures of time urgency and other constructs that may be related to time urgency. Using cluster analysis with stepwise discriminant analysis provides a powerful method that goes beyond the factor

analysis and canonical correlation analysis originally proposed. One great advantage is that the relationships among a multitude of measures and methods of classification or description can be evaluated simultaneously. Using cluster analysis with discriminant analysis it is unnecessary to do pairwise comparisons of the measures, an approach that is both cumbersome and error-prone.

Cluster Analysis

Cluster analysis was performed using the Syn-Tax IV (Podani, 1990) program HMCL, a program for generating hierarchical classifications using one of eight agglomerative sorting strategies that maximize the homogeneity of clusters as assessed by one of three homogeneity measures. That program offers 29 different similarity measures and two alternate methods for resolving ties encountered during the analysis.

Cluster analysis begins by computing a matrix of similarities among the objects being clustered. These objects can be subjects (cases) or variables (attributes of subjects). Since, with the ratio and interval metric information typically used in psychology, the Pearson .cp12product moment correlation coefficient is routinely used to evaluate the relationship among variables, this similarity measure was selected for the cluster analysis.

The next step in agglomerative cluster analysis is to find objects or groups of objects that can be merged into a single cluster according to some rule or sorting strategy. Three of the eight available sorting strategies were tried (minimization of the error sum of squares in new clusters, minimization of variance in new clusters, and minimization of the increase of error sum of squares). The last method, also known as Ward's method produced the most satisfactory classification. This determination is based on subjective criteria that derive from the researcher's experience with such classifications. This is not unlike the decision of the number of "meaningful" factors one chooses to accept from a factor analysis .

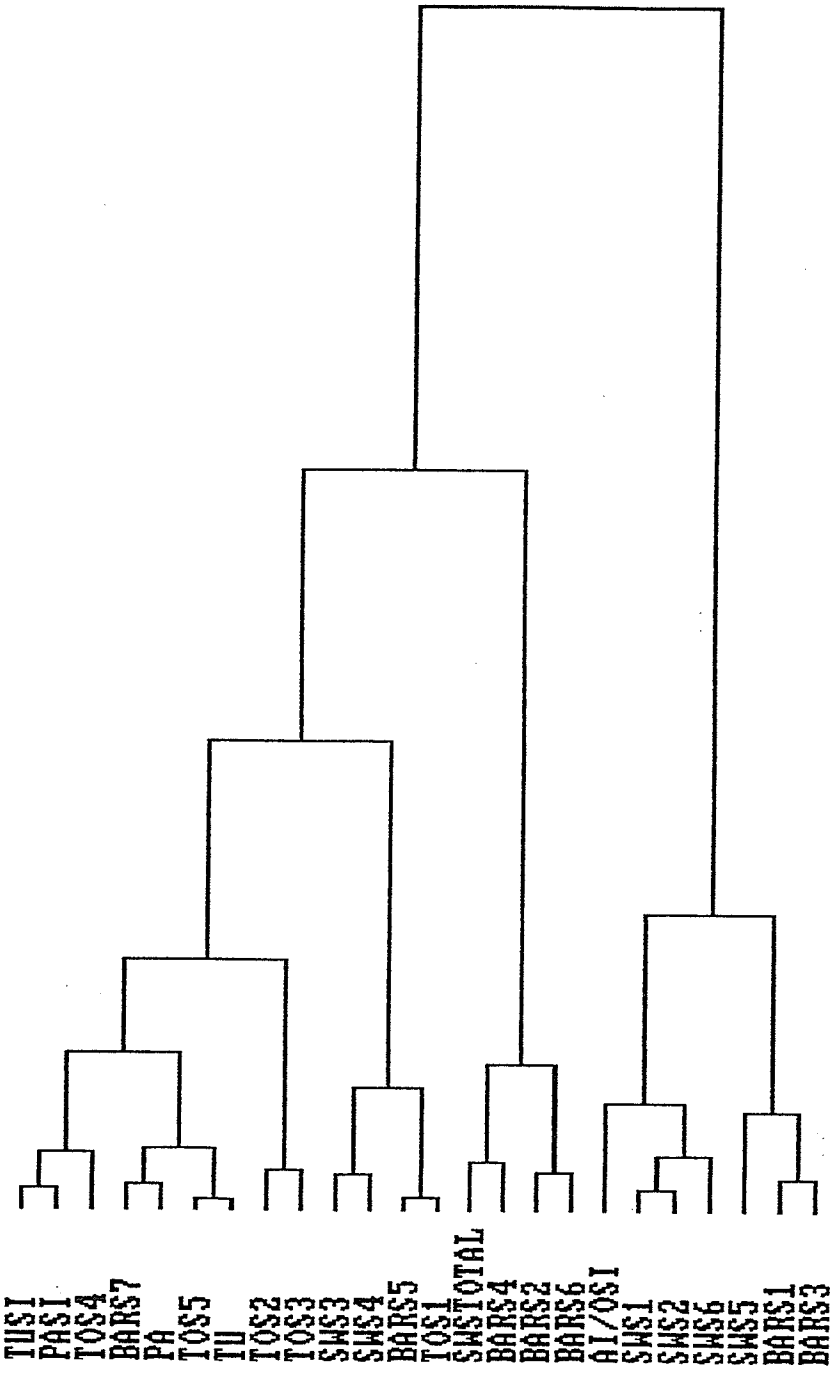
The results of a cluster analysis are best represented as a dendrogram, a branching tree structure that shows how the objects and clusters of objects were combined into decreasing numbers of aggregations as the agglomerative procedure progressed. By examining the dendrogram, a decision can be made concerning the point in the procedure where an "appropriate" number of meaningful clusters have been identified. Figure 5 is the dendrogram that resulted from the cluster analysis of 99 cases described by 25 measures derived from the various instruments used in this research.

Since cluster analysis results in arranging objects (subjects) into clusters even if there are in fact no separable clusters in the data it can potentially lead to misleading and false conclusions. One remedy to this

potential problem is to apply ordination techniques as well to the same data sets. This is why the data analysis in this study employed both principal components analysis with orthogonal rotation (Factor Analysis) and Correspondence Analysis. The factor analysis has already been presented. The integration of the information from the ordination techniques and the cluster analysis will be presented later in this section.

Once the number of clusters has been decided, the membership of the clusters can be examined. This provides information about which cases (subjects) have been grouped together based on their similarity on the entire collection of measures and descriptors included in the analysis. Four clusters were identified from the cluster analysis done on the subjects.

When it is the variables that are clustered rather than the subjects (by transposing the data matrix given as input to the program) the result is clusters of variables similar in the way subjects responses to those variables. The clustering of variables has much in common with factor analysis of variables based on subject data. The six factors from the factor analysis of the all the measures of time urgency and related constructs arising from the SWS, TUPA, TOS and ASI are readily identified on the dendrogram of variables (see figure 7).



Dendrogram of variables

Figure 7

Discriminant analysis is one of the best ways to determine the variables on which the members of clusters are similar and the ways in which the clusters differ. In this study SPSSPC was used to do a stepwise discriminant analysis. The first variable that entered the discriminant function was the SWS anger subscale. Clusters one, two, and three had means (50.55, 49.00, 55.48) higher than the grand mean (47.59) and Cluster four had a mean (38.55) lowers than the grand mean. This variable was subsequently removed from the discriminant function after Factor two ("Hard-driving, Competitive Impatience") was added to the function at step three. One way analysis of variance with the Student-Newman-Keuls multiple range test confirms a significant difference among the clusters ($F(3,95)=14.367$, $p < .05$). Cluster four was significantly lower than every other cluster. There was significant heterogeneity of variance with Cluster three by far the most variance and Cluster four showing the least.

The TU subscale of the TUPA entered the discriminant function at step two. Clusters one and four had means (294.45 and 294.71) on this variable higher than the grand mean (282.22). Clusters two and three had means (261.88 and 261.24) lower than the grand mean. Since this variable (Time Urgency) is the first variable that entered the discriminant function that is not later removed, it becomes the primary discriminator among the clusters. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=6.257$, $p < .05$). Both Clusters one and Cluster four were significantly higher than both Clusters two and three.

At step three, as previously noted, factor two ("Hard-driving, Competitive Impatience") entered the discriminant function. Clusters one and three had higher means (396.70 and 425.41) than the grand mean (380.32). Clusters two and four had lower means (371.60 and 337.92) than the grand mean. In many ways factor two is like a global Type A measure and the high scoring clusters contain Type A subjects and the low scoring clusters contain Type B clusters. The Global Type A measure from the SWS that entered the discriminant function at step eleven shows the same pattern of means noted above for factor two. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=12.144$, $p < .05$). Cluster four was significantly lower than other cluster and Cluster three was significantly higher than Cluster two.

This suggests that Time Urgency and global Type A are independent of each other. Both Type A and Type B individuals can be Time Urgent or not Time Urgent as the cluster means discussed above illustrate.

At step four, as previously mentioned, the SWS anger scale is removed from the discriminant function.

At step five, the SWS Job Dissatisfaction subscale entered the discriminant function. Clusters two and three (the low time urgency clusters) were the ones with the means (54.13 and 47.52) higher than the grand mean (44.30). Cluster one had a mean (43.16) not substantially lower than the grand mean while Cluster four (a high time urgency cluster) had a mean (38.19) lower than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=11.352$, $p < .05$). Cluster two was significantly higher than every other cluster and Cluster four was significantly lower than every other cluster.

At step six the SWS Impatience subscale entered the discriminant function. Clusters one and three had higher means (56.55 and 57.00) than the grand mean (51.39). Clusters two and four had lower means (46.31 and 45.06) than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=10.866$, $p < .05$). Both Clusters one and Cluster three were significantly higher than both Clusters two and four.

At step seven the AI/OSI subscale entered the discriminant function. Clusters one and three had higher means (6.67 and 1.79) than the grand mean (1.10). Clusters two and four had lower means (-1.62 and -3.52) than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=6.932$, $p < .05$).

Cluster two and Cluster four were significantly lower than Cluster one.

At step eight the Scheduling BARS entered the discriminant function. Clusters one, two, and four had higher means (4.55, 4.69, and 4.52) than the grand mean (4.34). Cluster three had a lower mean (3.52) than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=3.241$, $p < .05$). Cluster one and Cluster four were significantly higher than Cluster three. Even though Cluster two had a higher mean it was not significantly higher than cluster three. This is undoubtably a function of the smaller size of this cluster and the higher within-group variability.

At step nine the WOL scale entered the discriminant function. Clusters one and four had higher means (16.29 and 16.81) than the grand mean (15.85). Clusters two and three had lower means (14.38 and 14.90) than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=5.131$, $p < .05$). Both Clusters one and Cluster four were significantly higher than both Clusters two and three.

At step ten the SWS Work Involvement scale entered the discriminant function. Cluster one and four (43.26 and 44.10) did not differ markedly from the grand mean (44.07). Cluster two had a lower mean (39.88) than the grand mean and Cluster three had a higher mean (48.43) than the grand mean. One way analysis of variance does not confirm a significant difference among the clusters ($F(3,95)=1.800$, $p > .05$). This means that the incremental contribution of this variable to the discriminant function was not reflected in overall differences among the clusters.

At step eleven the SWS Global Type A/Type B scale entered the discriminant function. Clusters one and three had higher means (294.52 and 317.52) than the grand mean (285.34). Cluster four had a lower means (255.29) than the grand mean. Cluster two had a mean (283.56) just slightly lower than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=11.763$, $p < .05$). Cluster three was significantly higher than every other cluster. Cluster four was significantly lower than every other cluster.

At step twelve the TUSI entered the discriminant function. Clusters one and four had higher means (67.87 and 67.34) than the grand mean (64.39). Clusters two and three had lower means (59.20 and 58.84) than the grand mean. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=3.554$, $p < .05$). Cluster two was

significantly lower than Cluster.

Figure 6 summarizes the way the four clusters differed on the discriminating variables. At this point it is appropriate to summarize the characteristics of the four clusters and to contrast them.

	CLUSTER			
	Type A's		Type B's	
	Time Urgent			
	3	1	4	2
BARS SCHEDULING				
SWS Anger	L	H	H	H
FACTOR 2 (HD,Comp,Impat.)	H	H	L	L
SWS IMPATIENCE	H	H	L	L
ASI ANGER IN/OUT	H	H	L	L
TUPA TU	H	H	L	L
WOL NON-MUTUAL	L	H	H	L
ASI TIME URGENCY	L	H	H	L
SWS TYPE A/B	L	H	H	L
SWS JOB DISSAT.	H	H	L	
WORK INVOLVEMENT	H		L	H
SWS ANGER	H			L

Figure 6

Relative magnitude of discriminators by cluster sorted by magnitude of discriminator

Cluster one members (n=31) were individuals most like what one considers the "prototypical" Type A. They were high on anger, anger-out, Impatience, Non-mutuality in decision making and Time Urgency.

Cluster three members (n=21) were also Type A but they differed from those in Cluster one by not being Time Urgent, not being strong on scheduling, being much more work involved and higher in Job Dissatisfaction than the members of any other cluster.

Cluster two members (n=16) were almost the exact opposite of the members of Cluster one. These were the "prototypical" Type B subjects.

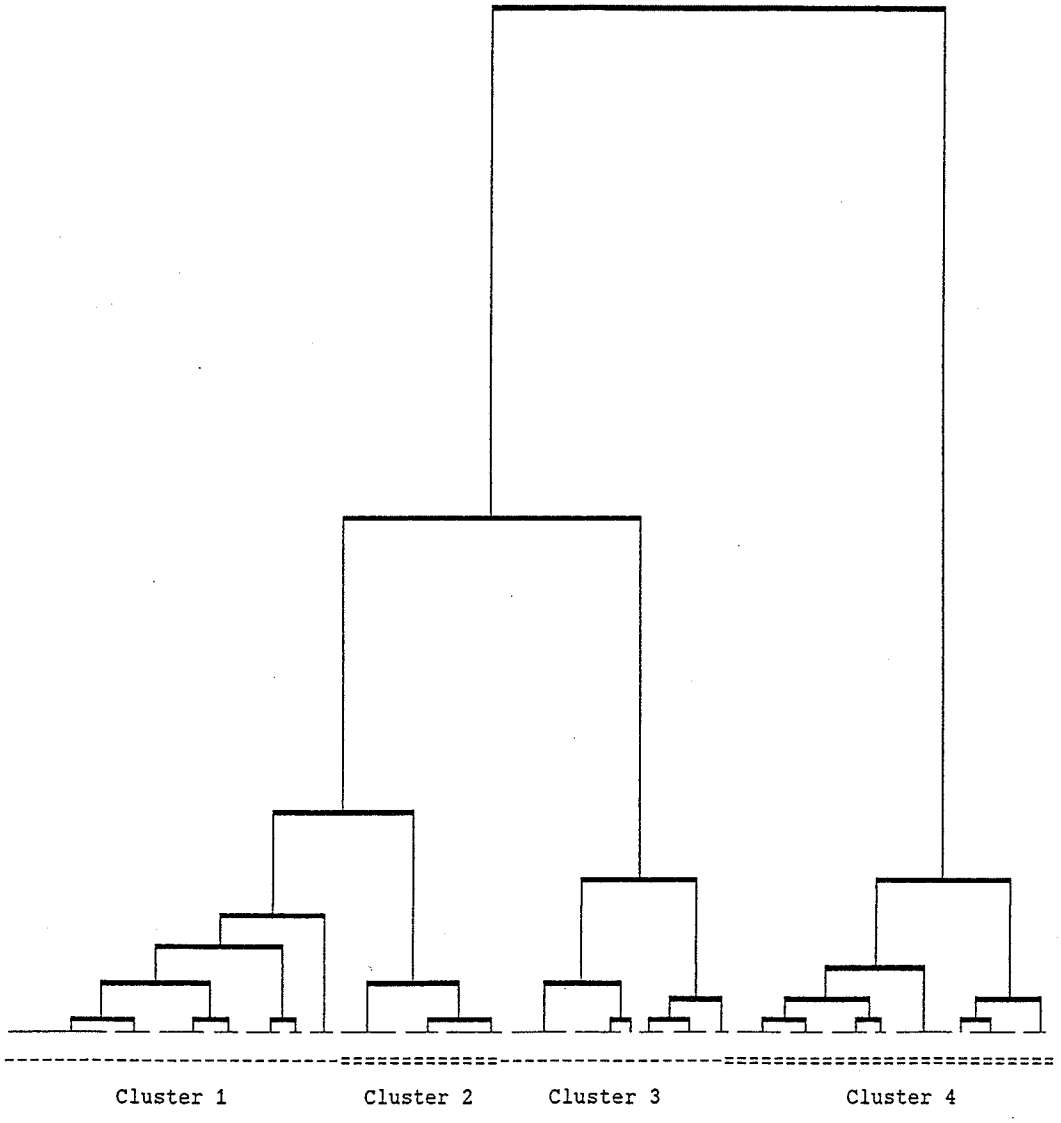
Cluster four members (n=31) were also Type B but they differed from those in Cluster two in that they were very time urgent and high on non-mutual decision making. They were lower in Job Dissatisfaction than both clusters of non-Time Urgent individuals. The existence of a large (31/99) group of time urgent Type B individuals is remarkable given that time urgency has long been considered a main feature of the Type A Behaviour pattern. This suggests that time urgency is not by any means restricted to that group.

Cluster analysis of all the measures of time urgency and related constructs arising from the SWS, TUPA, TOS, WOL, and ASI produced a dendrogram (Figure 7 in which six clusters were easily identified. The largest cluster consisted of seven of the nine variables that load high on Factor one. Clusters that correspond to Factor two, Factor

three and Factor four were readily discernible. Given that both factor analysis and cluster analysis begin with a matrix of similarities (correlations) and then arrange the objects according to these similarities, it was not unexpected that the results were similar despite the fact that cluster analysis, unlike the factor analysis done, uses no rotation procedures. The similarity of the solutions of these two procedures provides convergent evidence for the relationships among the measures.

Correspondence Analysis

Using the Syn-Tax IV PRINCOMP program a correspondence analysis was performed. This involves a simultaneous ordination of cases and variables and is especially valuable in clarifying the relationships between them. This analysis was done by symmetrically weighting the cases and variables in determining the coordinates. Correspondence analysis is also known as reciprocal averaging. In effect, this technique does a conjoint principal components analysis between cases and variables. This analysis was done to confirm the results of the cluster analysis of cases and to



Dendrogram of Individuals

Figure 5

relate it to the results of the factor analysis of variables. The most useful part of the output is the scatterplots of cases and variables using the coordinates determined by the analysis. Since the first two components are always the ones that account for the most variance (in this instance 27.98 and 16.56%), using these components as the axes for plotting is the most informative. Figure 8 shows the variables plotted on first two components of correspondence analysis with the variable codes replaced by the factor number on which the variable loads most strongly. The sign before the factor number differentiates strong positive and negative loading variables. Figure 9 shows the cases plotted on the first two components of correspondence analysis with the case numbers replaced by number of the cluster to which the case belongs. It is informative to examine the dendrogram of cases and this plot simultaneously. The dendrogram when viewed from the top downwards shows that Cluster four splits from all the other cases first. This means it is the most dissimilar from the other three clusters. This is why the Cluster four members are the most easily seen as a distinct aggregate on the scatterplot. The next cluster to split from the rest is Cluster three. It too is fairly easy to identify on the scatterplot. While Cluster 2 is tighter than Cluster one, there is considerable overlap between these two clusters on the scatterplot. This is consistent with the observation that in the discriminant analysis 9.7% ($^{3}/_{31}$) of the Cluster

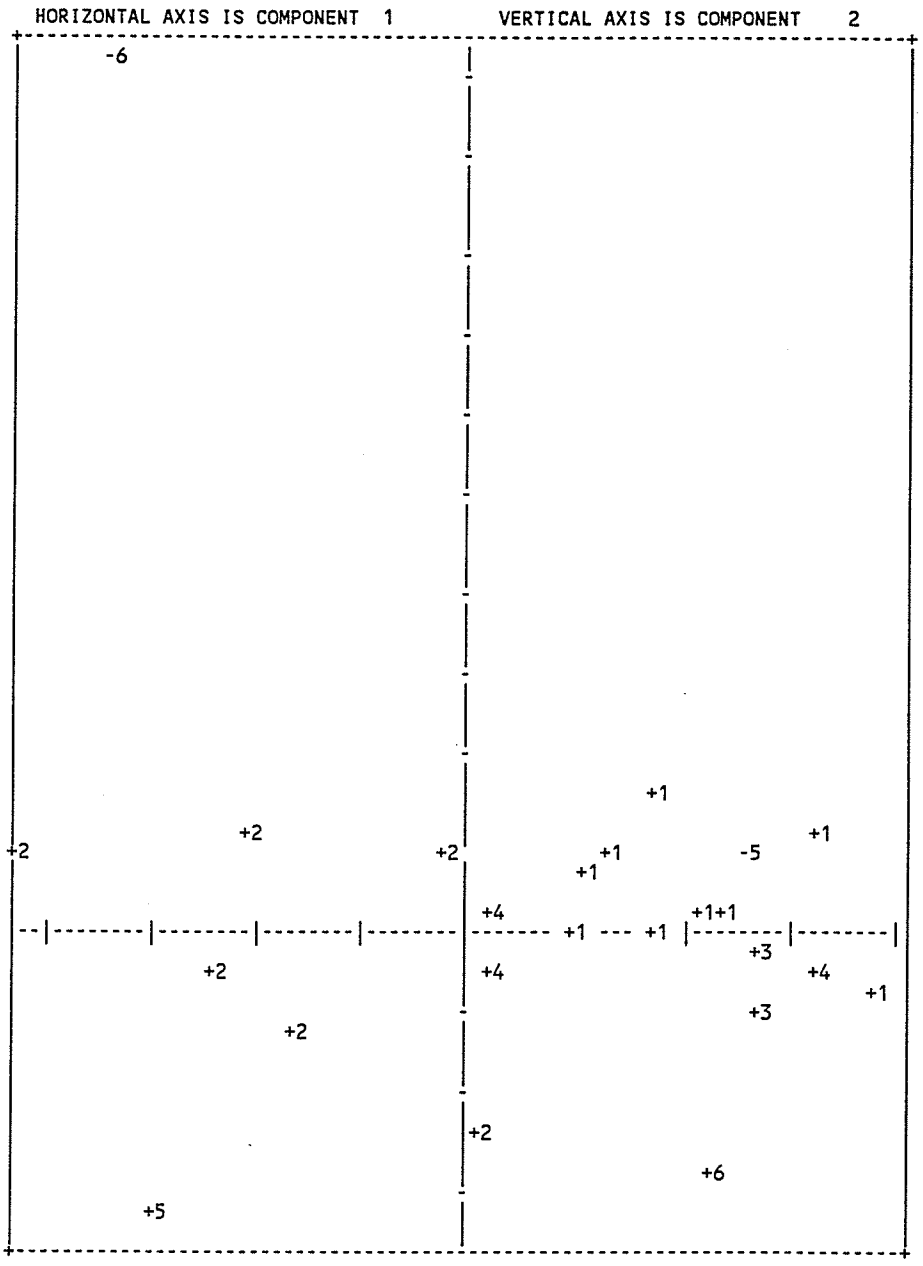


Figure 8

Variables plotted on first two components of correspondence analysis with variable codes replaced by factor number on which variable loads most strongly

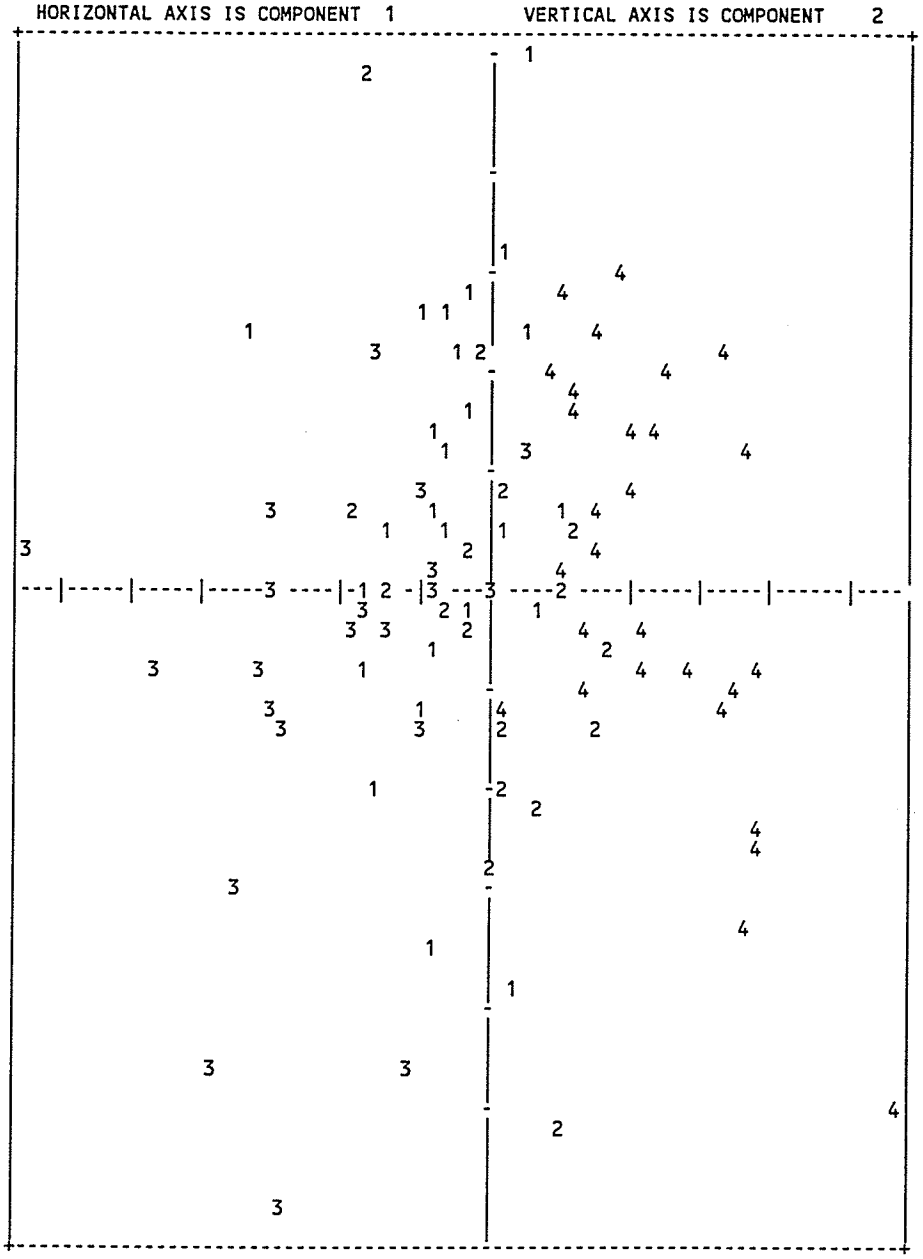


Figure 9
Cases plotted on the first two components of correspondence analysis with case numbers replaced by cluster to which case belongs

one members were misclassified as belonging to Cluster two and 6.3% ($^1/_{15}$) of the Cluster two members were misclassified as belonging to Cluster one. The other misclassifications involved clusters one and three, the two Type A clusters.

Comparison of Contrasted Groups

One way to evaluate the validity of a construct (in this case, time urgency) is to administer measures of it to groups believed to differ for theoretical reasons. If the expected differences on the measures are observed then this provides converging evidence for construct validity (Anastasi, 1976).

Analysis of variance

The Cluster analysis of subjects identified four clusters of individuals who were similar to each other on the dependent variables used to assess constructs related to time urgency. The factor analysis identified six clusters of variables to which subjects tended to respond similarly. Since the membership of clusters and the composition of factors were determined independently, the relationship among the clusters of subjects and factors (clusters of variables) should serve to clarify the constructs assessed in this study.

Factor one (time urgency/perpetual activation) would be expected to show effects between the time urgent clusters and the non-time urgent clusters. One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=6.438$, $p < .05$) as predicted. Clusters one and four ($\bar{X}=398.56$ and $\bar{X}=403.53$) were significantly greater than Clusters two and three.

Factor two (Hard-driving, Competitive Impatience) would be expected to show effects between the impatient clusters (one and three) and the patient clusters (two and four). One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=12.144$, $p < .05$). Cluster three ($\bar{x}=425.408$) was significantly greater than Cluster two ($\bar{x}=371.596$), and Cluster four ($\bar{x}=337.917$). Cluster one ($\bar{x}=396.695$) was significantly greater than Cluster four but not different from Cluster two. Thus it was possible to confirm the predicted differences in three out of four comparisons.

Factor three (eating behaviour) would not be expected to show any between-clusters effects as the constituent variables were not useful as discriminators among the clusters. The one way analysis of variance failed to find a significant difference among the clusters ($F(3,95)=1.772$, $p > .05$).

Factor four (Nervous Energy, Speech Patterns, List-Making) would not be expected to show any between clusters effects as the constituent variables were not useful as discriminators among the clusters. The one way analysis of variance failed to find a significant difference among the clusters ($F(3,95)=0.959$, $p > .05$).

Factor 5 (Job Dissatisfaction, low awareness of time) would be expected to show effects between the clusters high on Job Dissatisfaction (Clusters two and three) and the cluster low on Job Dissatisfaction (Cluster four). One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=12.505$, $p < .05$). Cluster two ($\bar{x}=39.253$) and Cluster three ($\bar{x}=34.142$) were significantly greater than Cluster four ($\bar{x}=26.401$).

Factor six (Work preoccupied internalizer) would be expected to show effects between clusters high on anger-in (Cluster four) and clusters high on anger-out (Cluster one) and between clusters high on work involvement (Cluster three) and clusters low on work involvement (Cluster two). One way analysis of variance with the Student-Newman-Keuls multiple range test confirmed a significant difference among the clusters ($F(3,95)=4.326$, $p < .05$). Cluster four ($\bar{X}=25.408$) and Cluster three ($\bar{X}=23.748$) were significantly greater than Cluster one ($\bar{X}=17.484$). This analysis, then, was able to confirm only the former of the above predictions. Since work involvement was not as important a discriminator among clusters as was anger-in/anger-out this outcome is not difficult to understand.

Behavioural task. To test the hypothesis that time urgent individuals would perform more poorly on the DRL task, a multivariate analysis of variance was performed on the mean decision time, response time, the% of responses made during the specified timer interval and total number of responses required to achieve the learning criterion using the TU scores from the TUPA, split at the mean, as the independent variable. This time urgency measure was selected over the SWS time urgency scale and the TUSI because it is based on the largest number of items and seems to have good face validity. No significant effect was obtained for any of the dependent variables.

The observational measures were evaluated as follows: the sum of the "restless" behaviours ratings observed over the five one-minute intervals of the "waiting" period was evaluated using MANOVA with TU and PA split at the mean as the independent variables. There were no main effects for either TU or PA and no interaction effect between them. All

F ratios were less than 1.00. In addition a between-groups X Minute repeated measures ANOVA was performed to see if the group differences change over time at different rates (i.e., to see if there is an interaction between group and time on restlessness). There was no repeated-measures effect nor any interaction between the independent variables and the repeated factor or among the independent variables. All F ratios were less than 1.00 and therefore not significant.

Repeated measures analysis of variance

In the TUPA, subjects rated how often they engage in various time urgent and perpetually active behaviours. Following the TUPA they were asked to consider ten randomly-selected behaviours from each of the three response categories (Always, Almost Always, Almost Never) that indicated some frequency of engaging in time urgent behaviour. For each item the subjects were presented with the two feeling/belief statements shown in Figure 1 and asked to indicate how often they reacted that way when engaging in the specified behaviour. With two questions for each of behavioural item and three categories of ten items, this amounted to a total of 60 follow-up questions on the TUPA. Repeated measures ANOVAs were performed with time-urgency (high versus low TU score) as the grouping factor and the frequency of engaging in time urgent behavioural examples as a within-subjects factor and two belief statements concerning time urgent behaviours as dependent variables. Table 8 summarizes the means and standard deviations for these two analyses.

On the analysis of the average response to the item, "When I act this way I feel I have more control over things around me and the rewards and benefits I get out of what I do," the following results were obtained. There was a significant ($F(1,97)=21.05$, $p < .05$) main effect for TU. The time urgent subjects had higher ratings on the item at all three frequency levels. There was a significant ($F(2,96)=132.958$, $p < .05$) repeated-measures effect for Frequency. On the one to seven Likert scale the mean ratings for the low and high TU subjects were Always($\bar{x}=4.274$ versus $\bar{x}=5.302$), Almost Always($\bar{x}=4.406$ versus $\bar{x}=5.157$), and Almost Never ($\bar{x}=2.836$ versus $\bar{x}=3.610$). It should be noted that there was significant heterogeneity of variance (Bartlett-Box $F(1,28219) = 8.13824$, $p = .004$) for the "Always" cell with the greater variability originating with the non-time urgent subjects. There was no significant interaction between TU and Frequency ($F(2,96)=0.587$, $p > .05$).

On the analysis of the average response to the item, "I believe this example describes a healthy way to act that helps me be more successful and effective at the things I do," the following results were obtained. There was a significant ($F(1,97)=12.74$, $p < .05$) main effect for TU. The time urgent subjects had higher ratings on the item at all three frequency levels. There was a significant ($F(2,96)=80.361$, $p < .05$) repeated-measures effect for Frequency. On the one to seven Likert scale the mean ratings for the low and high TU subjects were Always($\bar{x}=4.014$ versus

"When I act this way I feel I have more control over things around me and the rewards and benefits I get out of what I do."

Frequency Category of engaging in time-urgent behavior

Time Urgency	Always Mean	Always Std. Dev.	Almost Always Mean	Almost Always Std. Dev.	Almost Never Mean	Almost Never Std. Dev.	N
Low	4.274	1.810	4.406	1.070	2.836	.857	50
High	5.302	1.191	5.157	.872	3.610	.945	49
Mean	4.783	1.612	4.778	1.043	3.219	.978	99

"I believe this example describes a healthy way to act that helps me be more successful and effective at the things I do."

Frequency Category of engaging in time-urgent behavior

Time Urgency	Always Mean	Always Std. Dev.	Almost Always Mean	Almost Always Std. Dev.	Almost Never Mean	Almost Never Std. Dev.	N
Low	4.014	1.601	4.166	.992	2.814	.901	50
High	4.786	1.145	4.594	.850	3.455	.977	49
Mean	4.396	1.440	4.378	.945	3.131	.988	99

TABLE 8
Means and S.D.'s of time urgent beliefs by TU scores

$\bar{X}$=4.786), Almost Always($\bar{X}$=4.166 versus $\bar{X}$=4.594), and Almost Never ($\bar{X}$=2.814 versus $\bar{X}$=3.455). It should be noted that .pathere was significant heterogeneity of variance (Bartlett-Box $F(1,28219) = 2.28506$, $p = .022$) for the "Always" cell with the greater variability originating with the non-time urgent subjects. There was no significant interaction between TU and Frequency ($F(2,96)=1.403$, $p > .05$).

Post hoc analyses on pairs of frequency categories (e.g., Always, Almost Never) revealed that the repeated measures effect was due entirely to the differences between responses to the "Almost Never" behaviours and the two other frequency levels. The main effect for time urgency was consistent no matter what levels of the within-subjects factor was being examined. The tail probabilities for these post-hoc tests were so small that the use of adjustments to control experiment-wise error would not alter the conclusions.

A similar analysis was performed with cluster instead of time urgency as the independent variable. Table 9 summarizes the means and standard deviations for these two analyses. On the analysis of the average response to the item, "When I act this way I feel I have more control over things around me and the rewards and benefits I get out of what I do," the following results were obtained. There was a significant main effect for Cluster ($F(3,95)=6.05$, $p < .05$), a significant repeated-measures effect for Frequency ($F(2,94)=118.828$, $p < .05$) and no significant interaction between Cluster and Frequency ($F(6,190)=1.751$, $p > .05$). It should be noted that there was significant heterogeneity of variance for the "Always" cell with the least variability originating with the subjects in Cluster four. Cluster four, followed closely by Cluster one had higher ratings on the item at all three frequency levels than Cluster two and

Cluster three. On a one to seven Likert scale the mean ratings for Clusters one through four were Always($\bar{X}$=4.968, 3.925, 4.138, 5.477), Almost Always($\bar{X}$=4.958, 4.294, 4.305, 5.168), and Almost Never ($\bar{X}$=3.284, 3.244, 2.714, 3.484). The means from Table 8 and Table 9 are graphically represented in Figure 10.

On the analysis of the average response to the item, "I believe this example describes a healthy way to act that helps me be more successful and effective at the things I do," the following results were obtained. There was a significant main effect for Cluster ($F(3,95)=3.28$, $p < .05$), a significant repeated-measures effect for Frequency ($F(2,94)=69.453$, $p < .05$) and no significant interaction between Cluster and Frequency ($F(6,190)=1.844$, $p > .05$). It should be noted that there was significant heterogeneity of variance for the "Always" cell with the least variability originating with the subjects in Cluster four. Cluster four and Cluster one had higher ratings on the item at all three frequency levels than Cluster two and Cluster three. On a

"When I act this way I feel I have more control over things around me and the rewards and benefits I get out of what I do."

Frequency Category of engaging in time-urgent behavior

	Always		Almost Always		Almost Never		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	N
CLUSTER 1	4.968	1.601	4.958	.892	3.284	.897	31
CLUSTER 2	3.925	1.906	4.294	1.133	3.244	.974	16
CLUSTER 3	4.138	1.770	4.305	1.143	2.714	1.054	21
CLUSTER 4	5.477	.898	5.168	.878	3.484	.921	31
Mean	4.783	1.612	4.778	1.043	3.219	.978	99

"I believe this example describes a healthy way to act that helps me be more successful and effective at the things I do."

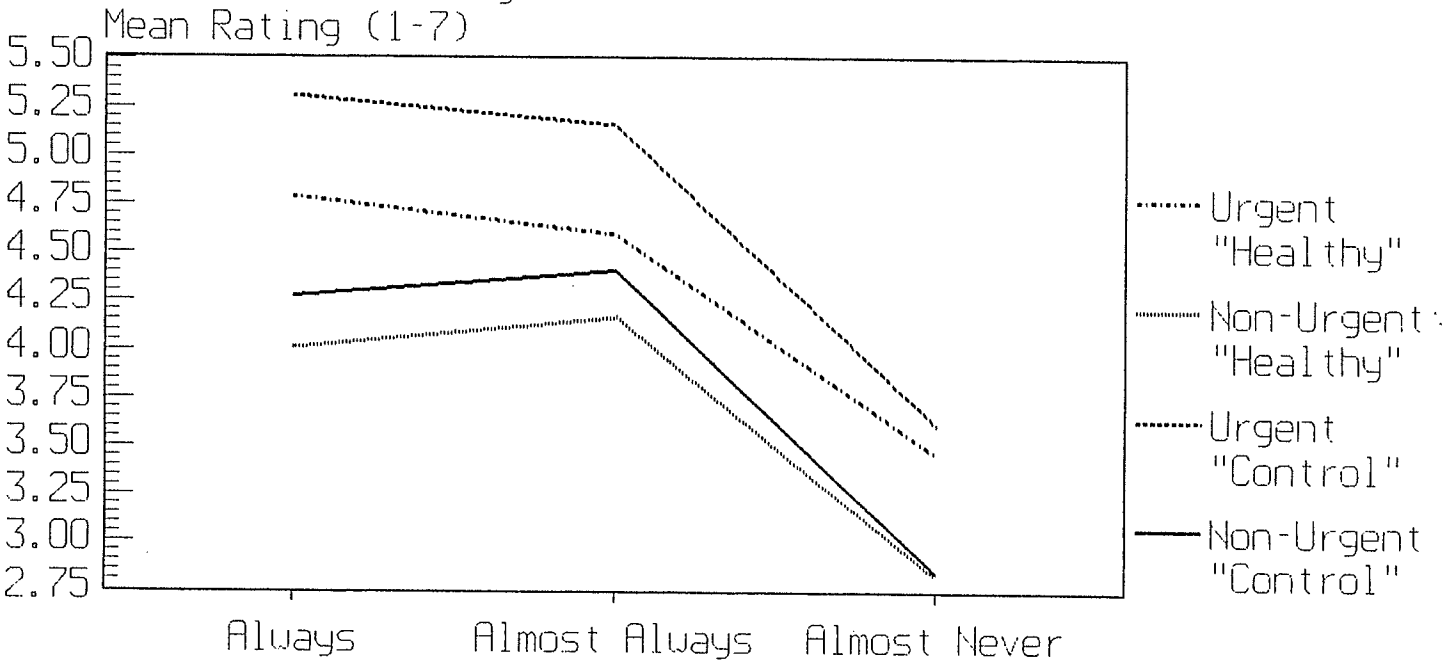
Frequency Category of engaging in time-urgent behavior

	Always		Almost Always		Almost Never		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	N
CLUSTER 1	4.568	1.455	4.635	.792	3.206	1.047	31
CLUSTER 2	3.681	1.804	3.956	1.107	3.119	.821	16
CLUSTER 3	3.886	1.436	4.157	1.078	2.867	.988	21
CLUSTER 4	4.939	.933	4.487	.831	3.242	1.020	31
Mean	4.396	1.440	4.378	.945	3.131	.988	99

Table 9
Means and S.D.'s of time urgent beliefs by cluster

Time Urgent versus Non Time Urgent on beliefs about enhanced control and healthfulness/adaptiveness of time urgency by frequency of such behavior

Figure 10



one to seven Likert scale the mean ratings for Clusters one through four were Always($\bar{x}$=4.568, 3.681, 3.886, 4.939), Almost Always($\bar{x}$=4.635, 3.956, 4.157, 4.487), and Almost Never ($\bar{x}$=3.206, 3.119, 2.867, 3.242).

Post hoc analyses on pairs of frequency categories (e.g., Always, Almost Never) revealed that the repeated measures effect was due entirely to the differences between responses to the "Almost Never" behaviours and the two other frequency levels. The main effect for cluster was consistent no matter what levels of the within-subjects factor was being examined for the question concerning control. For the question concerning "a healthy way to act" the effect for cluster did not hold up when the "Almost Always" and "Almost Never" behaviours were compared. The tail probabilities for these post-hoc tests that were significant were so small that the use of adjustments to control experiment-wise error (e.g., Dunn's test) would not alter the conclusions.

Other Analyses

While the main reason for including the WOL scale was to make the DRL task seem more meaningful to the experimental subjects than the DRL procedure reported by Glass (1977), the correlation between this score and measures of time urgency was examined to evaluate the hypothesis that inappropriate social control is related to time urgency. It was expected that time urgent individuals might use this non-mutual approach to decision-making to circumvent or avoid the delays and interruptions that go along with negotiation and collaborative decision making. The observed correlation was r=.7490, $p < .001$. Since the WOL scale itself is nested in what seemed a difficult and frustrating task, the scores derived from that task may have to be interpreted with caution. The effect of the difficulty of the task, if any, would have been to attenuate the

relationship between the WOL and other time urgency variables by decreasing the consistency of the subjects' responses. No estimate of internal consistency for this scale was computed because the way the WOL item responses were recorded within the context of the DRL task made extracting the responses extremely awkward. Given that the WOL variable loaded high on factor one, one may infer that the responses on that questionnaire were not adversely affected to any great degree.

Discussion

Summary of the findings

One major finding of this study was the identification of four clusters of individuals based on the time urgency and related measures used. Of particular interest was the discovery of a group of time urgent Type B individuals as large as the group of time urgent Type A individuals. The possible implications of cluster membership and relative risk for CHD are discussed below.

A second important finding was that time urgent individuals perceive their characteristic behaviour to enhance their sense of control over their environment and the reinforcement they get from their environment. They also perceive their time urgent behaviour as healthy and as something that contributes to their success and effectiveness. The implications of these beliefs are discussed further below.

A third finding was that the DRL task did not reproduce the findings of Glass (1977). The reasons for this failure to conceptually replicate those results are discussed below.

A fourth finding of this study is that time urgency and perpetual activation may not be meaningfully distinct. The concepts, taken together, may have predictive value but they are so highly correlated that distinguishing between them may not be productive.

Clusters of subjects and CHD risk

The cluster analysis of cases and the discriminant analysis to identify the variables that best distinguish one cluster from another was the part of the data analysis that provided the most information about the distribution of the characteristics measured by the instruments employed in this

study.

A fundamental question that follows from this research concerns the degree to which members of the four clusters might be at risk for Coronary Heart Disease. Cluster one seems to have the characteristics most like those individuals who score high on measures of Potential for Hostility (PoHo) that is scored on overt psychological and behavioural responses that indicate anger, irritation and resentment to frustrating events. Matthews et al, (1977) found that clinical CHD cases were higher than age-matched healthy controls on seven variables including, Potential for Hostility, Anger directed outward, and Irritation at waiting in lines. The combined effects of time urgency and anger-out may be associated with greater risk than either separately. This suggests that members of this cluster may be at the greatest risk of all the clusters for CHD. It has been shown that aggressive, hostile individuals secrete more norepinephine (NE) than more passive, anxious persons (Friedman, St. George, Byers, & Rosenman, 1960). Sudden releases of NE result in rapid changes in cardiovascular response. When such releases are associated with a survival response to actual danger they would be adaptive. When they occur chronically in response to stimuli that elicit Hostility and anger the repeated effects on the cardiovascular system may be damaging. This excessive wear and tear may contribute to the development of atherosclerosis (hardening of the arteries) and CHD.

Cluster three members, while having the tendency to be hard-driving, competitive and impatient and to express their anger outwardly, differ from those in cluster one. They are not inclined to work under extreme time pressure or to schedule their time tightly. They tend to be work involved and lose track of time. They are better at collaborating

with others and would likely experience less interpersonal conflict in that they are less inclined to non-mutuality in decision-making. Since they are not time urgent, many of the disruptions and obstacles to making progress on work that evoke extreme emotional outbursts in cluster one members would likely not do so in cluster three members. Cluster three members are also more likely to experience job dissatisfaction. This may be the result of the high expectations that they hold for themselves, characteristic of hard-driving, competitive individuals, which may be thwarted by their poorer organizational skills and low awareness of time. One might suspect that they would be prone to making internal attributions for difficulties and failures in areas related to work and achievement because they are much less likely to find events and individuals around them to be obstacles to their getting done the things they feel must be completed. This pattern of characteristics may make them more prone to depression and possibly gastrointestinal problems such as peptic ulcers. This group would likely be at lower risk for CHD than Cluster one because they do not possess the combination of anger-out and time urgency.

Cluster two members are intuitively the least at risk for CHD. They are not time urgent, or impatient. They tend to suppress reactions to frustrating events. They are easy-going, non-competitive and do not force their decisions on others. They tend to be high on job dissatisfaction but are low on work-involvement. This suggests they are bored rather than frustrated with their work.

Cluster four are the time urgent Type B individuals. They actively organize their time and prefer to work under pressure. Cluster four individuals are prone to non-mutual decision-making that may bring them into conflict with

others. They face more frustrations than other Type B's because events or individuals that obstruct or delay their work or plans. They are not particularly impatient with others who work slowly and tend not to express their anger. It is difficult to speculate where members of Cluster four stand with regard to risk for CHD. Being low on anger-out could mean they are at lower risk than those in Cluster one (Matthews et al, 1977). Subjects high on anger-in, on the one hand, faced with repeated disruptions to their schedules and plans that would engender frustration and resentment could be at greater risk for coronary heart disease relative to those low on anger-in (MacDougall et al, 1985). Anger-in is associated with seething qualities, muscle tension, and reluctance to complain about obvious annoyances (Wright & Schmidt-Walker, 1990). Spielberger, Johnson, Russell, Crane, Jacobs, & Worden (1985) summarize the findings of Johnson (1984) concerning the relationship between anger expression and blood pressure. They report positive correlations between anger-in and elevated systolic and diastolic blood pressure in both male and female high school students. Elevations in systolic blood pressure, it is often suggested, damage the inner lining of the coronary arteries, increasing the probability of atherosclerosis and subsequent coronary heart disease (Herd, 1978 (cited in Siegel, 1985)).

It is interesting that the SWS anger scale was the first to enter the discriminant analysis of the clusters. According to the authors the definition of this scale (as noted in Table 1) is, "One's propensity to become antagonized, resulting in an emotional excitement characterized by an evident display of feelings (flushed cheeks, accelerated heart rate), and a desire or intent to punish or seek revenge (Jackson and Mavrogiannis, 1987, Table 1, p. 5) ." This definition suggests both a tendency to be angry and hostile. Clusters one and three were both

high and Cluster four was extremely low on this dimension.

The existence of as large a cluster of Time Urgent Type B subjects as of Time Urgent Type A subjects poses a problem for the classic definition of the Type A behaviour pattern. The definition presented earlier in this paper (Glass, 1977) clearly links high time urgency with Type A and low time urgency with Type B. In contrast the results of this study suggest that time urgency varies independently with the other components of the Type A Behaviour Pattern (TABP). Not only does this suggest that the definition of the TABP may need to be revised but it may help to explain the apparent failure of recent studies (e.g., Ruberman, Weinblatt, Goldberg & Chandbury, 1984; Shekelle, Hulley, Neaton, Billings, Borhani, Gerace, Jacobs, Lasser, Mittlemark & Stamler, 1985; Case, Heller, Case & Moss, 1985; Shekelle, Gale & Norusis, 1985) to support the association between TABP and CHD. Depending on the degree to which the global measure used to define the Type A and Type B groups weights Time Urgency, the resulting groups of Type A (and Type B) individuals in different studies could differ markedly on time urgency. In addition, different approaches to sampling and different initial populations could also result in groups of Type A's in different studies that are not comparable on time urgency. If time urgency, either separately or in combination with other components of the TABP is an important predictor of CHD then TABP studies that failed to assess this characteristic may have erred in assessing the risk factors for CHD.

Since the literature seems to implicate both anger-in through its role on blood pressure and anger-out (and hostility) through greater cardiovascular reactivity to challenge as risk factors for CHD, it may be necessary to look at factors that determine or influence the likelihood of either extreme of anger expression. For time-urgent, impatient individuals many situations hold the potential for anger responses. A person who is constantly vigilant for events or individuals that may represent obstacles to meeting important deadlines may be prone to forming cynical, mistrustful attitudes towards others and well as to extremes of anger expression. Alternatively, individuals with hostile attitudes may tend to be more impatient with others they perceive to be slow or incompetent. While anger expression and its physiological consequences may be an important part of the mechanism leading to the development of CHD, time urgency and impatience may be an important trigger for those emotional responses (i.e., anger) and attitudes (i.e., hostility).

Since it would appear that time urgency is moderately correlated with the SWS anger subscale (r=.2934, $p < .01$) and the AI/OSI (r=.2708, $p < .01$) yet loads on a different factor than these anger measures, it is clear that time urgency is a distinct characteristic. It is more reasonable to postulate a causal role for time urgency in producing anger/hostility than the converse. If time urgency is an important contributor to anger and Hostility then it may be both an important characteristic to assess those at risk and a useful target for treatment. Focussing on time urgency may have important clinical implications for assessment and treatment. Targeting a characteristic such as time urgency which may result in anger and extreme emotional and physiological responses may meet with less resistance in therapy than targeting a cynical and mistrustful attitude

(hostility).

Beliefs of time urgent subjects

The analysis of the follow-up questions to the TUPA clearly suggest that time urgent individuals perceive the time urgent/perpetually active behaviours in which they frequently engage to enhance their control over situations and their outcomes. They also perceive these behaviours to be healthy and factors that contribute to their success and effectiveness. If future research demonstrates that time urgency is an independent risk factor for CHD then the goal of modifying this characteristic would take on considerable importance. The beliefs characteristic of time urgent individuals may be considered irrational beliefs that maintain the time urgency. Since these beliefs associate positive outcomes (i.e., greater control, better outcomes, greater health and increased success and productivity) with time urgent behaviour, time urgent subjects are likely to self-reinforce such behaviours even if the immediate consequences (e.g., interpersonal conflict) might normally be expected to reduce the frequency of such behaviours. For this reason, it is suggested, these beliefs may maintain the time urgent pattern of behaviour despite possible adverse long-term consequences to health. The beliefs are referred to as irrational because there may not be any empirical evidence that the perceived benefits actually accrue to the individual who chronically engages in time urgent behaviours. A therapeutic approach designed to test and refute these irrational beliefs could be designed along the lines of cognitive-behavioural interventions that are successfully used to treat the irrational beliefs that contribute to and maintain depression (Beck, Rush, Shaw, & Emery, 1979).

The DRL task: A failure to replicate previous findings

The DRL task used in this study failed to replicate the findings of Glass (1977). It was expected that time urgent individuals would require more trials to learn to answer during the correct interval and that their mean delay before answering would be lower than non-time urgent subjects. This may have been the result of procedural problems that obscured possible group differences in performance. The interviewers/experimenters in this study repeatedly noticed that those individuals who seemed the most time urgent during the interview and observation period were most likely to rush ahead into the DRL task without having understood the requirements of the task. Often the experimenter had to intervene and allow the subject to begin the task again with the instructions when it became clear the subject had no idea what the task required of them. This may have allowed them to benefit from practice and perform better on the task than if they had received only one trial. Another observation concerning the time urgent subjects was that some of them who clearly understood the instructions either worked very hard to discover the correct interval and then used very deliberate methods to count out the time while others responded almost immediately despite the penalty for doing so because it seemed they could not stand to wait to respond. This observation was confirmed with several subjects in informal discussions during the debriefing at the end of the experimental session. The multivariate analysis of variance, while not finding a significant effect for time urgency on the time waited before responding, did note a heterogeneity of variance on that variable (Bartlett-Box $F(1,28219) = 9.10868$, $p < .003$). This was the result of greater variance among the time urgent subjects than the non-time urgent subjects. This is consistent with the .cp8observed greater variability in the behaviour of

subjects on the DRL task. The results fail to replicate the effect Glass (1977) reported.

Caveats

One question that arises concerns the generalizability of the results beyond the sample tested in this research. While nothing short of a replication with a sample drawn from the general population will suffice to address this question, the discussion above was based on the assumption that the relationships observed with this sample will apply generally to any sample. The applicability of these results to samples of varying educational and occupational, socioeconomic status and gender needs to be evaluated in future research.

Directions for future research

Obviously a replication of the results of the cluster analysis would be critical. It is particularly important to confirm the existence of a group of time urgent Type B and to verify that time urgency varies independently of the other aspects of the TABP. In doing such a replication it would be extremely useful to include a measure of hostility such as the Cook-Medley Ho scale (Cook & Medley, 1954). It would also be worthwhile to score the interview (ASI) using a variation of the Matthews, Glass, Rosenman and Bortner (1977) component scoring system for hostility or Potential for Hostility (PoHo). These additional measures could be included in the cluster analysis and the discriminant analysis. The inclusion of these variables could result in a changed cluster structure or may just help to better define the nature of the differences among the clusters.

Another important goal would be to show that the four clusters can be distinguished reliably on the basis of their behaviour. The behavioural observations made during the five-minute "waiting" period and during the DRL task were evaluated for overall activity level and for signs of time urgency and perpetual activation in only the most broad fashion. Detailed examination of the specific behaviours engaged in by members of the four clusters may identify behavioural differences among the clusters that may form the basis of a more refined instrument for evaluating time urgent behaviour by direct observation. Another approach to identifying behavioural differences in members of the clusters would be to show that some sort of provocation or experimental manipulation produces changes in observable behaviour. For example, one could observe subjects for 5 minutes before and after either a non-provocative interview or the Augmented Structured Interview. If behaviours such as clock watching, pacing, fidgeting or sighing increase following the provocative ASI but not for the non-provocative interview, and if these changes differed in magnitude for members of time-urgent versus non-time urgent clusters, then such findings would provide evidence for behavioural differences among the clusters.

In addition to seeking behavioural indices of cluster membership, it would be important to evaluate the risk associated with cluster membership by seeking evidence of differences in relevant physiological measures. Some recent research (Dion, Ready, Gerrard & Dyck, 1991) involving platelet function and two blood chemicals, thromboxane A_2 (an important product of the platelets involved in the repair of vascular injury) and prostacyclin (PGI_2, a powerful inhibitor of platelet function) suggests that the measurement of the relative proportion of thromboxane A_2 and PGI_2 in response to a suitable stressor like the SI or ASI

may be an appropriate indicator of potential risk for the development of CHD.

Another goal for future research would be to refine the DRL procedure used in this study to eliminate the error variance. Subjects should be given complete verbal instructions and should mentally rehearse the procedure before proceeding with the computer administered task. This would allow all subjects to complete the task without intervention or restarting and would eliminate the variance introduced by time urgent subjects proceeding with the task without comprehending what is expected of them.

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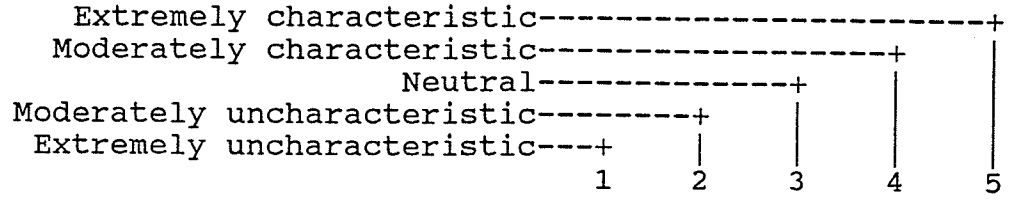
Appendix A

SWS
Survey of Work Styles
by
Douglas N. Jackson and Anna Mavrogiannis

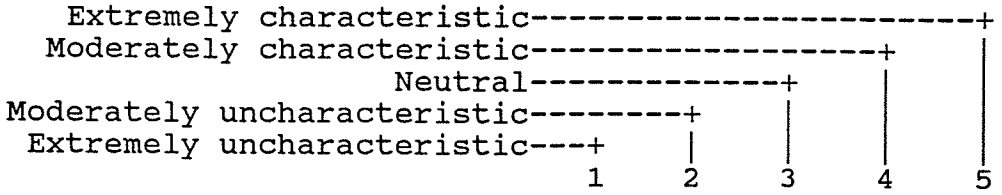
This survey contains statements describing work-related activities. You are asked to rate yourself by blackening the bubble on the IBM sheet that best describes how characteristic or uncharacteristic each activity is of your work-related behavior.

Although many of the statements in this questionnaire describe activities at work or on the job, please consider your studies as a form of work and interpret the statements as describing activities related to your work as a student. For example, you should interpret coworkers as fellow students in your courses and supervisors as instructors. Try to use all the categories from 1 to 5 in rating yourself. Answer every statement even if you are not completely sure of your answer. If you feel that any statement cannot be applied to a school setting, then imagine yourself in a work setting and answer accordingly.

Use the following scale for each question:



Appendix A



1. I become quite irritated when I have to wait in line.

2. I rarely slam doors because I am angry.

3. Coworkers and friends would agree that I "live, eat, and breathe" my job.

4. Even when my work accumulates, I still take time for a lunch break.

5. I rarely get praise for a well-done job.

6. It would not bother me if other workers had experienced more success than I.

7. I do not get upset if I am interrupted while working.

8. I tend to lose my temper easily at work.

9. There are many things in my life more important to me than my job.

10. I often have to hurry to finish a project because there are so many other things to do.

11. I enjoy my job and like most of my coworkers.

12. I would never let some one win a game.

13. Slow moving film plots bore me.

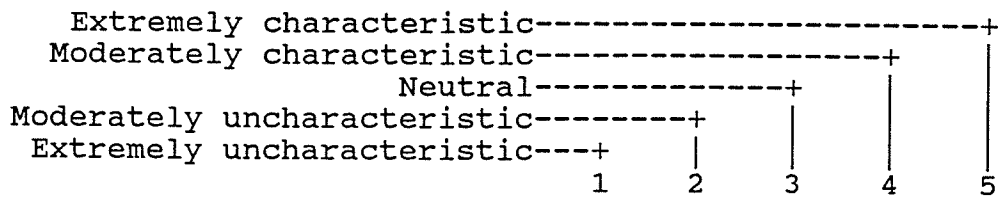
14. At work, I seldom feel grouchy.

15. I find it difficult to relax on weekends because I am thinking about work.

16. I regularly engage in two or more activities at the same time, like eating and reading.

17. Supervisors impose unrealistic standards on my performance.

18. I believe that organizations work best when employees don not compete with each other.



19. I would help a slow coworker, even if it delayed progress on my own work.

20. My coworkers agree that I get angry frequently.

21. I would leave a project or assignment unfinished if my work shift was over.

22. Often, I work under so much pressure that I find it very difficult to stop during the day, even if I wanted to.

23. There are many sources of personal satisfaction in my work.

24. I try to seize every opportunity for advancement at work.

25. When I have a project to complete, I become impatient with the slightest interruption.

28. I seldom raise my voice when arguing.

27. My conversations are usually centred around work-related activities.

29. I am dissatisfied with the way my supervisor treats subordinates.

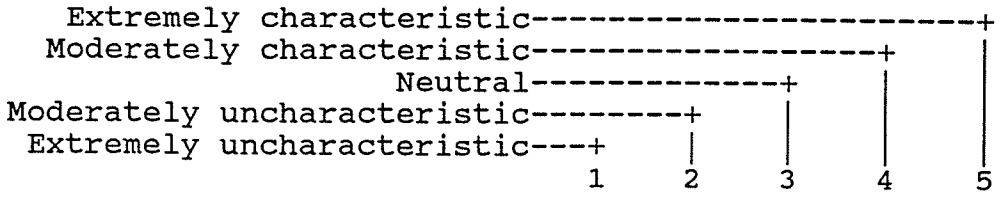
30. I would rather have my work evaluated as a team member rather than as an individual.

31. I have no problem with people who talk a lot and have little to say.

32. When things go wrong at work, I sometimes lose my temper.

33. I seldom take my work home with me.

34. Because of deadlines, I have little time to take breaks at work.



35. I feel that the quality of my work is recognized by my supervisors.

36. Part of the satisfaction of doing a good job is showing that I am better than other employees.

37. At work I find it irritating when people cannot come to a decision quickly.

38. I would remain calm, even if people at work were making fun of me.

39. I often become so involved in my work that I lose track of time.

40. I rarely take so much work that I have too little time to finish it.

41. I often feel concerned that my job has very little future.

42. Competition rarely brings out the best in me.

43. I am patient with less competent coworkers.

44. I would react strongly if I were unfairly criticized at work.

45. My work schedule allows me a good deal of time for recreation.

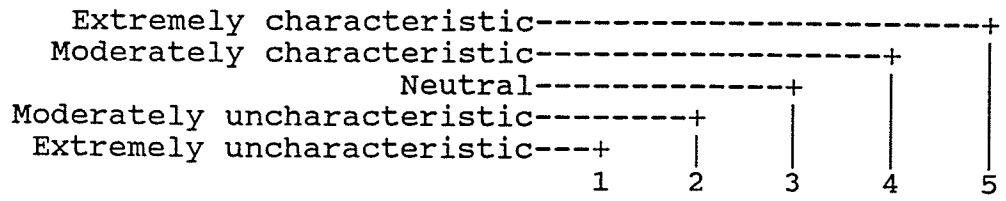
46. I often must work faster than most people.

47. I find it easy to talk with my supervisor on the job.

48. I hate to lose in a competition, even when the stakes are not high.

49. I find it quite annoying when coworkers are not on time for a meeting.

50. I am tolerant of coworkers who try to annoy me.



51. All of my thoughts during a work day are related to my job.

52. I rarely find myself working on a number of urgent tasks at the same time.

53. I would like to have more freedom to decide how to do my work.

54. I have no interest in comparing my salary or position to those of my peers.

55. I am patient with other employees who do not complete a job on time.

56. I would retaliate if someone insulted me.

57. I would rarely cancel a social engagement in order to work.

58. I often must rush at the end of the day to finish accumulated work.

59. I seldom feel that my actions are misunderstood at work.

60. I become very annoyed when I cannot do a job better than someone else.

61. Dull-witted, slow employees make me very impatient.

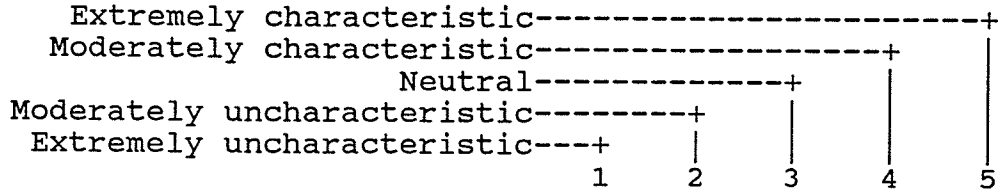
62. Coworkers would describe me as an even tempered person.

63. I usually show up to work early to prepare things.

64. I am rarely the first person to finish eating at the table.

65. I often wish I had a different supervisor.

66. I get just as much satisfaction from seeing a friend succeed as I would from succeeding myself.



67. I do not become annoyed if a driver reacts too slowly when a stoplight changes to green.

68. Sometimes I get into such heated arguments that I find myself shouting.

69. I rarely work more than eight hours a day.

70. I frequently find myself rushing, even when there is plenty of time.

71. I seldom feel frustrated at work.

72. I often compare my work to that of coworkers.

73. I would find it frustrating to have to explain the same thing over again to a new employee.

74. I would never hit anyone, even if I was hit first.

75. I rarely find time for hobbies or other recreational activities.

76. I can usually finish my work on time without rushing.

77. If I could, I would prefer to retire now, rather than to continue working at my present job.

78. I prefer a work environment where people cooperate rather than compete.

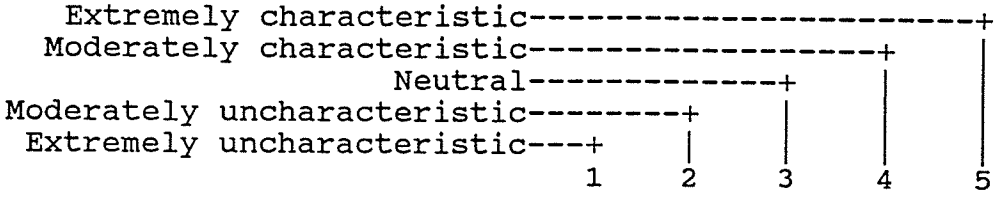
79. It does not usually aggravate me to have to wait for information needed to do my job.

80. If I were to become angry at work, I would remain "keyed up" for the rest of the day.

81. Work is a major part of my life.

82. I feel I must fill every minute of my day at work, leaving little or no time to relax.

83. I believe I am pair fairly for the work I do.



84. If asked, I am sure people would describe me as competitive.

85. I frequently find myself wishing that other workers would complete their work more quickly.

86. At work, I avoid heated discussions and disagreements with coworkers.

87. I often feel the urge to go back to work on a weekend or holiday.

88. Even when I have an urgent task to complete, I still take "breaks" from work.

89. I often wish for a totally different job.

90. If I played a game, I would rather just "play for fun," rather than enter a tournament.

91. It does not bother me to have to repeat myself several times in order to be understood

92. At work, annoying people sometimes "make my blood boil."

93. During my leisure time, I rarely think about my job.

94. I work best under pressure.

95. I feel that my job is quite satisfying.

96. In sports, as in life, the only thing that matters to me is winning.

Waiting Behavior Checklist

Arrived: Early O Late O

How many minutes _____

Observe for 1 minute then record for 30 seconds (repeat 5 times)

	During Minute # 1	2	3	4	5
Global rating of motor activity level during interval 1---2---3---4---5 (very inactive / very active)	___	___	___	___	___
Jaw muscles tense, teeth clenched?	O	O	O	O	O
Checking or updating appointment book?	O	O	O	O	O
Manipulating object, figiting, moving teeth?	O	O	O	O	O
Writing fast or pressing down heavily?	O	O	O	O	O
Facial grimace with effort?	O	O	O	O	O
Appears very uncomfortable while waiting?	O	O	O	O	O
Checks time?	O	O	O	O	O
Opens briefcase to get work materials?	O	O	O	O	O
Making notes?	O	O	O	O	O
Wads or folds paper before discarding?	O	O	O	O	O
Tosses rather than places objects in garbage?	O	O	O	O	O
Eats food while waiting?	O	O	O	O	O
Looking through magazines?	O	O	O	O	O
Looking through psychology textbooks?	O	O	O	O	O
Reads cartoons on the wall?	O	O	O	O	O
Pacing around or across room?	O	O	O	O	O
Turns on/off or tunes radio?	O	O	O	O	O
Talks out loud to self?	O	O	O	O	O
Leaves room to look for experimenter?	O	O	O	O	O
Closes eyes, head back?	O	O	O	O	O
Sitting quietly and calmly?	O	O	O	O	O
Listens to radio/tape player?	O	O	O	O	O
Other _____ Specify	O	O	O	O	O
Other _____ Specify	O	O	O	O	O
Other _____ Specify	O	O	O	O	O
Other _____ Specify	O	O	O	O	O

Appendix C

Augmented Structured Interview

Augmented Structured Interview

Original Items

(TUSI) 4. When you are under pressure, does it BOTHER you?

(PASI) 5. Would you describe yourself as a HARD-DRIVING, AMBITIOUS type of person in accomplishing the things you want, OR would you describe yourself as a relatively RELAXED and EASY-GOING person?

(PASI) 5a. Would your PARTNER (or closest friend) describe you as HARD-DRIVING and AMBITIOUS or as RELAXED and EASY-GOING?

(PASI) 5b. Have they ever asked you to SLOW DOWN (speed up)?

(AI/OSI) 6a. When you DO get angry, do people around you KNOW?

(AI/OSI) 6b. How do you SHOW your anger?

(AI/OSI) 6c. Do you ever Pound on your desk? Slam a door? THROW things?

(PASI) 8. Do you take work HOME with you?

8a. How often?

8b. Do you really DO it?

(TUSI) 12. When you are in your AUTOMOBILE, and there is a car in your lane going FAR TOO SLOWLY for you, what do you DO about it?

(AI/OSI) 12a. Do you MUTTER and COMPLAIN to yourself? Do you HONK your horn? FLASH your lights?

(AI/OSI) 12b. Does anyone RIDING with you know that you are ANNOYED?

(TUSI) 14. If you make a DATE with someone for, oh, two o'clock in the afternoon, would you BE THERE on TIME?

(AI/OSI) 14a. If you were kept waiting, do you RESENT it?

(AI/OSI) 14b. Would you SAY anything about it? What?

Appendix C

Augmented Structured Interview

(TUSI) 15. If you see someone doing a job rather SLOWLY and you KNOW that you could do it FASTER and BETTER yourself, does it make you RESTLESS to watch?

15a. Would you be tempted to STEP IN and do it YOURSELF?

15b. Have you ever DONE that?

(TUSI) 16. Do you OFTEN do two things at the SAME TIME -- like READING while watching TV, SHAVING while taking a shower, WRITING or READING while talking on the telephone, putting on make-up while driving?

(TUSI) 19. Do you EAT rapidly? WALK rapidly? After you've FINISHED eating, do you like to sit around the tale and CHAT, or do you like to GET UP and GET GOING?

(TUSI) 20. When you go out in the evening to a RESRTAURANT and find eight or ten people WAITING AHEAD OF YOU for a table, will you wait?

20a. How LONG will you wait?

20b. What will you DO while you are waiting?

(TUSI) 21. How do you feel about waiting in LINES -- BANK lines, SUPERMARKET lines, POST OFFICE lines?

21a. How LONG will you wait?

21b. What will you DO while you are waiting?

(TUSI) 22. When you are in a TICKET LINE for a show you really want to SEE, how do you feel if someone just CUTS IN in front of you?

22a. Would you do anything about it? What?

(TUSI) 23. Do you always feel anxious to GET GOING and FINISH whatever you have to do?

(TUSI) 24. Do you have the feeling that time is passing too RAPIDLY for you to accomplish ALL THE THINGS that you THINK you SHOULD get done in one day?

Appendix C

Augmented Structured Interview

(TUSI) 25. Do you HURRY in doing most things?

Augmenting Items

(TUSI) 1. Without looking at your watch, what time would you say it is right now?

(AI/OSI) 2. What kinds of things make you angry at yourself?

(TUSI) 3. Do you tend to start most tasks with a deadline to finish in mind?

(TUSI) 4. Are your deadlines usually short, and do you like to get things done quickly?

(TUSI) 5. Is it important that you get the assigned amount of work done by quitting time?

(AI/OSI) 6. DO you swear when you're angry?

(PASI) 7. Have you accomplished things in more different areas than most people?

(TUSI) 8. When you take a vacation, do you plan ahead how each day will be spent and stick to that schedule or would you say you "play it by ear?"

(AI/OSI) 9. Do you like Prime Minister Mulroney?
What do you think of John Turner (Jean Chrétien)?
Ed Broadbent (Audrey MacGloghlan)?
CHALLENGE ITEM (e.g. Why do you say that?)

(AI/OSI) 10. When you get angry, do you stay angry very long?

(AI/OSI) 11. Does it take a lot to get you angry?

(AI/OSI) 12. How do you "get over" being angry?

(TUSI) 13. Do you jot notes to yourself?

(TUSI) 14. In your estimation how many minutes do you think this interview has taken, so far?

Appendix C

Augmented Structured Interview

(AI/OSI) 15. Can you think of a specific incident when you were so angry or furious that you felt as if your insides were boiling?
What caused you to become so upset?
SECOND CHALLENGE ITEM, e.g., "Why did <u>that</u> upset you so much?" or "Do you really think that what he/she/they did was all that bad?"

(TUSI) 16. Do you feel like you have a lot of "irons in the fire?"

(PASI) 17. How many hours a day do you work?

(PASI) 18. How many days a week do you work?

(PASI) 19. What do you do for recreation? (query, e.g., if fishing -- determine if usually asleep on the river bank versus vigorously searching and throwing of plugs, etc.)

Appendix D

TUPA Scale

1 When driving around town, I wait until the last minute to leave, and therefore must move with haste to avoid being late.

2 I open things quickly and forcefully, sometimes ripping boxes or letters open rather than easing things open, or cutting them open gently with an opener.

3 I have the sense that I am falling behind or that things are gaining on me.

4 I speed up and brake when driving.

5 When other people talk and do not come to the point, I try to direct the conversation toward the central issue or otherwise keep things on track.

6 I anticipate a green light by watching for the yellow light for the opposing traffic.

7 When picking something out of a container, I dig for it quickly.

8 I look ahead at stoplights and try to time them so I won't have to come to a complete stop.

9 If I drop something, I attempt to grab it before it hits the ground, even resorting to using my foot for this purpose on occasions.

10 I chew gum or food vigorously.

11 I experience a surge of anxiety or other energy if I realize that a needed object is lost. I begin a search for it immediately thinking that this loss has set me behind on my schedule.

12 I will run a red light, especially if it has just turned red.

13 I eat on schedule and when hungry, but rarely for pleasure or social reasons.

14 My eyes are more wide open than most people's.

15 In traffic, I change lanes rather than stay in a slow one.

16 I am demanding or hard on machinery, mechanical items, or vehicles.

Appendix D

TUPA Scale

17 I can get ready faster than most people.

18 Once they are set, I find it difficult to abandon activities or plans.

19 I walk into the street a little early, before the light has changed.

20 When moving about with a group, I go first and lead the way, rather than stand around waiting for someone else to go first or figure out when to move.

21 I feel stressed over time even when there is no reason, and regardless of circumstances.

22 I will walk on a 'Don't Walk' traffic signal if no traffic is near.

23 I find that automated doors open too slowly, and that I must slow down a step to avoid running into them.

24 When I have 5 minutes free, I stay busy doing something, even if I know that task may take 10 minutes or more.

25 I do more than one thing at a time.

26 I have more than one iron in the fire at a time.

27 If I have spare time between activities, I attempt to 'make some progress' on another project.

28 People close to me have told me to slow down.

29 I think about upcoming events.

30 I drive a little above the speed limit but not fast enough to be stopped for speeding.

31 I will interrupt activities to take care of something small which has cropped up (i.e. something not requiring much time), so I won't have to remember to take care of it later.

32 My speech is logical and my points are well supported.

33 I feel surges of energy when performing household or grooming activities such as drying hair, taking shoes out of the closet, or buttoning a shirt.

34 I prepare for activities ahead of time, so I won't waste time or have to go back and get something I forgot.

Appendix D

TUPA Scale

35 I like to make quick departures from stop signs.

36 I keep my teeth pressed together, without grinding but with my jaw muscles tense.

37 The only times I feel really comfortable when moving slowly is when I am sick.

38 I ease through yellow lights or edge forward when waiting for a green light.

39 I speed up when two lanes of traffic converge, assuming that the people in the other lanes will either slow down or maintain the same speed.

40 I screw lids on containers, such as jars or toothpaste tubes, tighter than most people.

41 I like to be sure to take the shortest, quickest, or otherwise most efficient route on both short and long trips.

42 When planning something (a vacation or my working day), I leave little time for unstructured activity.

43 When turning left and faced with oncoming traffic, I edge out into the street so I will be able to complete the turn on the yellow light.

44 When I have spare time, I use the occasion to plan or think about a task.

45 I have an organized, well-planned day.

46 I seem to anticipate that certain jobs will take less time than they actually wind up taking.

47 When driving, I coast instead of braking when possible. As a result, I may get close to the car in front of me.

48 I plan social activities with a fairly precise beginning and/or stopping time.

49 I keep frequently used objects in the same familiar place.

50 I am careful to run errands in an orderly sequence so I can do them in a minimum amount of time.

Appendix D

TUPA Scale

51 I experience a surge of energy at the beginning of a work task.

52 I keep unexpected contacts with people to a minimum so as not to get too far behind my schedule.

53 While driving, I gather up in advance the items I am going to need for my destination even before I stop the car.

54 When I must sit still, I handle an object (like a pencil), produce finger movements, move my teeth, or otherwise do not keep completely still.

55 I write fast and/or press down heavily.

56 I shut or slam doors and/or drawers more vigorously than most people.

57 I work on something up until the last minute, allowing just enough time to get to the next place I am headed.

58 I make a facial grimace when I am exerting myself.

59 I carry more things at one time than can be managed so I can avoid making an extra trip.

60 If I forget to do something, I immediately do it on remembering, even though there is no real urgency to do it them.

61 A person who rambles when they talk make me want to coach or otherwise structure their way of talking.

62 I hate to keep anyone waiting, even for 5 minutes.

63 It is difficult for me to sit down to a long meal.

64 It is difficult for me to sit around and talk after finishing a meal.

65 I push elevator buttons several times rather than only once.

66 I want the meetings I attend to follow the agenda.

67 I dial phone numbers rapidly.

68 I hate to make a mistake dialing a phone number and have to start all over again.

Appendix D

TUPA Scale

69 I place deadlines on others as well as myself.

70 I go without a watch ...

71 I check my watch ...

72 My free time is spent in planned or organized activity.

73 I like to spend time in meditative or reflective activities such as introspective thinking, prayer, yoga, or taking long walks rather than goal-oriented tasks.

74 My speech is orderly and precise.

75 I like to get things done, rather than put them off.

76 My tone of voice could be termed 'forceful' or 'dramatic.'

77 I engage in discussions about 'non-doing' activities such as art, literature, music or other esthetic subjects.

78 I like to sit without having something to do.

79 I remove keys or other objects from my pocket before I reach the door; therefore, I do not have to stand in front of the door and look for the key.

80 My tone of voice varies during a conversation.

81 It bothers me to have to wait for people, particularly if it is somebody who works for me or over whom I have supervisory authority.

82 People say that I am a very busy person, one of the busiest that they have ever known.

83 I change my route of travel on streets depending on whether I hit a red light. (i.e. If I come to a red light and I can turn right and go a different route instead of waiting through the red light, I will.)

84 I go up stairs two at a time.

85 I get angry, because I feel that nothing gets done at work until I get there and take control.

Appendix D

TUPA Scale

86 I get angry with drivers who sit at the red light in the right-hand lane when I am behind them and want to turn right on the red light.

87 I get irritated with drivers ahead of me, in the left-hand lane, who drive slower than I do.

88 I get irritated with people who don't do what I want immediately when I ask.

89 I get angry with myself when I make mistakes.

90 I get angry when items are not where I expect them to be.

91 I cannot stand constant interruptions.

92 I find that while doing one physical activity (e.g. painting, etc.) that my mind is concerned with 1 or more other projects that I have under way.

93 I would rather do something myself than wait for someone else to do it. The other party is never fast enough for me.

94 I get bored with mundane things.

95 I like crises.

96 I like being needed and in demand.

97 I enjoy an extremely full day.

98 If I have an appointment, I will watch the clock so I can try to do just one more thing before it's time for that appointment.

99 I catch myself estimating the number of minutes it will take me to get to my appointment so I can leave at the last minute and still be on time.

100 I schedule activities as close as possible to both sides of an appointment in order not to waste time.

101 During one appointment, I am already thinking about my next appointment.

102 I make sure the other person knows that I have an appointment; thereby moving our meeting along more 'crisply.'

Appendix D

TUPA Scale

103 I make notes or think of other things to do while attending meetings.

104 I follow a very structured schedule when getting ready in the mornings. If this schedule varies in the time it takes, it throws me off.

105 When stopping at a 4-way stop sign with cars ahead of me, I watch cars as they take their turns leaving the stop sign and have figured out before my turn comes, which car I will follow into the intersection.

106 In meetings, I watch the agenda very closely. If items on the agenda does not stay close to their scheduled times, I get worried and I find myself thinking of ways I can help us to get back on schedule.

107 My desk is cluttered because I will work on several things at the same time.

108 I wake up during the night, thinking of something I need to do the next day.

109 I keep a pad of paper handy, so I can write down ideas or plans that come to me, even during the night.

110 I become impatient with people who operate at a slower pace or less structured manner.

111 I work out a daily schedule of events and become frustrated when someone talks to me too long and causes me to get off schedule.

112 I become frustrated when someone is talking or explaining an event and they go into such detail that it takes, in my estimation, an excessive amount of time.

113 I am structured, energetic, and something of a perfectionist. I tend to believe that others could and should be similar.

114 Before going to bed, I plan and/or lay out the clothes that I want to wear the next day.

115 It worries me when other people on the same job do not pull their share of the work.

116 I get frustrated when fellow workers want to 'visit' or casually talk with me while on the job.

117 I rush when shopping.

Appendix D

TUPA Scale

118 I do not like to be interrupted when working on any project.

119 I do not like company who has not been invited.

120 I do not like to travel a long distance.

121 I tend to go to bed at the same time every night.

122 I wad or fold up paper that I am putting in the trash can.

123 I 'toss' waste paper rather than gently placing it inside the trash can.

124 If a meeting continues past the time it was scheduled to end, I go ahead and leave at the scheduled time.

125 When the plans I make for the day do not go smoothly, I start changing them.

126 I find myself competing with fellow workers.

127 I will skip lunch so I can do some work during the lunch hour.

128 I do not like it when conferences or meetings are interrupted.

129 I become impatient in restaurants when the person serving is slower than I think they should be.

130 When I arrive early for a meeting, I get impatient waiting for the meeting to start.

131 I look at my watch on the way to work, checking at specific locations or places to be sure I will not be late.

132 I will interrupt a personal conversation to take a business- related phone call.

133 I make a special effort to be the first at work each day.

Appendix D

TUPA Scale

134 I work more than 8 hours per day.

135 I work more than 5 days per week.

136 I enjoy competitive recreational activities.

137 I find it difficult to sit still and do nothing.

Section I

INSTRUCTIONS : On the pages that follow, you will find a series of rating scales that you can use to describe how you use and perceive TIME. There are seven (7) different rating scales and each one deals with a different aspect of TIME. An example of one of these scales appears on the next page. Refer to it as you read the instructions below.

You will notice that at the top, there is a label. This label describes the aspect of time that the rating scale covers. In the example, this aspect is AWARENESS OF TIME. Below the label, there is a definition. This definition describes what is meant by the label in some detail. In this case, the definition of AWARENESS OF TIME is

> "The extent to which an individual is aware of the exact time of day, regardless of the environment or circumstances. The extent to which a person is aware of important dates such as birthdays, tests, etc."

Below this definition, you will find the actual rating scale. As you know from other rating scales that you have used, your task is to use that rating scale to describe something. In this case, you are to use the rating scale to describe how aware you are of time. In other words, you will use the rating scale to tell us if you are very aware of time, only moderately aware of time, or completely unaware of time. You will do this by choosing one of the seven numbers that appears on the vertical scale. The higher the number, the more aware of time you are; the lower the number, the less aware of time you are.

You will notice some statements on the right side of the scale. These statements are to help you define what is HIGH, AVERAGE, or LOW Awareness of Time. A person who is very aware of time would be one who glances at his or her watch frequently during the day. This person would also likely to keep track of time by estimating, every so often, how much time has passed. If this is the level of awareness of time that you would use to describe yourself, you would rate yourself as a "7" or perhaps a "6" on the scale. In contrast, people who are not very aware of time would be forgetful about times and dates. They would not look at a watch or clock very much. If that describes your level of awareness of time you would rate yourself as a "1" or perhaps a "2."

The statements on the right hand side of each scale are arranged so that the statements that represent high amounts of the trait or orientation appear toward the top of the page and those examples suggesting a low amount or orientation appear toward the bottom of the page. These examples are there to give you an idea of what HIGH, AVERAGE, and LOW mean in terms of the each rating scale. They are just like a temperature marks on a thermometer. They help you to interpret what the scale means.

You will rate yourself on each of the seven scales by simply circling the number that best represents your orientation toward the aspect of time being described. Simply circle one of the seven numbers on each page to describe yourself. Consider the definition and the behavioral examples in making the decision as to what number to circle. On the sample page (next page), you will see that the person who completed this rating scale circled the number "2." This person was telling us that he or she was not very aware of time.

<u>Make sure that you circle one number on each rating scale.</u>

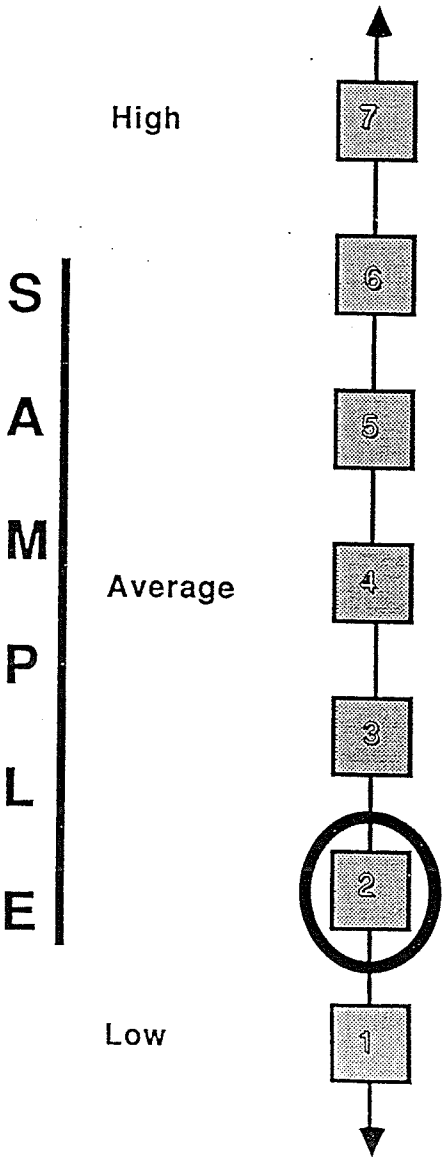
Appendix E

SAMPLE

Awareness of Time

SAMPLE

The extent to which an individual is aware of the exact time of day, regardless of the environment or circumstances. The extent to which a person is aware of important dates such as birthdays, tests, etc.



I glance at my watch frequently during the day.
Even when I can't look at a watch or clock, I know approximately what time it is.

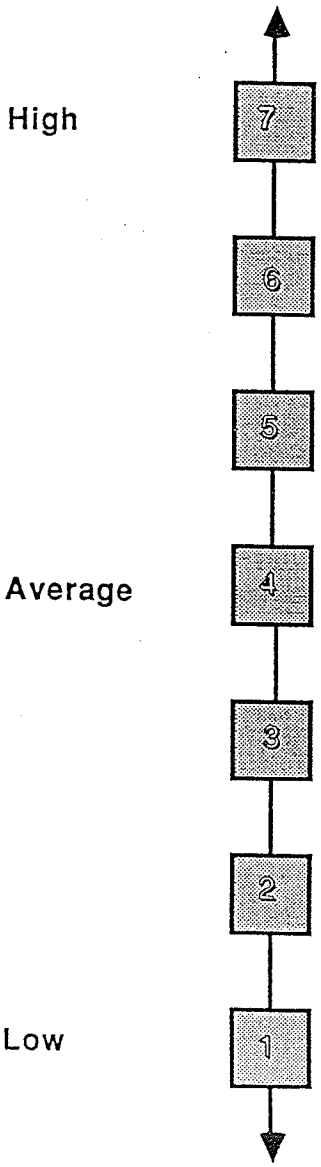
I often lose track of time when I am engaged in an activity.
Sometimes I remember the birthday of a close friend or relative a day or two after it has passed.
I must often be reminded of important dates.
I seldom look at my watch or a clock.

Occasionally, I forget what day of the week it is.

Appendix E

1. Awareness of Time

The extent to which an individual is aware of the exact time of day, regardless of the environment or circumstances. The extent to which a person is aware of important dates such as birthdays, tests, etc.



I glance at my watch frequently during the day.

Even when I can't look at a watch or clock, I know approximately what time it is.

I often lose track of time when I am engaged in an activity.

Sometimes I remember the birthday of a close friend or relative a day or two after it has passed.

I must often be reminded of important dates.

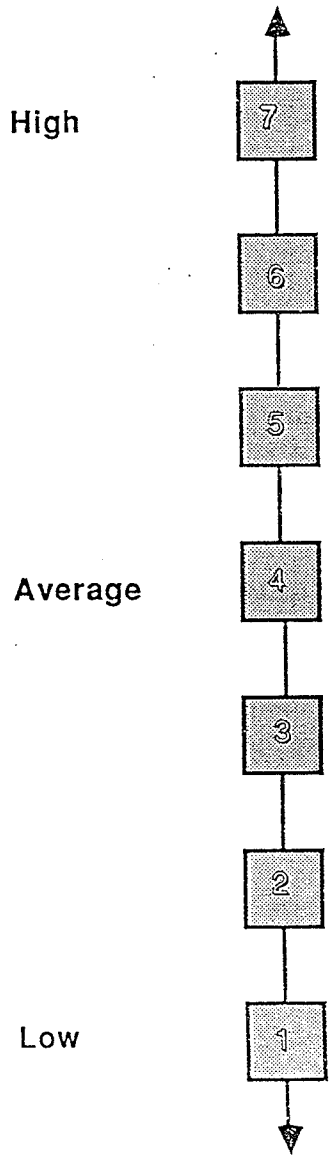
I seldom look at my watch or a clock.

Occasionally, I forget what day of the week it is.

Appendix E

2. Speech Patterns

The extent to which an individual exhibits rushed speech patterns. Such patterns include talking fast, interrupting others and finishing the sentences of others.



I will finish a sentence or supply a word to a person if I feel that they can't seem to find the right words.

I find that I adjust the speed of my speech to match the speed of those with whom I am talking.

I listen patiently to others until they are finished talking.

I never interrupt someone who is speaking.

I never interrupt or rush others when they are speaking.

I welcome interruptions.

3. Scheduling

The extent to which an individual schedules activities and keeps to that schedule. The schedule might include leisure, personal, and/or work activities. This also includes the extent to which an individual apportions time for particular activities.

High

I allow a specific amount of time for each activity that I engage in.

I like to schedule activities and appointments, but I am not overly upset if the schedules must change.

Average

Although I often have a rough plan for each day, I do not mind abandoning the plan if necessary.

My schedule is flexible enough so that it allows for unforseen events.

I often make plans on the spur of the moment rather than in advance.

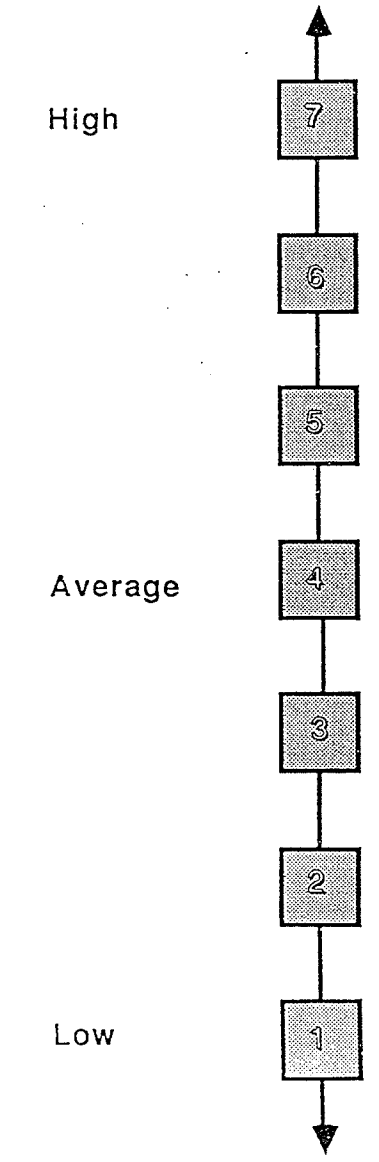
I do not have a daily schedule.

Low

Appendix E

4. Nervous Energy

The extent to which a person can be characterized as being in constant motion, even when "resting."

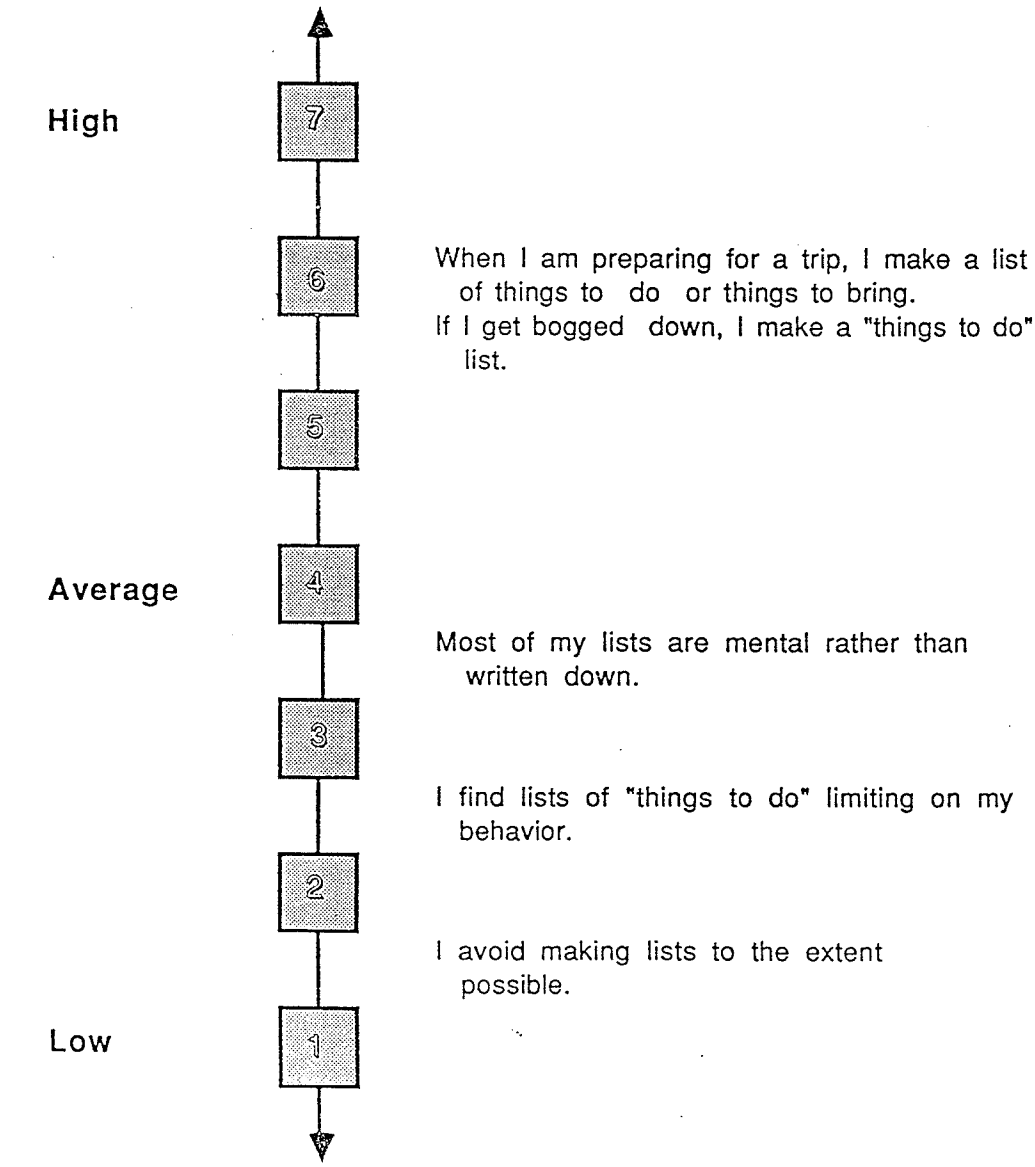


I become irritable when I sit for several hours without doing something.
I tend to pace when I talk or think.
I chew gum frequently and quickly.
I often look around at others when I am bored.

I can sit comfortably for several hours at a time.

5. List Making

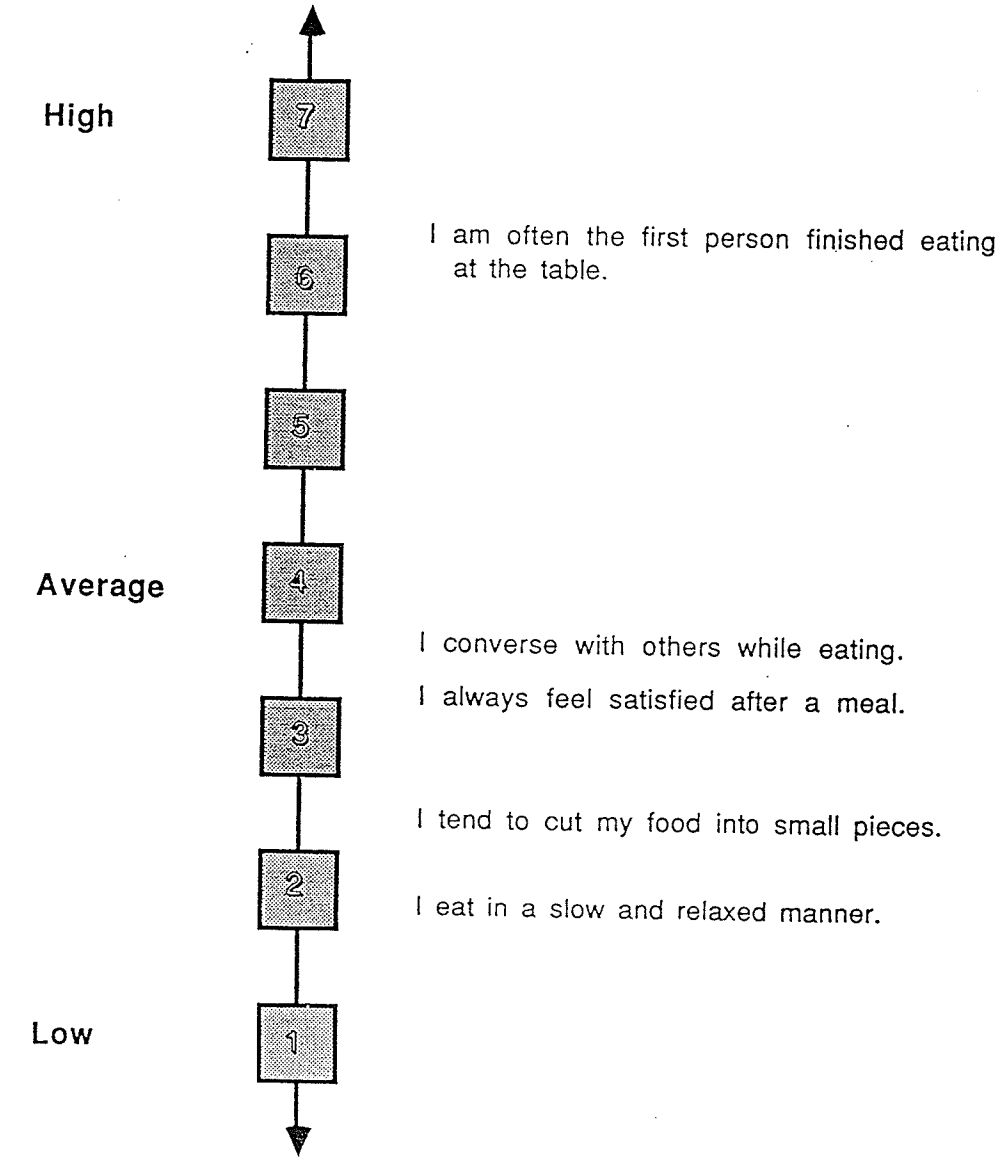
The extent to which a person engages in actions directed toward saving time through more efficient planning or action.



Appendix E

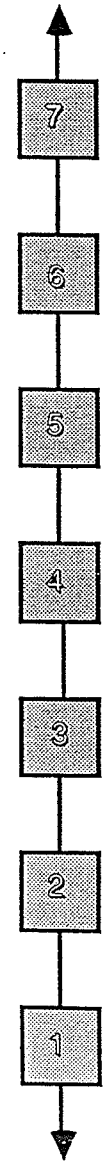
6. Eating Behavior

The extent to which time plays a role in the manner by which individuals plan or eat various meals.



7. Deadline Control

The extent to which an individual creates or appears to be controlled by external deadlines.



High

I pay bills as soon as I get them.

If I am not given a deadline for a particular activity, I set my own.

I am always preparing for some event.

I concentrate on one deadline at a time.

Average

I set deadlines for myself only when they are necessary.

I prefer to concentrate on the quality of my accomplishments rather than if they are done on time or by a deadline.

I seldom set deadlines for myself.

I often request extensions on deadlines and assignments.

Low

Appendix F

Time Orientation Scale Likert-Type Section

1 I am slow doing things.

2 I often feel very pressed for time.

3 My spouse or friend told me that I eat too fast.

4 I like work that is slow and deliberate.

5 I go "all out."

6 I have a strong need to excel in most things.

7 Compared to the average employee in my company, in sense of responsibility, I am much less responsible.

8 I talk more rapidly than most people.

9 I eat rapidly, even when there is plenty of time.

10 I am bossy or dominating.

11 When I listen to someone talking and this person takes too long to come to the point, I actually "put words in his mouth."

12 I am usually pressed for time.

13 I am more restly and fidgety than most people.

14 I never feel in a rush, even under pressure.

15 I eat more slowly than most people.

16 I am hard driving.

17 I find myself hurrying to get places even when there is plenty of time.

18 I usually speak louder than most people.

19 I often work slowly and leisurely.

20 I set deadlines or quotas for myself at work and other things.

21 I prefer to linger over a meal and enjoy it.

22 I am hard driving and competitive.

23 People that know me well agree that I tend to do most

Appendix F

Time Orientation Scale Likert-Type Section

things in a hurry.

24 I only care about satisfying myself, no matter what others think.

25 I am ambitious.

26 My spouse or close friend would rate me as definitely relaxed or easy going.

27 I usually work fast.

28 I eat too quickly.

29 I am a slow, deliberate talker.

30 Nowadays, I consider myself to be definitely relaxed and easy going.

31 I often try to persuade others to my point of view.

32 I am often in a hurry.

33 I ordinarily work quickly and energetically.

Appendix G

WOL Scale

1 I am easily awakened by noise.

2 When it's time to make a major decision like purchasing a house or car I usually make that decision.

3 When it's time to make a major decision about moving I usually make that decision.

4 My daily life is full of things that are interesting.

5 I enjoy detective or mystery stories.

6 I work under a great deal of tension.

7 When it's time to discipline the children I make that decision.

8 No one seems to understand me.

9 When it's time to decide about social events with friends or family I usually make that decision.

10 I like to be bossy.

11 At time I feel like swearing.

12 I like to get in the last word.

13 I find it hard to keep my mind on a task.

14 At times I feel like smashing things.

15 I like to know the details about other people's phone conversations.

16 I do not always tell the truth.

17 I like to have rules or structure for handling most or all situations.

18 I like to monitor other people to make sure things are going the way they should be.

19 I like to make sure everything goes according to plan.

20 I am a good mixer.

21 I like to lead conversations or group discussions.

22 I am liked by most people.

23 I get angry sometimes.

24 I may be inclined to interrupt people if they are not responding in the way they should be.

25 I think most people would lie to get ahead.

Appendix G

WOL Scale

26 I am lacking in self-confidence.

27 I am an important person.

28 I have a tendency to manipulate, maneuver or control other people.

29 I am a good leader but not particularly a good follower.

30 I like to give directions about driving or other activities.

31 I am happy most of the time.

32 I am a person who, when going out for an evening, likes to decide where to eat, what movie to attend, etc.

33 My hardest battles are with myself.

34 I seem to be about as capable and smart as most others around me.

35 I tend to overstructure spontaneous time such as vacation, and turn them into controlled events.

36 I feel useless at times.

37 I have ideas about controlling other things with the children and other people such as how much food they should leave on their plate, etc.

38 I am seen by relatives as being a dominant member of our extended family.

39 I am the one who usually decides which television channel to watch.

40 I am the one who usually controls the thermostat in the house.

41 Criticism or scolding hurts me terribly.

42 I would rather win than lose in a game.

43 I do not always tell the truth.

Appendix H

Debriefing Script

This completes your participation in this study. What follows is a brief explanation of the purpose of this study.

For many years researchers have been trying to understand why so many busy, hard working, and successful people develop coronary heart disease. A pattern of behavior known as "Type A Behavior Pattern" has been found to be a possible contributor to the development of this disease. The results of long term studies have produced conflicting results. Some studies have supported the link between this pattern of behavior and heart disease and others have failed to find evidence for this relationship. In recent years, there has been a great deal of research done to try and identify what aspects of this complex behavior pattern may be responsible for the increased risk of heart disease. Most of the attention has been focussed on the hostility aspect of the Type A pattern. Some suspect that a characteristic known as "time urgency" may also be important.

Until recently there did not exist any adequate measures of time urgency. At this time a number of new measures have been developed but until now there was little information about what these tests really measure. It was not known whether or not these tests measured the same characteristics. This study is the first to administer them all to the same group of people and evaluate what they really measure.

Your participation in this study will help make it possible to specify what time urgency is and how it ought to be measured. Since these measures are unproven and nothing is known about the relationship between what they measure and health, the results themselves have little immediate application except as a means of understanding the relationships among the various tests. It will remain for future research to discover what if any relationships might exist between measures of time urgency and heart disease.

Thank you for your help and good luck with your studies. If you have any questions or concerns, please make sure to speak to the experiementer before you leave.

Please <u>DO NOT DISCUSS</u> this experiment with other students until this study has been completed late in 1990. This is important so that other participants will not be influenced by the experience of others. Thank you for your cooperation!

Lawrence B. Erdile
Principal Researcher

Subject index

Subject index