School of Psychology

Job-Related Affective Well-Being and Its Relation to Intrinsic Job Satisfaction

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This is to certify that the thesis is that of the candidate alone and has not been submitted previously in the whole or in part in respect of any other academic award.

Peter Sevastos

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ABSTRACT

This thesis investigates the structure of job-related well-being; the identification of variables that contribute to either psychological well-being or distress; and the causal connections among elements of job-related well-being and intrinsic job satisfaction.

Two large samples (n=3,044 and 3,709) from a white-collar public sector organisation were used to test a four monopolar model of affective well-being, and the two bipolar model (enthusiasm-depression and anxiety-contentment) proposed by Warr (1990). Structural equation modelling (LISREL) was used to test both models, and results strongly supported a monopolar structure of affective well-being (enthusiasm, depression, anxiety and relaxation). Following the testing of the models, canonical correlation analyses related the set of the four affective variables and intrinsic job satisfaction to a set of predictors. The predictors were drawn from Warr's (1994) sub-categories of nine features of jobs that purport to enhance psychological well-being at work. Two dimensions were extracted from this analysis. The first dimension was mainly defined by intrinsic job satisfaction (from the dependent variable set) and supervisory support and skill utilisation (from the independent variable set). The second dimension was defined mainly by anxiety (dependent variable set) and job demands (independent variable set). From these results a model was developed based on the additive influences of the independent variables on the outcome variables (i.e., affective well-being and intrinsic job satisfaction) that helped explain psychological well-being and distress at work. Finally, a model was also developed that assumed a causal direction from intrinsic job satisfaction to affective well-being. Using a longitudinal sample (n=220) these causal relations were tested with LISREL. Results supported the hypothesis that intrinsic job satisfaction leads to affective well-being, rather than the alternative model that had the causal connections in the opposite direction. It was also possible to demonstrate with the same data set that one objective organisational variable, namely tenure, affects intrinsic job satisfaction over time, thus arguing against the proposition that intrinsic job satisfaction is dispositional.

INTRODUCTION

> "We must move away from the conventional narrow focus upon 'job satisfaction'. This orthodoxy and its associated forms of measurement have greatly hampered the development of occupational psychology. We must of course work to understand job-related well-being and the factors influencing it, but we need a shift in perspective away from job satisfaction.....It now seems desirable to focus upon three dimensions of measurement, including arousal as well as pleasure in our theories and measuring instruments" (Warr, 1986, p. 163-167).

The principal content of this thesis is based on the sentiments expressed by Warr in the paragraph shown above, and echoed by Watson, Pennebaker and Folger (1987). In a more recent paper Warr (1990_a) provided measuring instruments for the assessment of job-related well-being, based largely on similar frameworks offered by Watson and Tellegen (1985), and more recently by Burke, Brief, George, Roberson, and Webster (1989). As shown in Figure 1 Warr conceptualised affective well-being as a two-dimensional bipolar construct (anxiety-comfort and depression-enthusiasm) located diagonally in a space defined by the orthogonal dimensions of arousal and pleasure (or job satisfaction).

The study is based on Warr's framework of job satisfaction and affective well-being and it deals with three broad research areas. First, the construct validity of the well-being measures will be examined using a more appropriate and powerful analysis than that used by Warr and others. Also, rather than relying as Warr did on exploratory factor analysis, measurement models and structural models will be fitted to observed covariance matrices by means of the maximum likelihood procedures offered by the LISREL VII program (Jöreskog

& Sörbom, 1989). Although Warr's two bipolar model was evaluated using confirmatory factor analysis (CFA), and evidence was presented that showed that the model did not fit the data adequately (Sevastos, Smith & Cordery, 1992), the question remains as to whether an alternative four monopolar model of job-related well-being (i.e., anxiety, comfort, enthusiasm and depression) would fit the data better.

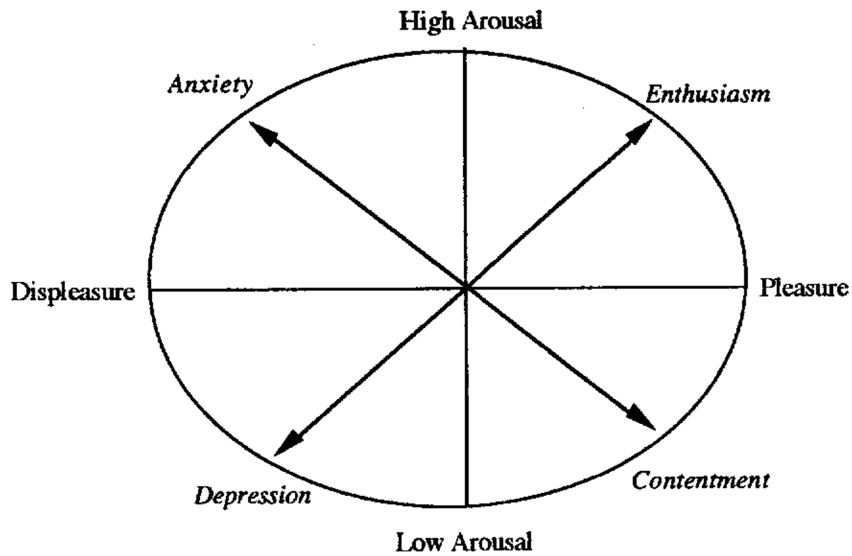


Figure 1. Warr's (1990) job-related well-being model.

Second, Warr's (1986) contention that in measuring job satisfaction (defined as "a set of feelings along the first axis of well-being" p. 163) "no consideration is taken of level of arousal" will be investigated. While most scales of job satisfaction are related to cognition, they also tap into the affective component of job attitudes as Brief and Roberson (1989) and Organ and Near (1985) have suggested. It is reasonable, therefore, to proceed with an analysis of the job satisfaction scales versus the well-being scales to identify the level of overlap between the two.

Third, Warr's suggestion that we need to understand job-related well-being and the factors influencing it points to empirical research to identify the causal links between job satisfaction and affective well-being. In the past, there has been little attempt in the literature to progress beyond descriptive research to the examination of causal processes. In particular, there is a need to develop and evaluate causal models which delineate the processes whereby well-being is affected by work/organisational characteristics. Normally, the common theme underlying occupational models is the relationship between job context variables (i.e., job characteristics, stressors, etc.) and some outcome, either job-related affective well-being or stress (see, for example, Kelloway & Barling, 1991). No attempt is made to relate the job context variables to job satisfaction *and* job-related affect, and examine them holistically within a single analysis. Also, no consideration is given to the causal links within the *outcome variables themselves*, and how they might (collectively) determine well-being. Such a model would offer stronger explanatory power, and lead to better predictions.

The purpose of the thesis, therefore, is to develop a model through the incorporation of Warr's (1990_a) framework as a way of explaining psychological well-being or distress in organisations. However, before such a model could be developed a series of studies needs to be undertaken and certain hypotheses tested. These hypotheses are formulated and tested in the chapters that follow. Briefly, the content of the chapters is as follows:

Chapter 1 investigates the meaning and operationalisation of well-being drawing on the extensive literature on positive (PA) and negative (NA) affect. Common elements between the literature on PA and NA, and Warr's conceptualisation of well-being are identified. Three theories of occupational well-being and mental health are reviewed. These are telic, activity, and dispositional theories of well-being and job satisfaction. A representative model from each of these theories of well-being will be tested in subsequent chapters.

Chapter 2 deals with the methodology for conducting the studies reported in the thesis, including sample size, organisations surveyed, instrumentation, and information on the construct validity of measures.

Chapter 3 investigates the dimensionality of affective well-being based on Warr's (1990) well-being model. Exploratory and confirmatory factor analyses are performed to test the hypothesis that well-being is a two bipolar construct as opposed to a four monopolar construct. As will be reported in this chapter, the overwhelming evidence points to a four-dimensional construct of well-being (enthusiasm, relaxation, depression and anxiety).

Chapter 4 deals with telic and activity models of well-being, and reports the results of multivariate statistical procedures with sets of dependent and independent variables analysed simultaneously. Neither Karasek's (1979) job-strain model, nor Warr's (1986, 1994) Vitamin Model, found support in this study. As an alternative to these models, a model of well-being is developed based on the finding from this study that intrinsic job satisfaction, enthusiasm and depression on the one hand, and anxiety and relaxation on the other are differentially related to two sets of predictors (see also Warr, 1990_b). Borrowing from Karasek's (1979) typology of passive-active, and low job strain-high job strain continua (formed by the dimensions of complexity and job demands identified in the analyses), an argument is advanced that well-being or psychological distress is the result of the additive influences of certain predictors (e.g., supervisory support, skill utilisation, and work pressure). However, because anxiety and depression were shown in this study to co-occur in high-strain jobs, the psychological outcomes themselves may be subject to an interaction effect. This conclusion stems from the clinical literature suggesting that the comorbidity of anxiety and depression leads to qualitatively different outcomes than the separate influence of these emotions acting singly.

Chapter 5 examines the extent to which intrinsic job satisfaction and job-related affect scales overlap. Analyses based on canonical correlation analyses and hierarchical regressions show that intrinsic job satisfaction is more strongly associated with job characteristics, while the affective measures are more strongly related to job demands (in this study affective measures and job demands have been shown to have discriminant validity, while job demands were strongly related to organisational level). The continued use of job satisfaction measures in organisational research (supplemented by affective measures) is recommended.

Chapter 6 describes the development of a causal model among outcome variables (intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation) based on validation and cross-validation samples.

Chapter 7 reports the results of the testing of the model developed in chapter 6, using a longitudinal sample. Competing models of well-being were tested through structural equations modelling procedures to determine whether intrinsic job satisfaction lead to affective well-being (enthusiasm, depression, anxiety, and relaxation) or vice versa. The model where intrinsic job satisfaction leads to affective well-being fitted the data better than the alternative explanation.

Chapter 8 extends the findings from chapter 7, and tests the proposition that intrinsic job satisfaction is dispositional. To test this hypothesis, that has been consistently advanced recently in the organisational literature, "length of organisational tenure" was selected as an objective organisational variable. This variable was dichotomised into short- and long-tenure groups. Using a longitudinal sample, results showed that over time short-tenure employees (1-4 years) registered a decrease in their intrinsic job satisfaction and an increase in their depression measures, while the long-tenure group (>4 years) recorded an increase in their intrinsic job satisfaction and a decrease in depression. This finding argues against the proposition that intrinsic job satisfaction is dispositional.

Finally, in chapter 9 a summary of the thesis is presented with conclusions and recommendations for future research.

CHAPTER I

The Meaning of Affective Well Being

"Man wishes to be happy, and only wishes to be happy, and cannot wish not to be so." Pascal (p. 203)

In popular discourse there seems to be agreement as to the meaning of the word "happiness". Being happy connotes a sense of satisfaction and fulfilment - something that is pursued for its own sake. Philosophers for centuries have concerned themselves with defining happiness. Aristotle, for example, one of the first classical philosophers who considered the idea of "happiness" in some detail, states in his Nicomachean Ethics, that ευδαιμονια (translated loosely in English as "happiness") is the highest of all good achievable "something final and self-sufficient, and is the end of action." He continues:

> "Now we call that which is in itself worthy of pursuit more final than that which is worthy of pursuit for the sake of something else, and that which is never desirable for the sake of something else more final than the things that are desirable both in themselves and for the sake of that other thing. Therefore, we call final without qualification that which is always desirable in itself and never for the sake of something else. Such a thing happiness, above all else, is held to be; for this we choose always for itself and never for the sake of something else." (p. 342; 30)

Although there may be some ambiguity from the above statement as to whether happiness is an emotion (i.e., joy), a cognitive evaluation (i.e., satisfaction), or a combination of both (Argyle & Martin, 1991), the majority of studies have treated "happiness" as an emotional state. Based on this construct definition the discussion that follows will concentrate mainly on describing happiness as an affective reaction.

The empirical nature of contemporary definitions of happiness (many have lamented the atheoretical nature of research in the area) has its origins in Bradburn's (1969) research. Bradburn and his colleagues investigated how certain macro level societal changes (e.g., educational level, urbanisation, etc.) impacted upon the life of the individual, and affected psychological well-being. Psychological well-being (henceforth "well-being" and "happiness" will be used interchangeably) was measured through the development of an affect scale intended to measure emotional well-being. These researchers found that the scale items formed two clusters that were relatively independent of each other. This chance finding emanating from a study of social change was counter-intuitive, because it meant that people who reported high positive affect were neither more or less likely than others to report high negative affect. It had been assumed up to that time that experiencing one type of affect (either positive or negative) would act against experiencing the other. These two dimensions were also found to be related differentially to sets of variables. For example, positive affect (PA) was related to active participation in social activities, while negative affect (NA) was found to be associated with anxiety, marital and sexual problems, and symptoms of ill-health. In Bradburn's terms happiness has been operationalised as the balance between positive and negative affect.

There is now a large body of research confirming Bradburn's results; that is, when ratings of adjectives describing affects are factor analysed, two dimensions usually account for the major portion of variance. The usual finding from the unrotated solution has been a pleasantness-unpleasantness dimension defined by such terms as *satisfied, pleased* vs. *unhappy, sad*, and an activation or arousal dimension defined by *aroused, surprised* vs. *still, quite*, etc (Russell, 1980). If the axes of the unrotated solution are subjected to a Varimax (orthogonal) rotation, a two-factor structure of affect emerges (Watson & Tellegen, 1985). Watson and Tellegen concluded that "in our own studies and in virtually all published self-report studies that we have subsequently reanalysed, we have encountered the same two large, bipolar dimensions" p. 220. These were labelled Positive Affect (PA) and Negative Affect (NA). Scales capturing the two high poles of these affects have been developed by Watson, Clark and Tellegen (1988). The Positive and Negative Affect Schedule (PANAS) defines PA with such items as *enthusiastic, interested, determined*, etc., and NA with items such as *scared, afraid, upset*, etc. A more comprehensive scale, the Job Affect Scale (Brief, Burke, George, Robinson, and Webster, 1988), captures the entire PA and NA space (i.e., both high and low poles of PA and NA). According to this definition the opposite of high PA (*enthusiastic, elated*, etc.) is low PA (*sluggish, sleepy*, etc.), while the opposite of high NA (*hostile, scornful*, etc.) is low NA (*calm, relaxed*, etc.). In this bipolar conceptualisation of affect only the high poles represent the experience of affect per se, while the low poles represent states that are relatively free of emotional involvement (Watson, 1988). For this reason, and in order to eliminate any ambiguity, it is important that researchers make explicit whether they are considering either the bipolar or the high poles of the dimensions only. This prescription, however, is not evident in the literature.

Other researchers have proposed similar affective structures, albeit with different labels attached to them. For example, Watson's (1988) high PA is

Thayer's (1978) "high energetic arousal", and Mackay, Cox, Burrows and Lazzarini's (1979) "high arousal". Watson's low PA is Thayer's "low energetic arousal", and Mackay's et al. "low arousal". Also, Watson's high NA is Thayer's "high tense arousal", and Mackay's et al. "high stress", while Watson's low NA is Thayer's "low tense arousal", and Mackay's et al. "low stress".

Consistent with this conceptualisation is Warr's (1990, 1994) description of affective well-being in the occupational setting through two principal axes. These two axes are labelled anxiety-contentment[1] (high and low NA respectively) and depression-enthusiasm (low and high PA respectively). These two axes parallel those of Watson and his colleagues, and are measured through scales that capture similar affects to those captured by the Brief et al. (1988). The dimensions from the Brief et al. scales have been re-labelled nervousness-relaxation, and enthusiasm-fatigue by Burke, Brief, George, Roberson & Webster (1989).

Diener and Emmons (1984), however, have proposed a somewhat different affect structure from the one proposed by Watson and his colleagues. Diener and his colleagues used for PA such items as *happy*, *pleased*, and *satisfied*, while NA was defined by *unhappy, blue*, and *lonely,* etc. PA, therefore, captures the "pleasantness" sector of Watson and Tellegen's (1985) affective space (shown in Figure 1.1, sectors 2 and 3), and NA captures the "unpleasantness" and "high negative affect" space (sectors 6, 7 and part of sector 8).

Note 1. The anxiety-contentment dimension was renamed subsequently by Warr (1994) "anxiety-comfort".

An issue that has emerged from research on affect is whether it is useful to distinguish between the frequency and intensity of affective reactions. The distinction is important, because the popular view would suggest that well-being is at its maximum when positive affect is both frequent and intense, while negative affect is infrequent and in low intensity (Diener, Sandvik and Pavot, 1991). A number of studies were carried out to test this common sense view. Diener, Larsen, Levine and Emmons (1985) reported research suggesting that positive and negative affect are strongly inversely correlated. However, work on subjective well-being indicated that over time, positive and negative affect were independent across persons. To reconcile this inconsistency, Diener et al., (1985) proposed a two- dimensional affective structure: the frequency of PA vs NA, and the intensity of affect. Across three studies designed to explore this inconsistency they found that the frequency and intensity of affect varied independently. Although average levels of PA and NA showed low correlations, this relationship became strongly inverse when intensity was partialled out. In this way, the intensity dimension helped explain the relative independence of PA and NA.

Diener, Sandvik and Pavot (1991) also addressed the question whether frequency of PA, intensity of PA, or both are necessary and sufficient for happiness. Their results suggested that happiness or affective well-being is related primarily to the frequency and not to the intensity of PA. But why do intense positive experiences (although desirable at the time of experience) not contribute greatly to subjective well-being in the long run? This question was answered by Diener, Colvin, Pavot, and Allman (1991) who in a series of five studies concluded that intense positive experiences may sometimes have costs in the form of increased negative affect, and lowered positive valence in the face of other good experiences. These costs counterbalance the desirable nature of intense positive affect. Diener, Sandvik and Pavot (1991) concluded that it is the frequency of positive affect that is the "essence of a phenomenon which can be labelled 'happiness'." (p. 124).

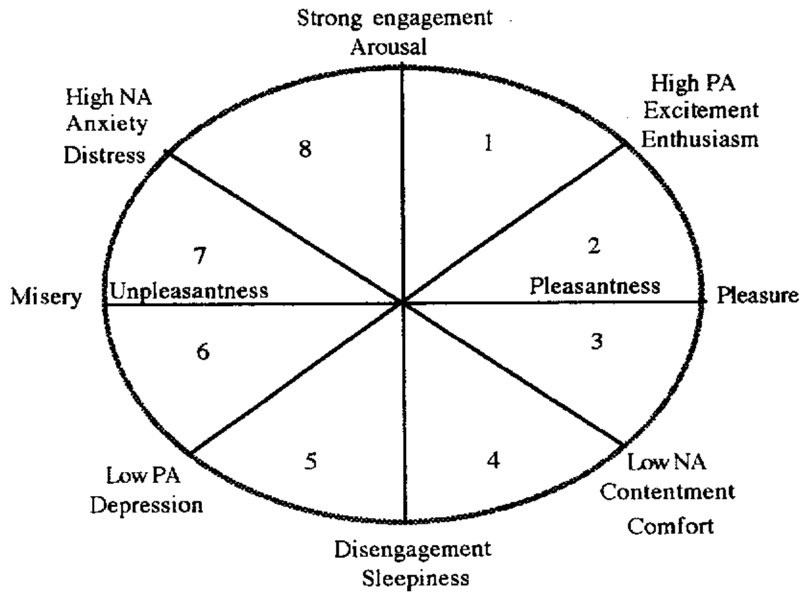


Figure 1.1. Affective space in well-being research. Integrating Russel's (1980), Warr's (1990, 1994), and Watson's and Tellegen's (1985) conceptualisations of affect.

At this point a distinction should be made between *state* and *trait* NA and PA. Measures of current or *state* affect assess how a person is feeling "right now", "today", or "this week". However, when instructions are given asking respondents to indicate how they have felt over longer time period (i.e., over the past few weeks, past few months, etc.) the retest reliabilities of subjects' affect ratings tend to increase as the rated time frame increases. This stability prompted some to suggest that these affect measures may in fact be tapping traits (Meyer, & Shack, 1989). It is, therefore, possible that some researchers may have unwittingly captured trait NA and PA in their studies, instead of state NA and PA, due to the rated time frame. The stability coefficients of self-report ratings of affect has been found to be fairly stable across administrations, and some researchers (for example, Meyer & Shack, 1989) suggested that they may be used as trait measures. George (1991) has identified at least two studies (Organ & Konovsky, 1989; Spector, Dwyer, & Jex, 1988) where the measurement of trait (rather than state) may have occurred, due to inappropriate longer term time frame instructions.

But what do state and trait PA and NA represent? George (1992) has suggested "that a given state captures the interaction of the relevant personality or dispositional and situational factors" (p. 194). State affect is, therefore, a function of the person and the situation. On the other hand trait PA and NA reflect individual differences in positive and negative emotionality (also referred to in the literature as positive and negative affectivity) that are maintained under all conditions, even in the absence of external stimuli. High-NA individuals are, therefore, more likely to report distress, discomfort, and dissatisfaction over time and regardless of the situation (Watson & Pennebaker, 1989), while high-PA individuals have a sense of excitement and enthusiasm (Watson et al., 1987), a generalised sense of well-being, and a zest for life, independent of the influences of NA (Costa & McCrae, 1980).

Measurement Issues in PA and NA Research

A number of studies investigated the possibility that PA and NA will show different associations depending on the response format. Warr, Barter, and Brownbridge (1983), for example, found that their PA and NA scales correlated only -.01 when the customary dichotomous (yes-no) Bradburn (1969) response format was used, but the correlation increased to -.54 when a 7-point frequency mode was used, in which subjects rated the proportion of a given time period they had experienced each affective state. A replication study by Watson (1988) confirmed the Warr et al. results; that is, the PA and NA scales were more highly negatively correlated using the frequency format. However, Watson also found that this relationship was dependent on the choice of descriptors. For example, pleasantness-unpleasantness descriptors making up the scales were affected more by the frequency format than *pure* PA and NA markers. Scales which were made up with pure PA and NA markers, such as the PANAS scales, remained largely independent.

The choice of descriptors has also resulted in some contradictory findings in the literature of self-rated affect. Although orthogonal PA and NA factors emerged from ratings based on short time periods (Watson & Tellegen, 1985), others (e.g., Diener & Emmons, 1984) reported strong negative correlations using the same time instructions. This anomaly was attributed to the complexity of some descriptors (those reflecting happiness, contentment, and sociability), which captured in addition to PA low NA. Conversely, descriptors that loaded high on NA captured also low PA (items reflecting depression and loneliness). Watson (1988) argued that, because these terms are part of the pleasantness and unpleasantness dimensions, they will produce NA and PA scales that are negatively correlated with each other.

Inappropriate mood descriptors were also used recently by Green, Goldman, and Salovey (1993) who questioned the consistent results reported in the literature confirming the independence of PA and NA. When they investigated the independence of happiness (PA) and sadness (NA) using structural modelling techniques, the observed correlation of -.27 was estimated at -.85 after controlling for measurement error. They concluded that pleasant and unpleasant affect are in fact opposites, but this relationship is masked by measurement error. However, in two out of three studies reported in the paper, their adjective list of mood items clearly captured the high PA and low PA affective space (i.e., segments 1, 2 and 5, 6 respectively in Figure 1.1), and not PA *and* NA (i.e., segments 1, 2 and 7, 8 respectively in Figure 1.1). When the mood adjective list was correctly modified to capture affect operating in a state of arousal (an operationalisation consistent with findings of orthogonal dimensionality), the estimated inter-factor correlation after controlling for random error was -.57, and -.58 with non-random error controlled. What is more damning for their conclusions on bipolarity is their comment that in "...none of our studies does a nested χ^2 difference test enable us to accept the null hypothesis that *one rather than two factors* generated the data" (Green et al., 1993, p. 1037, italics added). It seems reasonable, therefore, to argue that PA and NA are neither bipolar nor orthogonal but correlated and distinguishable affects.

If PA and NA are neither bipolar nor orthogonal but made up of discrete affects, a decision confronting the researcher is whether to measure affect at the discrete level or at the second order level. For example, Watson and Tellegen's (1985) hierarchical model of self-rated affect has two broad general dimensions (NA and PA) each composed of several correlated yet ultimately distinguishable sub-dimensions. Diener, Smith and Fujita (1995) found in their study that despite strong correlations between discrete emotions of the same hedonic tone (shame, fear, sadness, anger, and love and joy), these could not be conflated into two global positive and negative groupings. When competing models of affect were tested in their study (through structural equations modelling), the model that included the discrete affects fitted the data significantly better than a second order model. Diener et al. concluded that although the same individuals tended to experience as many pleasant as unpleasant affects, individual differences in the discrete affects could not be completely reduced to the two global categories of P A and NA. Their results demonstrate the importance of assessing both levels of the hierarchical structure in studies of self-rated affect. Watson and Clark (1992) recognised the importance of specificity versus non-specificity in studies of self-rated affect, but view these two levels of analysis as complementary rather than mutually exclusive. They argue that since these phenomena exist in tension with each other, it is a scientifically important task to disentangle their unique contributions to affect-related phenomena as much as possible.

Theories and models of affective well-being and mental health

Until recently, research on well-being focused on the practical application of findings, with little attention being paid to the examination of the meaning of well-being, and the identification of other important aspects of psychological functioning (Ryff & Keys, 1995). Notable exceptions are the models developed by Ryff (1989, 1995), and Warr (1990_a, 1994). The theoretical foundations of Ryff's model are based on the convergence of a number of approaches from developmental psychology (Erikson, 1959), clinical psychology (Allport, 1961; Jung, 1933; Maslow, 1968; Rogers, 1961), and mental health (Birren & Renner, 1980).

Ryff and Keys (1995) proposed a "super-factor" (second-order level) model of well-being that subsumed a number of dimensions including *self-acceptance* (positive evaluations of oneself), *environmental mastery* (the ability to deal successfully with the environment), *purpose in life* (a sense of purpose and meaning in one's life), *positive relations with others* (the existence of quality interpersonal relations), *personal growth* (a sense of continued growth and development as a person), and *autonomy* (self-determination). In one of the few confirmatory analytic procedures reported in the literature, this second-order factor model was tested by Ryff and Keys using data from a representative sample (n = 928). The proposed hierarchical structure of well-being fitted the data better (but not adequately according to acceptable criteria of fit) than alternative models of well-being that included the following first order factors: a single factor model; a two-factor model of positive and negative affect; and, a six factor model (without the higher order factor latent structure).

Taking a somewhat different perspective to describe primarily psychological health in the occupational setting,
treated well-being as one of the sub-dimensions of mental health. For Warr (1990_a) mental health comprises four components including *affective well-being*, *competence*, *aspiration*, and low levels of *negative job carry-over*. In a later re-formulation of the model, Warr (1994) retained the dimensions of affective well-being, competence, and aspiration, but excluded negative job carry-over (the spill-over effect from work to family and leisure life). Two additional dimensions, however, were added to the model: autonomy, and integrated functioning.

Briefly, *affective well-being* was conceptualised in terms of the two correlated axes (enthusiasm-depression and anxiety-comfort) referred to earlier (see Figure 1). *Competence* or efficacy is the person's ability to deal effectively with life's problems and is similar to Ryff's and Keys's (1995) "environmental mastery" dimension. *Aspiration* is the extent to which a person strives to achieve goals through purposeful activity. This dimension too is akin to Ryff's and Keys's dimension of "personal growth". *Autonomy* (not to be confused with the job characteristic of the same name) is the tendency to strive for independence and self-regulation in one's life, and is identical to Ryff's and Keys's conceptualisation of "autonomy". Finally, *integrated functioning* is the extent to which a person is able to act as a "whole" person through the balancing of the various components of mental health.

Although Ryff's and Keys's (1995), and Warr's (1994) models show some convergence (three of the components of well-being or mental health are the same, and both models are imbued by Western values) they are not identical. The models differ in their conception of what are the constituent parts of well-being and mental health. Although both models appear to be equally sound, a relativist position - in the absence of a universally applicable definition - is unlikely to lead to a proper scientific examination of mental health. By contrast, as was discussed earlier, there seems to be a wider consensus regarding the components of affective well-being (PA and NA).

At least three theories of well-being and mental health have appeared in the occupational literature recently, and stimulated research in the area. These theories, based on Diener's (1984) more general typology, may be classified as *telic*, *activity*, and *dispositional* theories.

Telic Theories

Warr's (1994), and Ryff's and Keys's (1995) models fall into telic or endpoint theories of well-being. The main characteristic of a telic or end state theory, is that well-being is achieved when some needs (e.g., competence, aspiration, etc.), either inborn or learned, are fulfilled. The argument is being made that if these needs are truly universal, their fulfilment should be associated with happiness in all cultures. However, it is unlikely that consensus among researchers will be achieved in identifying universal components of mental health (Warr, 1994).

Warr's (1986, 1994) model of occupational well-being (described in more detail below) is more comprehensive, because it identifies nine environmental features of jobs that are assumed to lead to better mental health in the workplace. The Vitamin Model of mental health (Warr, 1986, 1994) argues that the effects of vitamins on the physical well-being of the individual are analogous to the influence of nine aspects of the environment that collectively determine a person's mental health. These environmental features are: *opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact,* and *valued social position.* Similar to some vitamins, which could have either a beneficial effect (if taken in moderation) or a detrimental effect (if taken in large doses), these environmental features can either promote or decrease mental health in a similar manner. Aspects of the environment, that have the potential to impair mental health if they are present beyond a required level, are opportunities for control, skill use, and interpersonal contact; and variety, environmental clarity, and externally generated goals. Their influences are shown in Figure 1.3 and are represented by the AD curve.

Like the vitamins A and D, which are toxic when taken in large quantities, these features have an adverse impact on mental health. On the other hand vitamins C and E, even if taken in large doses, do not appear to have any ill effects. Equivalent to vitamins C and E in their effects on human physiology are environmental features associated with the availability of money, physical security, and valued social position. These features increase well-being and mental health up to a point and then level off, maintaining what Warr (1986) terms a "constant effect". These effects are represented by the CE curve in Figure 1.3.

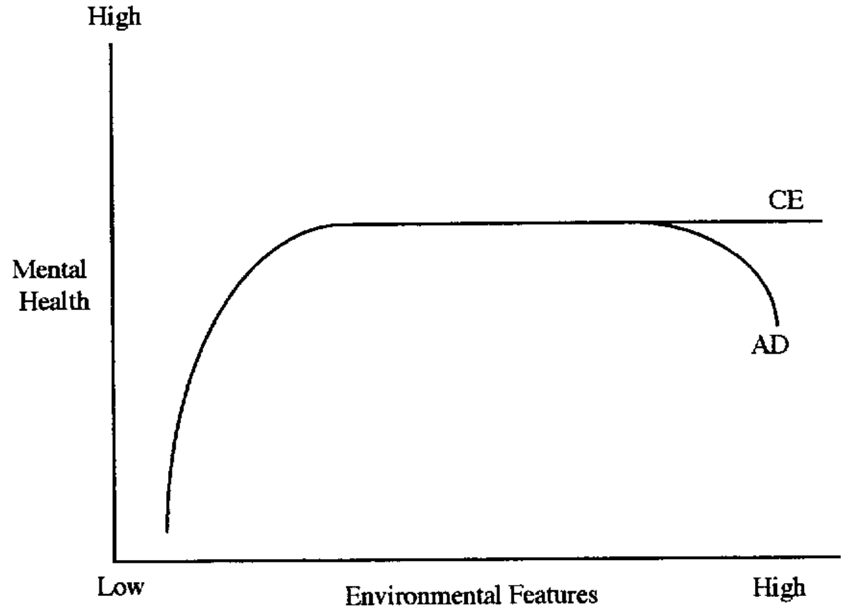


Figure 1.2. Warr's (1987) Vitamin Model.

Consistent with this model Warr (1986) argues that his Vitamin model of stress would predict that opportunities for control and skill use (or job decision latitude) would have a curvilinear relationship with well-being. In a study to test the Vitamin Model Warr (1990_b) found support for his predictions, but no evidence for the moderating effect of job decision latitude on job demands predicted by Karasek's model (to be described later).

Activity Theories

Whereas telic theories place the locus of happiness in certain end-states, activity theories maintain that happiness is a by-product of human activity. Happy people are those who are immersed in interesting activities. Aristotle was a major proponent of one of the earliest and most important activity theories. He maintained that happiness comes about through virtuous activity, that is, from activity that is performed well. The emphasis here is on the behaviour itself (the activity) rather than the achievement of some end point (i.e., a goal).

In a somewhat similar vein Gardner and Cummings (1988) have proposed an activation theory to predict well-being in the occupational setting. This theory maintains that humans have an idiosyncratic or "characteristic level" of activation. Activation has been defined by Gardner and Cummings as the "state of neural excitation in the reticular activation system (RAS) of the central nervous system (the brain and spinal cord)" (p. 83). Within this context arousal is treated by the proponents of this theory as a manifestation of activation levels. A characteristic level of activation is one that allows the central nervous system to operate more effectively. The psychological benefits from operating at or close to one's characteristic level of activation is reflected in enhanced well-being or positive affect. Deviations from this characteristic level (either positive or negative) result in diminished central nervous system efficiency, with accompanying deterioration of motor responses and though processes. Activation theory further posits that individuals are motivated to maintain their characteristic level of activation through appropriate behaviours. However, in many situations the application of impact modifying behaviours is thwarted, for example, through machine pacing, rules and regulations, or supervisory directives. The theory, therefore, predicts that positive psychological outcomes would only result when the individual's ability to modify the situation is not constrained. Although activation theory makes similar predictions to those made by Hackman's and Oldham's (1975) job characteristics model, or Karasek's (1979) job-strain model, it represents very different interpretation of how certain job characteristics (e.g., task novelty, complexity, etc.) lead to certain outcomes. Unlike Hackman's and Oldham's and Karasek's models, which are based on cognitive approaches, activation theory has relied more on the work of physiologists, physiological psychologists, and psychophysiologists (Gardner and Cummings, 1988). Although activation theory presents a viable alternative to the other job design and job stress models, it has been largely ignored as a research topic in occupational and organisational psychology, due mainly to measurement difficulties. By contrast, the work of Karasek (1979), that makes similar predictions to those made by the activation theorists, has generated considerable research output in the last fifteen years.

The research based on the work of Karasek (1979) and his associates has focused on the relationship between perceptions of stressful jobs and job related well-being and mental health (Cooper & Marshall, 1978; Landsbergis, 1988; Caplan, Cobb, French, Harrison & Pinneau, 1975; Warr, 1990). The model posits that there is a synergistic relationship between job demands and control or job decision latitude; that is, the interactive effects of high job demands and lack of control produce a strain effect greater than the simple additive effect of these two variables. In his original formulation of the model Karasek (1979) defined job decision latitude as a composite of "decision authority" and "intellectual discretion" (p. 340), and job demands as a measure of "the psychological stressors involved in accomplishing the work load, stressors related to unexpected tasks and stressors of job-related personal conflict" (p. 341). In a revision of the job strain model Karasek and Theorell (1990) re-defined the combination of intellectual discretion and job decision authority as "control", because "in our opinion a high level of skill gives the worker control over which specific skills to use to accomplish the task" (p. 58). The key prediction from this model is that when job demands are very high and control is low, well-being suffers disproportionately. The revised model has also been expanded by the inclusion of a third variable that has been identified by other researchers in the literature as a "buffer". This variable is social support, and incorporates the constructs of supervisory and peer support. These three broad constructs (i.e., control, demands, and support) are assumed to be orthogonal, and act interactively to determine the quality of the psychosocial work experiences of workers. To date, however, most research has investigated only the synergistic relationship between job decision latitude and job demands.

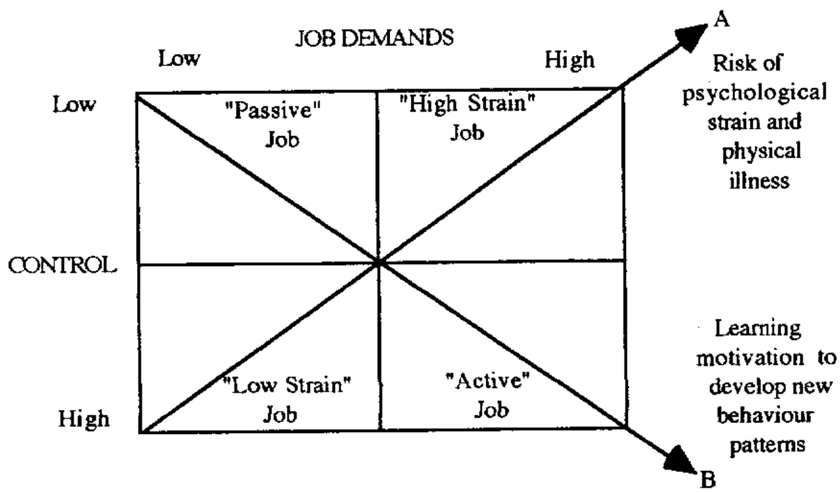


Figure 1.3. The demand-control model (Karasek & Theorell, 1990).

Figure 1.3 describes a typology of jobs resulting from different combinations of job demands and job control. "High strain" jobs are those with a combination of high job demands and low levels of control. "Low strain" jobs have low levels of job demands and high levels of job control. "Passive jobs" are those characterised by low job demands and low job control, resulting in learned helplessness as a way of coping. When job demands and job control are simultaneously high these jobs would not be associated with strain because they are "active jobs". These jobs allow the individual to develop new behaviour patterns to mitigate the effects of high demands. The psychological strains are not great under these circumstances, because the energy generated by the job's many challenges is translated into action through effective problem solving (Karasek & Theorell, 1990). Furthermore, research has shown that people with active jobs enjoy the highest material and psychological rewards (Karasek, 1979). Although low strain jobs, shown in the high control low demand quadrant in Figure 1.3, characteristic of self-paced occupations, may be considered "a relative psychosocial paradise with low levels of psychological strain" (Karasek & Theorell, 1990, p. 42), they are not considered desirable from a well-being and mental health perspective. Warr (1994, p. 86) in particular has adopted a value-laden position on this issue by suggesting that this "passive contentment" view of mental health ought to be rejected in preference to the active involvement in the pursuit of challenging goals. A problem arises, however, if the strain is particularly severe or it becomes chronic. Employees occupying high status managerial or professional jobs with exceptionally high levels of control, for example, may experience this control as a significant demand in itself (Karasek & Theorell, 1990). This may give rise to unacceptable levels of job-related anxiety (Warr, 1990; Birdi, Warr, & Oswald, 1995), and general psychological distress. A curvilinear relationship between certain job characteristics and well-being has been suggested also by Champoux (1980). Also, Warr's Vitamin Model may be considered a viable alternative to Karasek's model, because it addresses some of the anomalies found when the Karasek model is tested empirically.

Dispositional Theories

Currently there is considerable debate taking place among psychologists on the nature of happiness or well-being. The question being asked is whether happiness is a state - simply the accumulation of individual happy feelings - or the predisposition to react in a happy way (Diener, 1984). Diener cites the following examples from the literature to demonstrate the differences between the two approaches. For example, Lewishohn and Amenson (1978) contend that lack of pleasant events lead to depression, while the dispositional theorists argue that depression prevents an individual from feeling pleasure in circumstances that are normally pleasant (Sweeney, Schaeffer, & Golin, 1982). Great proponents of the dispositional approach are Costa and McCrae (1980) who proposed a "model of happiness". Costa and McCrae asserted that differences among individuals in PA and NA over time are a direct result of differences in extroversion and neuroticism, respectively. This view was strengthened by the research of Meyer and Shack (1989) who used factor analytic techniques to examine the degree of convergence between the two-dimensional model of affect and personality structure. It was shown that extroversion and PA share a common dimension in the combined affect and personality space, while neuroticism and NA together defined the second dimension of this space. This finding persisted whether affect was evaluated as a state or a trait.

Findings showing convergence of affect and personality structure were reported by a host of other researchers (see for example, Costa & McCrae, 1980; Emmons & Diener, 1985; Larsen & Ketelaar, 1989, 1991; Meyer & Shack, 1989; & Brownbridge, 1983; Watson & Clark, 1984; Williams, 1989). Costa and McRae concluded that "over time, the small but persistent effects of traits emerge as a systematic source of variation in happiness, whereas situational determinants that vary more or less randomly tend to cancel each other out" (p. 676). Research on this "systematic source of variation" was carried out with trait NA as a control variable examining the relationships between self-report stressors and self-report strain outcomes. Brief, Burke, George, Robinson, and Webster (1988), and Payne (1988), who controlled neuroticism rather than NA in his study, found that the stressor-strain relationship was attenuated, when trait NA or neuroticism was controlled. In a more recent study Schaubroeck, Ganster and Fox (1992), using confirmatory factor analysis, found that although NA did not share a common factor space with measures of subjective strain, nevertheless it attenuated the effects of self-report work stressors. These results, however, are in disagreement with those of Chen and Spector (1991) who found little evidence of attenuation when they partialled NA and trait anxiety respectively from correlations between self-report of work stressors and self report strain outcomes. More consistent results have been reported, however, when the examination focuses on trait PA. Studies by Schaubroeck et al. found little evidence to suggest that this trait is substantially related to either stressors or strains.

Are these individual differences in trait PA and NA likely to persist over time? Research has found that personality differences in extroversion and neuroticism were found to antedate and predict differences in happiness over a period of years (Costa & McCrae, 1980; Warr et al., 1983). This finding is presented by some as evidence to rule out the rival hypothesis that temporary affective states account for any observed relations.

Additional evidence suggests that affective well-being exhibits correlational stability with age. Costa, Zonderman, McCrae, and Cornoni-Huntley et al. (1987) examined maturational changes and cohort differences on subjective well-being. The results indicated that older participants tended to be lower in both PA and NA, but longitudinal changes in overall well-being were not found. Stacey & Gatz (1991) reported similar cross-sectional findings, with older cohorts reporting lower levels of both PA and NA. However, longitudinal analyses indicated small but significant changes toward decreased PA and NA, with NA registering the strongest effect size.

PA, NA and Their Association With Anxiety, Depression, and Job Satisfaction

Are PA and NA related to anxiety and depressive disorders? Research by Watson, Clark, & Carey (1988) has shown that NA is broadly associated with symptoms and diagnoses of both anxiety and depression (and as such is a predictor of psychiatric disorder), while PA is inversely related only to symptoms and diagnoses of depression. Tellegen (1985) carried out a factor analysis of a number of self-report measures of anxiety, depression, and state NA and PA, and found a high correlation between depression and anxiety. However, after plotting the factor structure the depression measures loaded closer to low PA, whereas the anxiety measures loaded closer to high NA. This prompted Tellegen to conclude that anxiety and depression might be better differentiated if the depression measures included more items tapping low PA, and anxiety measures had more items reflecting high NA. Tellegen's findings, therefore, are in agreement with the description and location of the anxiety and depression dimensions in Warr's (1990_a) well-being model (see Figure 1).

Because NA is treated by many researchers as a pervasive predisposition to experience negative emotions and cognitions (Watson & Clark, 1984), it has been linked also to perceptions of the working environment. There is support for the view that job satisfaction is genetically determined (Avrey, Bouchard, Segal, & Abraham, 1989; Staw, Bell, & Clausen, 1986), and as Chen and Spector (1991) observe, this genetic source of job satisfaction may operate through NA. Many have reasoned that since NA permeates job satisfaction and other job affect measures "NA may operate as a nuisance factor in self-report data. To the extent various self-report measures all tap the same underlying NA construct, presumed 'independent variables' and 'dependent variables' ....may represent little more than different measures of the same thing." (Watson, Penebaker, & Folger, 1987; p. 155). If this is the case, then widely-used work attitude measures do not discriminate between positive and negative affects and cognitions (Organ & Near, 1985). Responses on job satisfaction scales may, therefore, be subject to the influences of NA and PA depending on the affective content of the scale. There are, however, certain job satisfaction scales (such as the satisfaction scale in the JDS), which were shown to provide results that are less affected by dispositional characteristics (Schaubroeck, Ganster & Fox, 1992).

Summary & Conclusions

There is wide consensus (across a number of studies) that the basic structure of affect consists of two orthogonal dimensions labelled positive and negative affect (PA & NA). These two dimensions have consistently emerged with varying sets of descriptors, time frames, and response formats following orthogonal rotation based on factor analysis. PA and NA may be measured as two monopolar (e.g., high positive affect and low positive affect), or two bipolar dimensions (e.g., enthusiasm-depression and anxiety-comfort). They may also be measured as state or trait PA and NA, depending on the time frame instructions. In the first instance state affect is a function of the person and the environment, while trait PA and NA represent enduring aspects of a person's personality.

There are at least three theoretical frameworks of well-being that appeared recently in the organisational psychology literature. These are: Warr's Vitamin Model (1986, 1994), Karasek and Theorell's (1990) Job-Strain Model, and Staw & Ross's (1985) dispositional approach to job satisfaction. Each of these frameworks make predictions that help explain well-being at work.

The conclusion from the literature review has suggested that there is a paucity of empirical research dealing with job-related affect. In addition, studies of context-free affect based on confirmatory factor-analysis are rare in spite of such analyses being the most robust methods of determining the dimensionality of affect by taking into consideration measurement error. The determination of job-related affect, either as bipolar or monopolar structures based on confirmatory factor analysis (following the equivocal results by Green et al., 1993), would make possible the formulation of a theoretical causal framework in which intrinsic job satisfaction formed an integral part. This would not only increase our understanding of how job-related affect *and* intrinsic job satisfaction behave, but would lead to better predictions when these variables are related to sets of independent variables consistent with models of job-related well-being. Research questions dealing with these issues will be developed further and explored in more detail following a chapter on methodology.

CHAPTER II

Methods

Sample

Three distinct samples and one sub-sample from the Western Australian Public Service were used for the study. The year of data collection, number of respondents for each survey and their hierarchical level, composition of the workforce (blue/white-collar), sex distribution, and extent of sampling (i.e., whether the sample was random or included the entire organisation) are shown in the table below.

Financial support for the collection of data for samples 1 and 2 was given by the Australian Research Council who funded the project between 1989 and 1990. The grant was made to three researchers from Curtin University's School of Management and School of Psychology. Broadly stated, the aim of the study was "to investigate the impact of changes in skill formation and job redesign upon white collar employment, both in terms of quality of working life and productivity" (Cordery et al. 1989, p. 7). Before the questionnaire was administered to public service employees, extensive consultation was carried out between the researchers, and representatives from all agencies, the Civil Service Association, and the Multiskilling Executive Steering Committee.

Data for sample 4 were collected by the author. This was made possible through consulting work undertaken by the School of Psychology at Curtin

University, aimed at establishing baseline Quality of Working Life measures in one agency.

Table 2.1
Sample

Sample ID	Year	n	Level	White / Blue Collar	Sex Distribution	Sampling of Depts*
1	1989	3,044	1	W	25% M 75% F	44[a]
2	1990	3,709	1-8	W	59% M 41% F	21[b]
3[c]	1989 & 1990	247	1	W	27% M 73% F	21[b]
4	1993	2,276	1-8	W & B	84% M 16% F	1[a]

Notes: * For all samples respondents were located throughout Western Australia.
[a] Represents entire organisation or department. [b] Random sample. [c] Sub-sample of sample number 2. A department is an organisation in its own right (i.e., Corporate Affairs, Community Services, Commerce and Trade, etc.).

Sample 1 consisted of 3,044 white collar employees from 44 departments of the Western Australian Public Service. This sample represented approximately 60% of all employees classified "Level One" (lowest white collar classification in the organisation). Although only one organisational level was surveyed, there was considerable task heterogeneity within this level, with respondents engaged in nineteen distinct task groupings. These ranged, for example, from accounting tasks (processing accounts, performing mathematical calculations, etc.), to laboratory tasks (conducting experiments, collecting samples for analyses, etc.), to filing tasks. Of the sample 25% (748) were male and 75% (2,245) female employees, reflecting the actual gender ratio composition of the work force in that organisation.

Sample 2 was a random sample of 3,709 white-collar employees from all organisational levels (Levels 1 to 8) from 21 departments of the same organisation. This sample represented approximately 30 per cent of all employees in the departments surveyed. Broadly, the eight classifications may be grouped into clerical (Level 1), supervisory (Levels 2 and 3), middle management (Levels 4 and 5) and higher management (Levels 6 to 8). Within these groupings the sex distribution was: 316 male and 799 female for clerical; 526 male and 315 female for supervisory; 791 male and 253 female for middle management; and 456 male and 69 female for higher management (184 cases had missing information on sex and/or classification). The sex distribution within these classifications roughly approximated the actual male/female ratio in the population of employees within the organisation. Amongst those participating in the survey were also 247 "Level One" (clerical) employees who responded to the earlier survey (sample 1) conducted in 1989 which is described in Sevastos, Smith and Cordery (1992).

Sample 4 from a survey carried out in 1993 included employees from one department of the Western Australian Public Service, and had a mix of blue collar and white collar occupations. Specifically there were the following classifications and number of personnel in each broad category: 246 managerial or executive personnel, 103 professional engineers, 686 other professional and sub-professional personnel (e.g. draftspersons, information technologists, scientists, surveyors, etc.), 457 clerical and administrative personnel, 212 tradespersons, and 497 semi-skilled employees. In total 2,276 useable questionnaires were returned from this male-dominated organisation (84.1% male and 15.9% female) representing a 57.6% response rate. This sample was used in the present study to cross-validate results obtained from the other samples described above.

Procedure

For all samples a standardised questionnaire was administered on work premises during normal working hours, and in the majority of cases, with a member of the research team present. A video presentation was used for samples 1 and two to standardise administration procedures in each of the departments. All questionnaires required approximately one hour to complete. Survey returns were made through sealed ballot boxes, or by pre-paid envelopes. Response rates for the surveys were considered satisfactory if one takes into account the geographical dispersion of the branches of the Western Australian Public Service, which logistically made it difficult at times to ensure full participation.

To assess the implementation of change affecting Level One officers (sample 1) in the organisation surveyed, interviews were conducted by a research team (headed by Dr John Cordery) within five "pilot" departments. Those departments designated "pilot" were assigned the responsibility for the introduction of job design changes based on multi-skilling principles. A total of 88 employees were interviewed. Interviews took place at the place of work and during working hours. The average interview lasted 45 minutes. Of the 88 participants 29 were from the clerical grades (Level 1), 26 from supervisory grades (Levels 2 and 3), and 33 were classified managerial (Levels 4 to 8). Results of these interviews and other baseline measurements are reported in Cordery et al. (1989).

Instruments

Affective well-being. Affective well-being was tapped using the 12 items developed by Warr (1990$_a$). Warr used two scales to measure affective well-being: *anxiety-contentment,* and *depression-enthusiasm.* However, in a recent paper Sevastos, Smith and Cordery, (1992), evaluating the bi-polar dimensionality of the well-being measures, presented evidence which did not support the hypothesised underlying dimensionality of the instrument. Subsequent to this paper a re-analysis of the data (discussed in chapter 4) suggested that well-being is a four monopolar construct, rather than a two bi-polar one. The four monopolar dimensions consist of anxiety, comfort, enthusiasm and depression.

In this study the four monopolar dimensions will be used. The observed variables (and their latent constructs in parentheses) for each dimension are: calm, contented, relaxed (relaxation); uneasy, worried, tense (anxiety); gloomy, depressed, miserable (depression); and enthusiastic, cheerful and optimistic (enthusiasm). Respondents were asked to think of the past few weeks and indicate the extent to which they felt any of the above-mentioned adjectives. Scores range from 1 (never) to 6 (all of the time).

Intrinsic job satisfaction. Four items comprise the measure of intrinsic job satisfaction from the seven-item scale by Warr, Cook & Wall (1979). Measurement is on a seven-point scale, and respondents are asked to indicate how satisfied, or dissatisfied they are with each item. Extreme scores are 7 for positive responses, and 1 for negative responses. The items are prefaced with "How satisfied are you with", followed by: the recognition you get for good work; the amount of responsibility you are given; your chance of promotion; and the attention paid to suggestions you make?

The Job Diagnostic Survey (JDS). The five Hackman and Oldham (1975) "core" dimensions were assessed using the revised positive-worded (Idaszak &

Drasgow, 1987; Kulik, Oldham & Langer, 1988) 15-item JDS scale, which was shown to fit better the five-factor structure underlying the instrument (Cordery & Sevastos, 1993). There are five sub-scales in this instrument comprising skill variety, task identity, task significance, autonomy, and feedback. Respondents were asked to indicate on seven-point scales their level of agreement with aspects of their job (1 = very little; 7 = very much; or 1 = very inaccurate, 7 = very accurate). The five core job characteristics may be combined to form a summary index of the motivating potential of jobs [Motivating Potential Score, or MPS = (Skill Variety+Task Identity+Task Significance)/3 X Autonomy X Feedback], and can range from 1 to 343. This index has been used extensively in organisational research, and has been found in numerous studies to correlate highly with job satisfaction (Cook, Hepworth, Wall & Warr, 1981).

Skill utilisation. This scale developed for this study comprises the following three items: "My job usually makes use of very few of the work-relevant skills and knowledge I possess"; "most of the skills and abilities I use in my job are important to me"; "performance of my job requires the use of all the work-relevant skills and knowledge I possess", and "on my job, I seldom get a chance to use my special skills and abilities". Score range is from 1 = very inaccurate to 7 = very accurate. The internal consistency of the scale was acceptable (α = .79). Evidence of the construct validity of the scale is reported later in this chapter.

Supervisory support. This scale (developed by the Curtin research team) consists of three items with five response anchors ranging from 1 = to no extent, to 5 = very great extent. Items are: "does the person you report to show confidence, trust and respect for you?", "is the person you report to aware of and concerned with your needs?", and "does the person you report to encourage a participative decision-making climate?" For the 1993 survey (sample 4) this scale was replaced with one developed by Koys and DeCotiis (1991), and measurement was on a five-point scale ranging from "1 = strongly agree" to "5 = strongly disagree". Five items comprise this scale: "I can count on my boss to help me when I need it", "my boss is interested in me getting ahead in the company", "my boss is behind me 100%", "my boss is easy to talk to about job-related problems", and "my boss backs me up and lets me learn from my mistakes."

Stressors. Three chronic work stressors were assessed: work pressure (a measure of subjective work load), attentional demand, and role ambiguity. For *work pressure* the three-item scale by Martin and Wall (1989) was used. The items are prefaced by: "on an average day, to what extent do you find yourself"; followed by: "under constant pressure to do your work on time; having work piling up faster than you can complete it; and having to work faster than you would like". Responses are from 1 = to no extent to 5 = very great extent. *Attentional demand* (the extent to which the work environment places demands on human attention for performance) a scale developed by Martin and Wall (1989) was made up by the following three items: "to what extent do you have to concentrate while working?" "to what extent do you need to inspect your work closely?" "to what extent do you need to react quickly to prevent problems arising?" Again responses were from 1 = to no extent to 5 = very great extent. *Role ambiguity* was measured with three of the six-item scale by Rizzo, House and Lirtzman (1970): "I feel certain about how much authority I have in this job", "I know exactly what my responsibilities are in my job", and "I know exactly what is expected of me in my job".

Negative job carry-over. Three items from Warr' s (1990_a) four-item measure were selected for this scale following validity analyses of the 1989 data set ("after I leave my work, I keep worrying about job problems"; "I find it difficult to unwind at the end of a workday"; and "my job makes me feel exhausted at the end of a workday"). Negative job carry-over refers to the "spill over" effect of work into leisure and family life, and its dysfunctional consequences. It is measured on a five-point scale ranging from 1 "strongly disagree" to 5 "strongly agree".

Organisational Level. Respondents were asked to indicate their job classification, which ranged from Level 1 to Level 8 (Sample 2). "Organisational Level" was used as a proxy measure of job complexity (Campbell, 1988) for some of the analyses. The construct validity of this measure was determined when organisational level was categorised as 1 = clerical, 2 = supervisory, 3 = middle management, and 4 = upper management, and two one-way-analyses of variance were carried out, with the *Motivating Potential Score* (or MPS from the Job Diagnostic Survey) and *work pressure* as dependent variables.

Table 2.2
One-Way Analysis of Variance. MPS Across Organisational Levels[a]

			DIFFERENCES BETWEEN GROUP MEANS			
GROUPS	MEANS	SD	A	B	C	D
			n = 1,138	n = 850	n = 1,050	n = 529
A	110.07	74.68	-			
B	139.96	72.88	29.89*	-		
C	157.97	66.39	47.90*	18.01*	-	
D	179.69	66.07	69.62*	39.73*	21.72*	-

Notes: [a]Sample 2. A = clerical, B = supervisory, C = middle management, D = upper management. * $\alpha = .01$, Scheffé test.

The results showed that there were statistically significant differences between the various categories: $F(3, 3563) = 145.75$, $p < .0001$ for MPS, $F(3, 2524) = 65.93$, $p < .0001$ for Work Pressure. Using the Scheffé (1953) test ($\alpha = .01$) in post-hoc analyses, all possible pairs of means were compared. The results are shown in Tables 2.2 and 2.3.

Table 2.3
One-Way Analysis of Variance. Work Pressure Across Organisational Levels[a]

			DIFFERENCES BETWEEN GROUP MEANS			
GROUPS	MEANS	SD	A	B	C	D
			n = 1,119	n = 833	n = 1,047	n = 529
A	2.31	0.92	-			
B	2.51	0.93	0.20*	-		
C	2.73	0.93	0.42*	0.22*	-	
D	2.91	0.91	0.60*	0.40*	0.18*	-

Notes: [a]Sample 2. A = clerical, B = supervisory, C = middle management, D = upper management. * $\alpha = .01$, Scheffé test.

Biographical information. A range of personal information was requested from respondents including date of birth, sex, department, length of service with the organisation, and education. Education was categorised as follows: 1 = elementary school; 2 = some high school education; 3 = completion of high school education; 4 = university graduate.

Since no names were requested for identification purposes in the questionnaires on both surveys, matching of data for the 271 respondents was based on date of birth, sex, department, and length of service with the organisation. Listwise deletion procedures for all analyses were adopted, which resulted in 213 valid cases.

Independence of measures

The independence of the dimensions of the 14 scales described in this study (i.e., enthusiasm, depression, anxiety, relaxation, intrinsic satisfaction, supervisory support, skill variety, task identity, task significance, autonomy, feedback, skill utilisation, work pressure, attentional demand, and role ambiguity) were tested through confirmatory factor analyses (CFA) using the LISREL VII (Jöreskog and Sörbom, 1989) program. Data were from the 1990 survey that included employees from Levels 1-8.

Although the chi-square statistic is the most acceptable measure of fit for determining the appropriateness of a model, it has been found to depend on sample size (Marsh, Balla, & McDonald, 1988). Relying exclusively of the χ^2 statistic would have made it difficult to reject the null hypothesis (Bentler, 1980; Bentler and Bonett, 1980). In recent years, incremental fit indexes, that have been recommended as an alternative to the chi-square statistic if the sample size exceeds 200 (Hoetler, 1983), are: the Tucker-Lewis Index (TLI or ρ) = $(\chi^2_{null}/df_{null})$ - $(\chi^2_{proposed}/df_{proposed})/(\chi^2_{null}/df_{null})$ - 1 (Tuker & Lewis, 1973); Bentler and Bonett's Normed-Fit Index (BBI or Δ) = $(\chi^2_{null} - \chi^2_{proposed})/\chi^2_{null}$ (Bentler & Bonett, 1980); and the Parsimonious Normed Fit Index (PNFI) = (degrees of $\text{freedom}_{proposed}$/degrees of freedom_{null}) X BBI (Mulaik, James, Van Alstine, et al., 1989). Among the 30 or so indices examined by Marsh et al.(1988), the TLI was the only one considered to be relatively independent of sample size. The BBI should be used with caution when making comparisons across different methods of estimation or different-sized samples (La Du & Tanaka, 1989), and the TLI is only appropriate when the method of estimation is based on Maximum Likelihood

(ML) procedures (Bentler & Bonett, 1980). The PNFI tests simultaneously for the goodness of fit of the model to the data and the parsimony of the model (Mulaik et al., 1989, p. 439). This index may be used to compare directly different models that fit the same data. The TLI, BBI and the PNFI compare the fit of the proposed model with the fit of a model without structure (the "null model"), i.e., where all the parameters in the model are uncorrelated.

Global assessments of model fit are also provided by the LISREL program (Jöreskog & Sörbom, 1989). These are the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI, where the GFI is adjusted for the degrees of freedom), and the root mean squared residual (RMSR). For the GFI, AGFI, TLI and BBI values close to unity are an indication of a good fit. For the RMSR a value of <.05 is considered acceptable (Byrne, 1989) if the matrix for the analysis is based on correlations. The PNFI unlike the other goodness-of-fit indices described earlier, however, may not reach the acceptable levels of other indices. Mulaik et al. (1989) suggest that it is not uncommon for other fit indices in the range of .90 and above, for example, to be accompanied by a PNFI in the .50s. The evaluation of model fit will be based, therefore, on multiple criteria as recommended by Bollen (1990).

To test for the factorial independence of sets of measures that were judged to be conceptually related the covariance matrix from the entire sample was used after listwise deletion of cases. Because the number of cases for each analysis was large, the evaluation of model fit was based on incremental fit indexes described earlier.

Results are shown in Table 2.4. The first CFA was performed with the items comprising intrinsic satisfaction, anxiety, depression, relaxation, and enthusiasm. The second analysis included the skill variety, task significance, task identity, autonomy, feedback and skill utilisation manifest items; while the third analysis was performed with the indicators making up the three stressor scales - work pressure, role ambiguity, and attentional demand. The third (intrinsic satisfaction and supervisory support), and fourth (anxiety and work pressure) analyses were performed to allay concerns that the latent variables in each set were one and the same.

Table 2.4
Confirmatory factor analysis of scales using LISREL VII

Measures	χ^2 (df)	GFI	AGFI	RMSR	TLI	BBI
Intrinsic satisfaction, anxiety, depression, relaxation & enthusiasm (N = 3,852).	1558.56 (94)	.954	.933	.064	.941	.951
JDS "core" dimensions & skill utilisation (N = 3,687).	2334.41 (120)	.929	.899	.109	.924	.938
Work pressure, role ambiguity and attentional demand (N = 3,846).	160.64 (17)	.990	.978	.036	.981	.987
Intrinsic satisfaction and supervisory support (N = 3,852).	142.96 (13)	.989	.977	.042	.979	.985
Anxiety and work pressure (N = 3,775).	29.33 (8)	.997	.993	.014	.996	.997

Overall, results from the CFA, therefore, may be taken as an indication that the measures used in this study are relatively independent of one another. Discriminant validity results for intrinsic satisfaction, enthusiasm, depression, anxiety, and relaxation, are shown in chapter 3 (Table 3.3) and chapter 5 (Table 5.1).

CHAPTER III

Exploratory and Confirmatory Factor Analyses of Job-Related Affective Well-Being

There is an increasing awareness in Western societies that stress-related conditions and psychological disorders are among the most prevalent work-related diseases today (Ganster & Schaubroeck, 1991; Levi, 1990; Millar, 1990). As a result greater attention by occupational and organisational psychologists is being paid to the affective well-being and mental health of workers (Cooper & Cartwight, 1994; Gebhardt & Crump, 1990; Theorell, 1993). However, the accumulation of comparative data from organisational research into job-related well-being has been hindered by the proliferation of instruments purporting to measure the same constructs (Warr, 1990_a). To overcome some of these problems Warr developed scales more appropriate and less cumbersome that those offered to organisational researchers hitherto.

Warr (1990_a) conceptualised job-related affective well-being in terms of two separate axes (anxiety-contentment and depression-enthusiasm) located diagonally in a space defined by the orthogonal dimensions of arousal and pleasure. Following the publication of Warr's (1986; 1990_a) model of affective well-being, Sevastos Smith and Cordery (1992), and Daniels and Guppy (1994) replicated his results. Two correlated dimensions emerged from principal components analyses after controlling for response bias. However, when the model was evaluated by Sevastos et al. using confirmatory factor analysis, no support for its construct validity emerged. In particular, evidence was presented that the low pole of the "anxiety-contentment" axis was mis-specified. The proposed marker variable "contented" loaded higher on the enthusiasm-depression axis than its target dimension (anxiety-contentment). Following the study by Sevastos et al. (1992), Warr (1992, 1994) re-named the axis "anxiety-comfort", consistent with his original conceptualisation of the well-being model (Warr, 1986).

The aim of this chapter is to explore further the measurement properties of job-related well-being and its correlates. In particular Warr's model that emphasises a broad nonspecific conceptualisation of two constructs of well-being (anxiety-comfort, and enthusiasm-depression) will be compared to a model that is based on discrete affects (anxiety, enthusiasm, depression, and comfort or relaxation). Similar competing models of affect feature prominently in the literature on self-rated mood but are by no means incompatible (Watson & Clark, 1992). As a result of the work by Watson and Tellegen (1985), Watson and Clark proposed a hierarchical model of affect with two broad higher order factors reflecting valence (i.e., Positive and Negative affect), and correlated lower level affects capturing the distinctive qualities and content of these emotions.

Watson and Clark (1992) carried out four studies that examined the relations among fear, sadness, hostility, and guilt. Through a series of multitrait-multimethod analyses they concluded that these emotions represented "meaningful and differentiable psychological constructs" (p. 489). However, because these emotions were also highly intercorrrelated they concluded that the higher order factor of Negative Affect was driving these lower level emotions.

A more thorough testing of the hierarchical model of emotions was undertaken by Burke, Brief, George, Roberson and Webster (1989). This study is more appropriate for drawing comparisons with Warr's (1990_a) model, because it was used to measure affect at work. In addition, the twenty clear markers of positive and negative mood capture all the affective space; that is, both poles of positive and negative affect are tapped through the items.

Two competing models were assessed through confirmatory factor analyses: a model made up of two bipolar factors of positive and negative affect (i.e., the two higher order factors), and a four factor model consisting of nervousness, relaxation, enthusiasm and fatigue. When these two models were examined in a confirmatory way the four-factor model provided the best fit across three distinct samples. These results supported the case for the measurement of positive and negative affect through four correlated but distinct monopolar factors. On the basis of these results, therefore, the research hypothesis is:

$H_{3.1}$ Job-related well-being is a four-monopolar construct rather than a two bipolar one.

Methods

Sample

Two cross-sectional samples from the Western Australian Public Service were used for this study. The first sample consisted of 3,044 white collar employees (reduced to 2,960 due to missing information) from 44 departments of the Western Australian Public Service. The sample represented approximately 60% of all employees classified "Level One" (lowest white collar classification in the organisation).

The second sample was surveyed in 1990. It represented a random sample of 3,709 (reduced to 3,535 due to missing information) white-collar employees from all organisational levels (Levels 1 to 8) from 21 departments of the same organisation. This sample represented approximately 30 per cent of all employees in the departments surveyed. Broadly, the eight classifications may be grouped into clerical (Level 1), supervisory (Levels 2 and 3), middle management (Levels 4 and 5) and higher management (Levels 6 to 8). Within these groupings the sex distribution was: 316 male and 799 female for clerical; 526 male and 315 female for supervisory; 791 male and 253 female for middle management; and 456 male and 69 female for higher management (184 cases had missing information on sex and/or classification). The sex distribution within these classifications roughly approximated the actual male/female ratio in the population of employees within the organization.

Instruments

Affective well-being. Affective well-being was tapped using the 12 items developed by Warr (1990_a). Warr used two scales to measure affective well-being: *anxiety-contentment,* and *depression-enthusiasm.* Respondents were asked to think of the past few weeks and indicate the extent to which *their job* made them feel each of the following: calm, contented, relaxed, uneasy, worried, tense (anxiety-contentment); gloomy, depressed, miserable, enthusiastic, cheerful and optimistic (enthusiasm-depression). Scores range from 1 (never) to 6 (all of the time).

The job-related affective well-being constructs will be related to sets of job, personal, and organisational variables which are described in chapter 2.

Data Analyses

Initially the analyses proceeded in an exploratory mode to demonstrate empirically the two bipolar dimensionality of job-related affect. Two exploratory factor analyses were performed. The first analysis was based on the data from the 1989 study that included employees from the lowest job classification level (i.e., Level 1 officers, N = 2,820). The second analysis was from the 1990 study, and included employees from all hierarchical levels of the organisation (i.e., Levels 1 to 8, N = 2,883). Results reported previously (Sevastos et al., 1992), from the 1989 study, were based on Principal Component Analysis (PCA), rather than factor analysis. This procedure, however, is not recommended if the objective of the analysis is to identify constructs. Specifically, Snook and Gorsuch (1989) have recommended Common Factor Analysis (FA) over PCA, because FA yields unbiased estimates of loadings.

The number of factors extracted from the present FA analyses were based on eigenvalues equal to or greater than 1 (Harman, 1967), and the percentage of variance accounted for by each of the factors according to the scree test (Cattell, 1966). Because the two factors were shown previously to be highly correlated (Daniels & Guppy, 1994; Sevastos et al., 1992; Warr, 1990_a) oblique rotations were performed following the orthogonal rotations.

In analysing the data, the procedure described by Warr (1990_a) was followed in order to control for acquiescent response set of respondents. The control variable was estimated by summing all the well-being items without reverse scoring, and controlling for this in partial correlations between each item, after the negative-worded items had been reversed scored. The partial correlation matrix from this analysis was then used in FA.

A more comprehensive test of the well-being model was undertaken based on confirmatory factor analyses. Two competing models were compared: Warr's (1990_a) bipolar model (anxiety-contentment and depression-enthusiasm), and a four-factor model of affective well-being (relaxation, anxiety, enthusiasm and depression).

The LISREL VII (Jöreskog & Sörbom, 1989) maximum likelihood (ML) estimation method was used to test whether the hypothesised factor structures consistently emerged across different job classifications. These classifications were clerical, supervisory, and managerial. Two samples represented the clerical classification (Level 1 from the 1989 and 1990 studies; n = 2,820 and n = 609 respectively). The third sample was from the supervisory classifications (Levels 2 and 3; n = 684), while the fourth sample included all managerial employees (Levels 4 to 8; n = 1,476). The two clerical samples were independent; that is, longitudinal data were excluded from the analyses. For each category of employees, two competing factor structures were tested (two bipolar and four monopolar).

The two- and four-factor models were separately fitted to the data from the different samples. For all models, the analyses were performed on the observed covariance matrix without controlling for response set. The decision not to control for response set afforded the opportunity to make comparisons between the solutions obtained in the Sevastos et al. (1992) study -- where response set was controlled -- and the solutions from this study where no such control took place.

Results

Table 3.1 displays the results of the two FAs, which show remarkable similarities. In both sets of data "contented" loads on the depression-enthusiasm factor, rather than its target factor (anxiety-contentment). Also, "uneasy" loads substantially (>.30) on both factors. The results of both analyses are consistent with those reported elsewhere (Sevastos et al., 1992; Warr, 1990_a). For the purposes of the confirmatory factor analyses, therefore, the observed variable "contented", that was clearly mis-specified, was allocated to the ***enthusiasm-depression*** dimension, and to the ***enthusiasm*** dimension in the case of the bipolar and monopolar models respectively. The specification of the two models appears in Figures 3.1 and 3.2.

Table 3.1

Factor Analysis of Well-Being items with Oblimin Rotation. Pattern Matrix of Loadings

	Study 1 (N = 2,820)		Study 2 (N = 2,883)	
Items	Factor 1 (DE)	Factor 2 (AC)	Factor 1 (DE)	Factor 2 (AC)
Miserable	.82		.78	
Gloomy	.81		.77	
Enthusiastic	.80		.87	
Depressed	.78		.74	
Optimistic	.63		.68	
Cheerful	.61		.60	
Contented	.66		.59	
Calm		.84		.83
Relaxed		.76		.82
Tense		.74		.72
Worried		.65		.63
Uneasy	.36	.40	.37	.45
Unrotated Eigenvalues				
	6.56	1.25	6.50	1.46
% Variance	54.6	10.5	54.1	12.2

Notes: Analyses are based on partial correlation matrices controlling for response set as per Warr (1990_a). DE = Depression-Enthusiasm; AC = Anxiety-Relaxation.

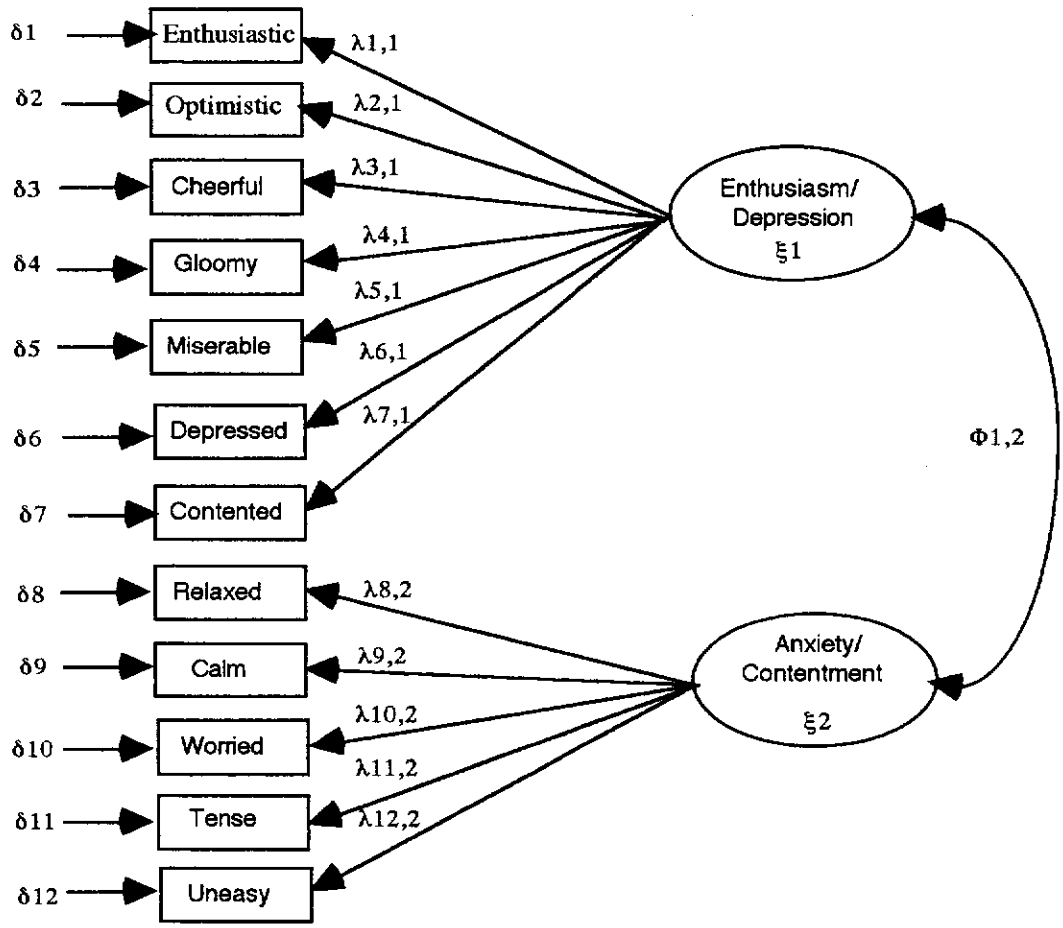


Figure 3.1
Two-factor congeneric measurement model of affective well-being.

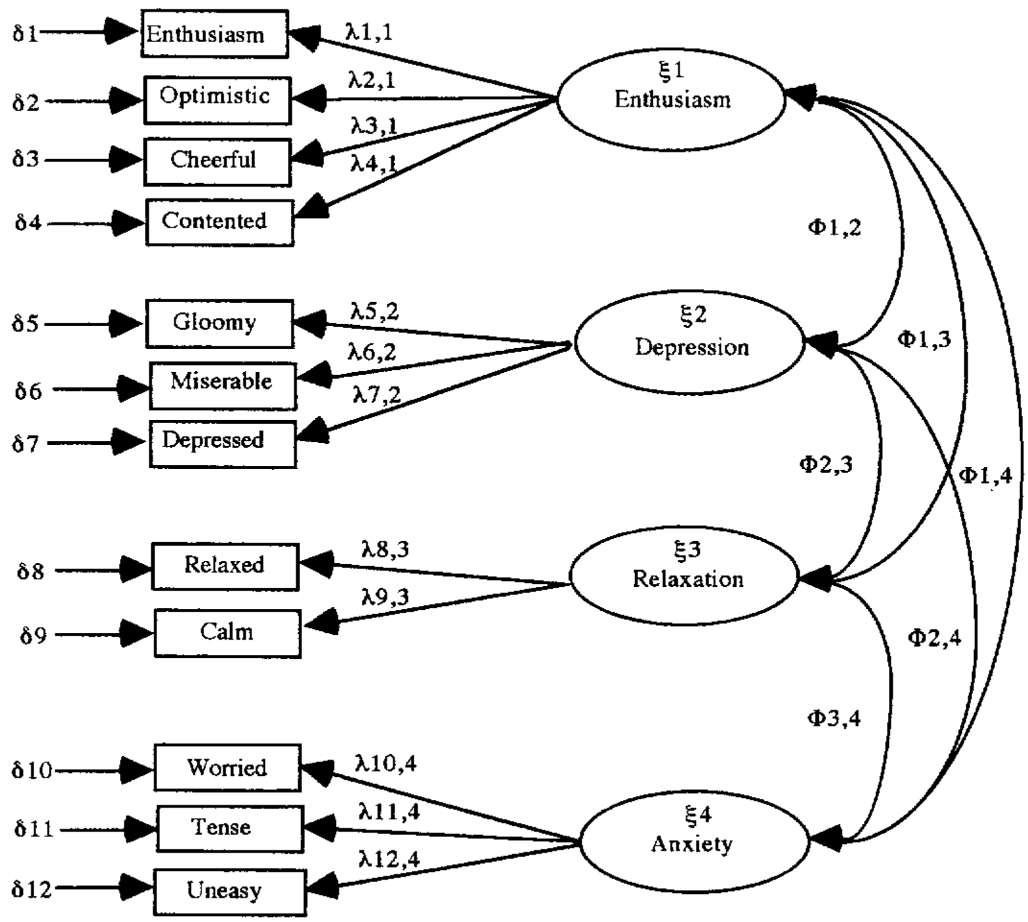


Figure 3.2
Four-factor congeneric measurement model of affective well-being.

Table 3.2

LISREL Analyses of Two Competing Models of Well-Being

	χ^2	df	GFI	AGFI	RMSR	TLI	BBI	PNFI
Study 1[a]								
Clerical (N = 2,820)								
2 bipolar dimensions	4574.72	53	.679	.527	.104	.690	.749	.601
4 monopolar dimensions	679.12	48	.961	.937	.041	.952	.963	.700
Study 2[b]								
Clerical (N = 609)								
2 bipolar dimensions	1107.68	53	.661	.501	.160	.670	.726	.583
4 monopolar dimensions	229.18	48	.941	.905	.072	.937	.943	.686
Supervisory (N = 684)								
2 bipolar dimensions	1204.39	53	.676	.522	.141	.682	.737	.592
4 monopolar dimensions	279.83	48	.937	.898	.065	.929	.939	.683
Managerial (N = 1,476)								
2 bipolar dimensions	2233.79	53	.718	.585	.119	.723	.774	.622
4 monopolar dimensions	500.78	48	.945	.911	.063	.937	.949	.690

Notes: [a]Sampe 1, [b]Sample 2. All n are independent. Input for analyses are covariance matrices. GFI = Goodness-of- Fit Index; AGFI = Adjusted Goodness-of-Fit Index; RMSR = Root Mean Square Residual; TLI = Tucker-Lewis Index; BBI = Bentler-Bonett Index; PNFI = Parsimonious Normed Fit Index.

Results of the confirmatory factor analyses are shown in Table 3.2. Because it was inappropriate to evaluate the two competing models on purely statistical terms based on the chi-square statistic (due to the large Ns), incremental fit indices were used instead. Of all the indices provided in Table 3.2, the Tucker and Lewis Index (TLI) is considered to be the most independent of sample size (Marsh, Balla & McDonald, 1988). A value greater than .90 would indicate an acceptable fit to the data. Also, Mulaik's et al. (1989) parsimonious normed fit index (PNFI) may be used to compare models in terms of their parsimony (from a theoretical standpoint the more parsimonious the model the better). For the PNFI a greater value represents more parsimony.

For Study 1 (Sample 1) shown in Table 3.2 for the two bipolar model the TLI was .690 and the PNFI .601, while for the four monopolar model the TLI was .963 and the PNFI .700. For Study 2 (Sample 2) the results were similar. For the various samples the following coefficients were obtained: TLI = .670, PNFI = .583 for the bipolar model, as opposed to TLI = .937, and PNFI = .686 for the four monopolar model for the clerical sample; TLI = .682, PNFI = .592 for the bipolar model, as opposed to TLI = .929, and PNFI = .683 for the four monopolar model for the supervisory sample; TLI = .723, PNFI = .622 for the bipolar model, as opposed to TLI = .937, and PNFI = .690 for the four monopolar model for the managerial sample. Overall, the fit indices indicate that in every instance, when examined in a confirmatory manner, the four monopolar structure of job-related well-being provides an adequate and better fit to the data than the two bipolar structure.

Table 3.3

Discriminant Validity of Well-Being Constructs[a]

	Anxiety with Relaxation, Enthusiasm, & Depression			Relaxation with Enthusiasm & Depression		Enthusiasm with Depression
Model A χ^2 (df)	1148.46 (5)	4159.37 (9)	1523.81 (9)	1317.69 (5)	1512.34 (5)	2395.70 (9)
Fit indices when $\Phi(2,1)$ is fixed at 1	GFI = .89 AGFI = .68 RMSR = .14	GFI = .72 AGFI = .35 RMSR =.32	GFI = .86 AGFI = .67 RMSR = .01	GFI = .88 AGFI = .63 RMSR = .14	GFI = .88 AGFI = .63 RMSR = .19	GFI = .79 AGFI = .52 RMSR = .17
Model B χ^2 (df)	41.34 (4)	578.17 (8)	67.29 (8)	419.21 (4)	32.56 (4)	209.71 (8)
Fit Indices when $\Phi(2,1)$ is set free	GFI = 1.0 AGFI = .98 RMSR = .02	GFI = .96 AGFI=.89 RMSR = .09	GFI = .99 AGFI = .98 RMSR = .02	GFI = .96 AGFI = .85 RMSR = .07	GFI = 1.0 AGFI = .99 RMSR = .02	GFI = .98 AGFI = .95 RMSR = .05
Differences in χ^2 between Model A & Model B	1,107.12*	3,581.20*	1,456.52*	898.48*	1,479.78*	2,185.99*

Notes: [a] Sample 2. GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; RMSR = Root Mean Square Residual. * Differences (in favour of Model B) are statistically significant (p <.0001).

Discriminant Validity of Job-Related Affect Measures

Discriminant validity was assessed for each pair of estimated latent variables after setting free the estimated correlation parameter ($\Phi_{2,1}$), and then performing a separate analysis where the relationship between them was constrained to 1.00. Because these two different models are nested, a chi-square difference test (with 1 degree of freedom) on the values obtained for the constrained and unconstrained models is appropriate (Jöreskog, 1971). It would be possible, for example, to test the differences between the two models statistically without relying on incremental fit indices to make comparisons. A significantly lower χ^2 value, for the model in which the $\Phi_{2,1}$ is set free, would indicate that the latent variables are not perfectly correlated, and, therefore, discriminant validity is assured (Bagozzi & Phillips, 1982).

The χ^2 difference test must be performed for one pair of latent variables at a time, rather than as a test involving all pairs of associations simultaneously. According to Anderson and Gerbing (1988) the reason for this is that a nonsignificant value for one pair of factors can be obscured by being tested along with several pairs that have significant values. Also, like any other procedure that involves multiple comparisons, a Bonferroni type adjustment should be performed to guard against Type I error for the family of tests.

Results for the discriminant validity of the well-being measures are shown in Table 3.3. In every case, the difference in χ^2, between the model where the parameter $\Phi_{2,1}$ was set free (Model B), and the model where the same parameter was fixed at 1 (Model A), was statistically significant ($p < .0001$). That is, all the chi-squares for the unconstrained Model B were substantially lower.

The LISREL fit indices also (goodness-of-fit index, adjusted goodness-of-fit index, and root mean square residual) were consistently better for Model

B. This is strong evidence that the multi-factor model of job-related well-being possesses discriminant validity.

With the discriminant validity results shown in Table 3.3, it is possible to provide an additional test of Warr's (1990_a) bipolar model (from the one shown in Table 3.2, where all constructs were evaluated simulataneously), by comparing the differences in χ^2 separately between a pair of constructs based on either a monopolar model, or a bipolar model of affective well-being. For example, for the pairs of anxiety-relaxation and enthusiasm-depression, the following χ^2 differences were obtained. For the first pair (anxiety-relaxation) the chi-square difference was 1,107.12 (1 df, p <.0001), while for the second pair (enthusiasm-depression) the chi-square difference was 2,185.99 (1 df, p <.0001). In both cases, as was discussed earlier, the statistically significant differences were in favour of a multi-factor model of affective well-being. Hypothesis 3.1, therefore, was supported.

Intercorrelations Among Well-Being and Other Variables of Interest

Table 5.5 shows the intercorrelation among all variables in the study. Of special interest is the relationships among the well-being constructs. The correlation between enthusiasm and anxiety shows a weak association (r = -.24). These results lend further support for the independence of positive and negative affect, when only the two high poles are considered. However, all the other intercorrelations among the well-being constructs are substantial. For example, the correlation between enthusiasm and depression is r = -.52, and between anxiety and relaxation r = -.50. Even stronger associations are shown between anxiety and depression (r = .60), and enthusiasm and relaxation (r = .67). Consistent with Warr' s (1990_a) bipolar model of job-related affect, one would have expected a stronger association between enthusiasm and depression than between anxiety and depression. Equally, one would have expected a stronger association between anxiety and relaxation, than between enthusiasm and relaxation. Neither discriminant nor convergent validity characterises, therefore, Warr's bipolar model.

Intrinsic job satisfaction and most of the well-being variables are highly intercorrelated as was expected. The correlations are r = .51 for enthusiasm, r = -.45 for depression, and r = .38 for relaxation. The only weak association was between anxiety and intrinsic satisfaction (r = -.20).

Intrinsic job satisfaction and enthusiasm show moderate to weak associations with most of the job characteristics - unlike depression, anxiety, and relaxation. These three variables have only zero to weak associations with job characteristics. Supervisory support is strongly associated with intrinsic job satisfaction (r = .60), and moderately associated with enthusiasm (r = .42) relaxation (r = .32), and depression (r = -.33). However, anxiety shows only a weak negative association with supervisory support (r = -.14). Conversely, anxiety has a moderate association with work pressure (r = .41), whilst intrinsic job satisfaction, enthusiasm, depression, and relaxation show only weak associations with this variable and all the other stressors (correlations range between .01 to -.29).

The personal characteristics variables show only weak associations with intrinsic job satisfaction and the well-being measures. Age is positively related to enthusiasm and relaxation (r = .18 and r = .14 respectively), and negatively associated with depression (r = -.12). Similar findings linking age with higher levels of well-being have been reported by Warr (1990_a) and Sevastos et al., (1992).

Table 3.4

Pearson inter-correlations among all variables (N=3,108)

Variables	Means (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Intrinsic Satisfaction	4.31 (1.21)	*.76*	.51	-.45	-.20	.38	.35	.25	.26	.39	.38	.45	.60	-.03	-.29	.18	.06	.00	.08	.19	.00
2. Enthusiasm	3.49 (1.13)		*.85*	-.52	-.24	.67	.30	.21	.27	.31	.33	.37	.42	-.04	-.24	.20	.18	.05	.02	.12	-.01
3. Depression	1.97 (.94)			*.85*	.60	-.51	-.18	-.16	-.13	-.23	-.25	-.26	-.33	.15	.25	-.08	-.12	-.05	-.01	-.06	.04
4. Anxiety	2.37 (.95)				*.80*	-.50	.12	-.07	.11	-.01	-.07	.00	-.14	.41	.21	.16	.00	.04	.10	.16	-.08
5. Relaxation	3.40 (1.11)					*.80*	.06	.15	.09	.16	.21	.20	.32	-.29	-.26	.01	.14	.05	-.08	-.03	.01
6. Skill Variety	5.09 (1.48)						*.79*	.36	.56	.61	.47	.55	.24	.26	-.06	.44	.18	.16	.32	.50	-.24
7. Task Identity	5.04 (1.46)							*.85*	33	.46	.45	.28	.15	.03	-.16	.24	.07	.05	.12	.15	-.01
8. Task Significance	5.28 (1.34)								*.81*	.41	.48	.35	.18	.22	-.11	.35	.13	.10	.13	.27	-.12
9. Autonomy	5.30 (1.37)									*.86*	.42	.42	.26	.10	-.14	.27	.18	.16	.21	.38	-.14
10. Feedback	4.76 (1.35)										*.86*	.34	.26	.09	-.19	.30	.10	.06	.05	.13	-.08
11. Skill Utilisation	4.64 (1.56)											*.79*	.31	.16	-.12	.36	.15	.17	.13	.34	-.14
12. Supervisory Support	3.24 (.89)												*.82*	-.04	-.24	.17	.05	.01	.04	.08	.01
13. Work Pressure	2.58 (.95)													*.83*	.07	.31	.04	.08	.13	.23	-.16
14. Ambiguity	2.57 (1.25)														*.88*	-.06	-.09	-.07	.05	.01	-.03
15. Attentional Demand	3.80 (.71)															*.73*	.10	.04	.17	.23	-.14
16. Age	36.29 (10.29)																-	.46	.08	.35	-.20
17. Tenure	9.71 (8.58)																	-	-.02	.36	-.34
18. Education	3.04 (1.06)																		-	.56	-.19
19. Organisational Level	3.25 (2.04)																			-	-.43
20. Sex	-																				-

Note: N is based on listwise deletion of cases. Correlations > .06 are significant at the .001 level (two-tailed test). Alpha reliabilities, where appropriate, are shown in the diagonal. Sex was categorised 1=male, 2=female.

Organisational level is weakly associated with intrinsic satisfaction (r = .19), enthusiasm (.12), and anxiety (r = .16). These results are in agreement with the conclusions reached by Warr (1990_a), that greater arousal levels in high-level occupations may account for the pattern of these associations. That is, as jobs become more complex (and therefore, rich in job characteristics) intrinsic job satisfaction and enthusiasm tend to increase (up to a point), but concurrently there are increases in anxiety levels due to higher work pressures. By contrast the relationship between organisational level and depression and relaxation (i.e., low arousal) are negative and non-significant. There are high to moderate associations between organisational level and skill variety (r = .50), education (r = .56), autonomy (r = .38), skill utilisation (r = .34), age (r = .35), and tenure (r = .36). These results are as expected.

Discussion

The results of confirmatory factor analyses performed on two large data sets supported a four factor model of job related affect (enthusiasm, depression, anxiety, and relaxation), rather than the two bipolar factor model (enthusiasm-depression and anxiety-comfort) proposed by Warr (1990_a). Warr's two-bipolar model finds support only in exploratory analyses when response set is controlled. Exploratory factor analyses, however, are not appropriate for establishing the dimensionality of constructs. The nature of the relationship among constructs need to be specified a priori - a condition absent in exploratory factor analysis.

The results of the confirmatory factor analyses, based on covariance matrices that well-being is multi-factorial, are robust, because the dimensionality was tested across four distinct sub-samples from three different organisational levels. In every case the four-factor dimensionality of well-being was upheld; that is a four-factor model better fitted the data than a two-factor model.

Discriminant analyses also further corroborated the results, when every possible pair of well-being constructs were evaluated in turn. When two competing models were compared (a single factor model and a two-factor model), the two-factor model provided the better fit in every case. With only one degree of freedom set free, each time the competing models were compared, the differences in chi-squares between models were substantial (ranging from 898 to 3,581). In addition, based on Warr's (1990_a) bipolar model, the association between the high and low poles within each pair of constructs was lower than the association between unrelated poles. This is a clear indication that convergent validity also does not characterise Warr's bipolar model.

It could be argued that the presence of a response set masks the underlying relationship among constructs, and, therefore, the bipolar dimensionality of well-being cannot be confirmed. However, Sevastos et al. (1992) performed a confirmatory factor analysis on the data using the partial correlation matrix (after controlling for response set). When the results of the Sevastos et al. (p.39) analysis are compared with the results of the confirmatory factor re-analysis (Table 3.2), performed on the same data set (which did not control for response set), a more acceptable fit is achieved (i.e., χ^2 = 4,574.72 as opposed to χ^2 = 13,614.91). The reason, therefore, cannot be attributed to response set for the failure to find confirmatory evidence for the two bipolar model of well-being. On the contrary, controlling for response bias affected adversely the model fit statistics.

One additional reason why a four-factor model of affective well-being is more appropriate than Warr's (1990_a) two-bipolar model is provided by Burke et al. (1989). These researchers have conceptually linked four similar dimensions, to those suggested here, to the two major cortical regulatory systems: the left-laterised dopaminergic activation, and right-laterised noradrenergic arousal systems. Borrowing from Tucker and Williamson's (1984) model of hemispheric specialisation they labelled the factors Negative Activation (nervousness), Low Activation (relaxation), Positive Arousal (enthusiasm), and Low Arousal (fatigue). The markers of relaxation and enthusiasm in the Burke et al. study were similar to those used by Warr and, therefore, the constructs are in agreement with Warr's conceptualisation of the high and low poles of positive and negative affect respectively. However, the constructs nervousness and fatigue are not the same, because different markers were used by Burke et al. from those used by Warr to define the high and low poles of negative and positive affect respectively. Warr's labels of these two constructs (anxiety and depression) are more appropriate than those used by Burke et al (i.e., nervousness and fatigue). Tucker, Antes, Stenslie and Barnhardt (1978), for example, have linked anxiety (rather than nervousness) with high left-hemispheric activation, while Tucker, Stenslie, Roth and Shearer (1981) pointed to the linkage between a reduction in right-hemispheric activity and depression (rather than fatigue).

It is interesting to note that Warr's (1990_a) model of job-related well-being has been conceptualised as a four monopolar construct previously. For example, Martin and Wall (1989) measured affective well-being through four three-item scales: tense, frustrated, anxious (anxiety); miserable, depressed, gloomy (depression); keen, lively, enthusiastic (enthusiasm); and calm, contented, relaxed (contentment). However, no rationale for using a four monopolar model was provided by these researchers.

Does the evidence presented in this chapter relating to the specificity of emotions suggest a refutation of Warr's (1990_a) two bipolar model? To respond to this question unambiguously a more thorough analysis would have been necessary. This analysis would have related the four distinct emotions to a second order confirmatory factors analysis. It would have then been possible to confirm that the two models of well-being exist (or do not exist) concurrently. However, the objective of this study was to explore relations among the individual discrete affects, and in so doing achieve greater explanatory power, especially when viewed within a theoretical-causal framework when these affects are subsequently related to sets of organisational variables. In the chapters that follow these relationships will be explored in more detail.

CHAPTER IV

Intrinsic Job Satisfaction and Affective Well-Being, and their Differential Associations with Job Features: An Exploratory Study

In the previous chapter the zero order correlations between the well-being measures, intrinsic job satisfaction, and sets of job characteristics, personal, and organisational variables were presented. However, because the interrelationships among some of these variables were shown to be substantial, a more thorough investigation based on multivariate analyses is necessary to explore further these relationships. The aim of this chapter, therefore, is: firstly, to pursue this objective by relating intrinsic job satisfaction and job-related well-being to sets of independent variables in a single analysis, and in so doing identify the unique variance of the variables of interest. Secondly, it would be possible from such an analysis to extract composite dependent variables, through the linear combination of intrinsic job satisfaction and job-related well-being, and test two models that purport to explain well-being/distress in the occupational setting. These models are Karasek's (1979) job-strain model (see also Karasek & Theorell, 1990), and Warr's (1986, 1994) Vitamin Model, both described in chapter 1.

Briefly, Warr's (1994) Vitamin Model argues that certain job features (for example, autonomy) are associated curvilinearly with employee well-being. Karasek's model posits that decision latitude and job demands combine interactively to determine levels of well-being, or more precisely levels of stress.

Warr's (1986, 1994) model of occupational well-being identifies nine environmental features of jobs that are assumed to collectively determine a person's well-being in the workplace. As was mentioned in chapter 1 these features are opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact, and valued social position. Are some of these features related differentially to the intrinsic job satisfaction and well-being variables? Warr (1990_b), for example, reports bivariate relationships that show job demands to be more strongly associated with job-related anxiety-contentment than with depression-enthusiasm, while decision latitude shows a stronger association with depression-enthusiasm than with anxiety-contentment. Based on these findings, the first hypothesis to be explored is:

$H_{4.1}$ When considered simultaneously within a single multivariate statistical analysis, variables from Warr's sub-categories of nine job features (i.e., skill variety, task identity, task significance, autonomy, feedback, skill utilisation and supervisory support) would be strongly related to intrinsic job satisfaction, enthusiasm and depression; while job demands (e.g., work pressure, role ambiguity, and attentional demand) would be strongly related to anxiety and relaxation.

Warr (1986, 1994) in his description of the Vitamin Model further argued that similar to some vitamins, which could have either a beneficial effect (if taken in moderation) or a detrimental effect (if taken in large doses), these environmental features can either promote or decrease mental health in a similar manner. One job feature that has the potential to impair job-related well-being if it is present beyond a required level, is opportunities for control, or autonomy.

In a study that tested non-linear components, Warr (1990_b) has demonstrated an inverted U relationship between decision latitude and job satisfaction which was statistically significant. However, a recent test of Warr's Vitamin Model of well-being, based on a cross-sectional analysis, found little evidence to support the model (Fletcher & Jones, 1993). This is not surprising. Warr's model has strong linear components with curvilinearity only present in extreme scores and, therefore, restriction of range in some of the studies (McClelland & Judd, 1993) would make it impossible to replicate the results. Given the inconsistent findings surrounding Warr's Vitamin model, the second hypothesis to be tested is as follows:

$H_{4.2}$ Quadratic components will be present in the relationship between autonomy and well-being/distress.

In relation to Karasek's (1979) job-strain model, Warr (1990_b) endeavoured to replicate Karasek's results of the interactive effect of job demands and decision latitude. However, the results of Warr's analysis did not support the model - a situation consistent with the accumulating research evidence (e.g., Landsbergis, 1988; Spector, 1987; Payne and Fletcher, 1983), although job demands and decision latitude both appear to have main effects on job satisfaction (Hurrell & McLaney, 1989; Kasl, 1989). Also, Ganster (1989) argued that the Karasek's findings may overstate the role of control (or autonomy), because it may be that job complexity or challenge is the more important predictor of the health outcomes. In the same vein Kauppinen-Toropainen, Kandolin, and Mutamen (1983), commenting on the "relatively low total explanatory power of the model" (p.201), have questioned the basis on which only two job factors underpin job strain. According to Fletcher (1991) a more appropriate model would include a wider range of job features (including social support), a view in line with other research findings (e.g., Johnson, 1991; Parkes, 1990; 1991; Parkes, Mendham & von Rabenau, 1994). However, since the main focus is the examination of Karasek's (1979) original model the hypothesis to be tested is:

$H_{4.3}$ Well-being/distress will depend on a synergistic relationship between autonomy and job demands.

Analyses

Normally the research strategy for exploring the predictive power of sets of independent variables is conducted within a dependent variables context (e.g., depression, job satisfaction, job-related well-being, etc.); that is, the procedures are aimed at identifying how well each dependent variable can be predicted from a set of independent variables. This of course is an unsatisfactory approach for two reasons. First, with a large number of analyses there is no protection level for the possibility of Type I errors occurring. Second, most of the dependent variables in studies of this kind are inter-correlated, (e.g., job satisfaction and other conceptually related job affect measures), and, therefore, would show considerable shared variance. Under such circumstances it would be better to consider all variables (dependent and independent variables) simultaneously in a single analysis. Within this framework a research question might involve the identification of the maximum correlation between a set of dependent variables and a set of independent variables; or better still, the identification of a number of different dimensions of association between the two sets, and the major variables accounting for each set. These types of research questions may be answered through a statistical procedure known as canonical correlation.

Canonical correlation analysis is a multivariate statistical technique that analyses simultaneously several predictor and criterion variables. The aim of the canonical correlation is to produce a linear combination from each set of variables so that the correlation between them is maximised. These linear combinations from each set of variables are known as canonical variates, and are analogous to principal components derived from a principal-component analysis (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975).

To define each canonical variate or dimension, canonical variable loadings, or standardised weight coefficients are used. For the purpose of assessing the relationship between the original variables and the canonical variates some have suggested a correlation between a canonical variate and a variable of equal to or greater than .30 (Tabachnick and Fidell, 1989). However, Dillon and Goldstein (1984) have suggested the use of cross-loadings (instead of simple loadings) as a preferable base for interpretation, because these are less inflated than within-set loading. In addition, they highlight the relationship of each variable separately with the canonical variate from the other set. The cross-loadings are calculated by multiplying each loading separately in a set with the canonical correlation coefficient of the set. For interpretive reasons, others (for example, Tatsuoka, 1970) have suggested a standardised weight coefficient equal to or greater than half the size of the largest coefficient in the set as a more acceptable base for interpretation.

Due to problems of multicollinearity, it is inappropriate to consider concurrently linear, quadratic, and product term relationships in one canonical correlation. Curvilinear and interactive effects can only be tested hierarchically (Cohen & Cohen, 1983) - a procedure not available to canonical correlation where all variables are tested simultaneously. The focus of the canonical correlation analysis is, therefore, linear; and even though there might be curvilinear relationships in the data, a linear model would still provide a good approximation of the relationships among variables (Kelloway & Barling, 1991). However, curvilinear (Warr's model) and moderator effects (Karasek's model) will be considered in subsequent analyses following the testing of hypothesis $H_{4.1}$.

Study 1

Sample and Instrumentation

Because canonical correlations are optimal in the sample within which they are derived, either cross-validation of results is necessary, that take into account statistical shrinkage (Bobko, 1990), or replication of results using a different sample (Tabachnick & Fidell, 1989). Since the objective of this study was the examination of the stability of individual coefficients (rather than overall statistical shrinkage), the results from two independent sub-samples (N = 3,085) were used to make these cross-sample comparisons. These two sub-samples - derived from the 1990 survey (Sample 2) - were created on the basis of different activity levels (i.e., levels of low and high job complexity, respectively). The strategy behind this approach was to test whether the same set of independent variables featured prominently in the results of the two separate analyses.

After listwise deletion of cases, sub-sample 1 consisted of 1,667 white-collar clerical and supervisory employees (Levels 1-3), and sub-sample 2 included 1,418 managerial employees (Levels 4-8). For each sub-sample a canonical correlation was performed with two sets of variables - a criterion and predictor set. The first set included all the well-being measures (i.e., anxiety, relaxation, enthusiasm and depression) and intrinsic job satisfaction. The set of independent variables for this study were selected from Warr's (1994) sub-categories of nine features of jobs that are assumed to underlie well-being and mental health. Specifically, the following variables were included in the analyses: autonomy (opportunity for control), skill utilisation (opportunity for skill use), workload, and attentional demand (externally generated goals), skill variety (variety), task identity, feedback, and ambiguity (environmental clarity), supervisory support (opportunity for interpersonal contact), and task significance (valued social position). From Warr's category of nine job features only two have not been included in the study: availability of money, and physical security. However, organisational level was included in the analyses, and this may be considered a proxy variable for the two omitted features.

In addition to the job features identified in the research hypothesis, personal characteristics (age, gender, education, tenure and organisational level) of the respondents were included in the analysis. In previous research (e.g., Sevastos et al., 1992; Warr, 1990a) these variables have been shown to be related to well-being.

Results

Estimation Sample

For the estimation sample (i.e., sub-sample 1) results indicated that there were five significant ($p < .05$) canonical variate pairs (or dimensions), with each pair representing shared variance between the criterion and the predictor variables. The first and second canonical correlations (.74 and .49 respectively) accounted for the bulk of the variance (74.65% and 19.12%; this, however, is variance shared by the canonical variates and not the variance shared by the original criterion- and predictor-set variables). Both canonical variate pairs accounted collectively for 93.76% of the variance in the solution. Inspection of a dimension reduction analysis, where the canonical variate pairs were evaluated in descending order, indicated that only the first two pairs were worth interpreting (Wilk's Lambda for the first pair was .31 and the second pair .69), while for the third and subsequent pairs (although statistically significant, mainly due to sample size), the Wilk's Lambda was .91 and .99 respectively. A Wilk's Lambda of 1.00 indicates that the test has no power to discriminate between pairs; that is, the lower the Wilk's Lambda the greater the discriminatory power of the test.

Results of the canonical correlation analysis for the first sub-sample are shown in Table 4.1. Shown in the table are canonical correlations, cross-loadings, the standardised canonical variate coefficients or weights, the percent of variance extracted from within its own set of variables, and redundancies (the percent of variance extracted from the opposing set of variables). Redundancies are analogous to R^2 and are the products of the squared canonical correlation and the proportion of that set's variance accounted for by the canonical variate (Dillon & Goldstein, 1984). Because the canonical variates are orthogonal to each other the percent of variance and redundancies are additive, and these are shown in the "total" column in the table.

The first canonical variate extracts 46.25% of variance from the criterion-set, and 15.97% of variance from the predictor-set. For redundancies, the first criterion-set variate accounts for 25.25% of variance in the predictor-set, and the first predictor-set variate accounts for 8.72% of variance in the criterion-set. The second canonical variate extracts 19.16% of variance from the criterion-set, and 12.15% of variance from the predictor-set. For redundancies, the second criterion-set variate accounts for 4.51% of variance in the predictor-set, and the second predictor-set variate accounts for 2.86% of variance in the criterion-set.

Considering both canonical variates, approximately 29.76% of the criterion-set variability, and 11.58% of the predictor-set variability is accounted for.

As was mentioned earlier, in order to interpret the results from a canonical correlation either the cross-loading and/or the standardised coefficients may be used. As a preliminary step, an examination of the loadings and the weights for each variable may be carried out to detect any instability in the standardised weights. Instability in the standardised weights (for example, a small weight relative to a loading, or a negative algebraic sign where a positive sign was expected) may be due to either multicollinearity, or to the variance in a variable having already been accounted for by some other variable (s) (Dillon & Goldstein, 1984). The problem of multicollinearity has already been addressed in part in the instrumentation section, where evidence was presented (based on confirmatory factor analyses) of the independence of the measures.

Also, Table 3.3 in chapter 3 shows Pearson inter-correlations among all variables, which indicate that the highest correlation is .66. However, the problem of over-lapping variance among variables still remains.

The results from the canonical analysis indicate that there is a moderate association between the pair of the first canonical variate (i. e., percent of variance explained, and redundancies), and a low association between the pair of the second variate.

The first canonical variate (with a cross-loading of .30 or better as candidate for interpretation) is defined mainly by *intrinsic satisfaction* (cross-loading = .71) and to a lesser extent by *enthusiasm* (cross-loading = .55), *relaxation* (cross-loading = .45), and depression (cross-loading = -.44). The independent variable set in the first canonical variate is defined by *supervisory support* (cross-loading = .63), *skill utilisation* (cross-loading = .46), *feedback* (cross-loading = .40), *autonomy* (cross-loading = .38), and *skill variety* (cross-loading = .34).

In the second canonical variate the dependent variable is mainly defined by *anxiety* (cross-loading = -.39), or more precisely by *lack of anxiety*. All the other variables show low cross-loadings (i.e., <.30). The independent variable set in the second canonical variate is defined exclusively by work *pressure* (cross-loading = -.41), or more correctly *lack of work pressure*.

Replication Sample

The results obtained from the first canonical correlation were replicated with sub-sample 2 and are shown in Tables 4.2. An examination of the cross-loadings (with a cut-off point of .30) confirms that, with some minor differences, the same variables emerge as important for the criterion and predictor sets for both canonical variates. For the dependent variable set within the first canonical variate *intrinsic satisfaction* has a cross-loading of .70 followed by *enthusiasm* (.53), *depression* (-.43), and *relaxation* (.40).

The independent variable set within the same canonical variate is mainly defined by *supervisory support* (.59), *skill utilisation* (.44), *role ambiguity* (-.42), *autonomy* (.40), *feedback* (.40), and *skill variety* (.34).

Within the independent variable set only role ambiguity (or more precisely role clarity) shows a coefficient above the cut-off point of .30 for sub-sample 2 (managerial employees), as opposed to a coefficient of only -.25 for the same variable in sub-sample 1 (clerical and supervisory employees). This may be a reflection of the more complex nature of work carried out by the employees of sub-sample 2 and, as a consequence, the requirements for a clearer role definition due to the professional status of most of the jobs.

For the dependent variable set within the second canonical variate only *anxiety* has a substantial cross-loading (.44). The independent variable set is defined entirely by *work pressure* (cross-loading = .45). Neither task identity nor task significance showed a strong association with the first canonical variate, as was hypothesised. Hypothesis 4.1, therefore, was partly supported.

Although the results of the second canonical variate for sub-samples 1 and 2 are the same (shown in Tables 4.1 and 4.2) the signs of the substantial coefficients are reversed for the criterion and predictor sets. This, however, is not problematic. The coefficients within each canonical variate may be multiplied by -1 to reverse the signs. Through this procedure, and for each table, an additional relationship may be represented that is a mirror image of the existing one.

For both sub-samples the results indicate that the *canonical correlations* (.74 for sub-sample 1, and .74 for sub-sample 2 for the first canonical variate; and .49 for sub-sample 1 and .51 for sub-sample 2 for the second canonical variate), *total percent of variance* (65.41 for sub-sample 1 and 66.15 for sub-sample 2 for the criterion set; and 28.12 for sub-sample 1 and 25.81 for sub-sample 2 for the predictor set), and *total redundancies* (29.76 for sub-sample 1 and 29.08 for sub-sample 2 for the criterion set; and 11.58 for sub-sample 1 and 11.26 for sub-sample 2 for the predictor set) are very similar. We may conclude from this that the results obtained from the first analysis are robust, and are able to be generalised to other samples of white-collar employees. Overall, the results indicate that there are two orthogonal dimensions. The first dimension is defined by intrinsic job satisfaction and job characteristics, while the second dimension is defined by anxiety and one "stressor" (work pressure). Similar results were obtained from the second replication sample shown in Table 4.7 at the end of this chapter.

Table 4.1

Canonical correlation (N = 1,667). Clerical and Supervisory Employees

Variables	First Canonical Variate		Second Canonical Variate	
	Cross-Loadings	Standardised Coefficients	Cross-Loadings	Standardised Coefficients
Dependent Variable Set				
Intrinsic Satisfaction	.706	.753	-.027	-.170
Enthusiasm	.553	.258	-.045	-.523
Depression	-.438	-.058	-.109	.362
Anxiety	-.249	-.018	-.390	-.848
Relaxation	.453	.077	.243	.690
Percent variance	*46.252*		*19.162*	*Total = 65.414*
Redundancy	*25.249*		*4.511*	*Total = 29.759*
Independent Variable Set				
Skill Variety	.336	-.018	-.230	-.185
Task Identity	.250	-.042	-.042	.087
Task Significance	.250	.033	-.224	-.228
Autonomy	.380	.155	-.099	.023
Feedback	.402	.199	-.109	.041
Skill Utilisation	.463	.320	-.103	.050
Supervisory Support	.625	.602	-.024	-.054
Work Pressure	-.134	-.147	-.412	-.708
Ambiguity	-.253	-.144	-.143	-.232
Attentional Demand	.219	-.008	-.249	-.202
Education	-.041	-.058	-.093	-.085
Age	.105	.113	-.011	-.031
Sex	.095	.092	.055	-.119
Tenure	-.007	-.181	-.018	.030
Organisational Level	.084	.061	-.163	-.179
Percent variance	*15.969*		*12.153*	*Total = 28.122*
Redundancy	*8.718*		*2.861*	*Total = 11.578*
Canonical Correlation	.739		.485	

Table 4.2

Canonical correlation (N = 1,418). Managerial Employees

Variables	First Canonical Variate		Second Canonical Variate	
	Cross-Loadings	Standardised Coefficients	Cross-Loadings	Standardised Coefficients
Dependent Variable Set				
Intrinsic Satisfaction	.695	.754	.015	.137
Enthusiasm	.530	.301	-.022	.384
Depression	-.426	-.113	.148	-.249
Anxiety	-.209	.057	.442	.874
Relaxation	.401	.044	-.296	-.553
Percent variance	*42.317*		*23.836*	*Total = 66.153*
Redundancy	*22.963*		*6.113*	*Total = 29.076*
Independent Variable Set				
Skill Variety	.343	.070	.232	.275
Task Identity	.249	.008	-.071	-.170
Task Significance	.287	-.008	.124	-.020
Autonomy	.401	.160	.046	.071
Feedback	.397	.218	-.007	-.076
Skill Utilisation	.436	.274	.118	.001
Supervisory Support	.590	.569	.036	.104
Work Pressure	-.038	-.083	.450	.767
Ambiguity	-.422	-.236	.112	.236
Attentional Demand	.089	-.093	.216	.156
Education	-.004	-.029	.001	-.127
Age	.035	-.021	-.066	-.070
Sex	-.005	-.042	.052	.123
Tenure	-.043	-.081	-.057	-.056
Organisational Level	.109	.093	.072	.079
Percent variance	*16.210*		*9.599*	*Total = 25.809*
Redundancy	*8.796*		*2.462*	*Total = 11.258*
Canonical Correlation	.737		.506	

Multiple Regression

As was suggested earlier in this chapter the disadvantage of using canonical correlation analysis is the absence of significance levels for individual variables. To overcome this problem, a series of multiple linear regressions may be performed, with dependent variables those compound variables computed for each case from the sums of the products of the weights (the standardised coefficients defining the canonical variates), and the standardised scores on the variable (Cliff, 1987).

An assessment of the relative importance of a variable may be based on a standard multiple regression (where all variables enter in a single step), where the unique variance explained by a particular variable could be obtained through the squared semi-partial correlations. The reader, however, should note that the results of these analyses are specific to the compound dependent variables, which were linearly combined (i.e., the variates), and *not* to the original variables.

The pattern of relationships from the two canonical correlations reported earlier were remarkably similar. It was, therefore, appropriate to combine the two sub-samples and conduct the regression analyses on the entire sample. The merging of the two sub-samples resulted in three thousand and eighty six cases (3,086) made available.

Results of Multiple Regression and Discussion

Tables 4.3 and 4.4 show two separate standard multiple regressions performed on the entire sample, with dependent variables the canonical variate scores from the top half of the first and second variate, are shown in Tables 4.3

and 4.4. More information on the weights used for the entire sample are shown in Table 5.1 in chapter 5.

Results from the first multiple regression (with dependent variable the first canonical variate consisting of the composite of well-being and intrinsic job satisfaction) indicate that the following variables (in order of magnitude) contributed 1 per cent or more of unique variance: *supervisory support* (15.07%), *skill utilisation* (3.32%), *role clarity* (1.53%), and *feedback* (1.40%). Collectively these variables contributed 21.31% of unique variance, while the remaining variables only accounted for an additional 2.46% of variance. As with the canonical correlation analyses, supervisory support was the most important variable.

The analysis from the second standard multiple regression (with dependent variable the second canonical variate consisting of the composite of well-being and intrinsic job satisfaction) resulted in two variables contributing unique variance greater than 1%. Those variables were *work pressure* (11.89% of unique variance) and *role ambiguity* (1.32% of unique variance) - a total of 13.21%. All the other variables collectively contributed an additional 2.38% of unique variance.

The results from the canonical correlation analyses and the multiple linear regressions are summarised in Figure 4.1. Figure 4.1 shows the attitudinal and affective outcomes from the combination of the two independent dimensions. The first dimension may be labelled task complexity (Campbell, 1988) and supervisory support. Task complexity may be the more appropriate construct, rather than Karasek's (1979) conceptualisation of the first dimension as a composite of control and job complexity. Certainly, some researchers (e.g., Ganster, 1988) suggested that the confounding of control with job complexity did not "permit a clear interpretation of his data" (p.93).

The second dimension is primarily work pressure and to a lesser extent role ambiguity. The combination of these two dimensions gives rise to a typology of four distinct types of jobs that is consistent with Karasek's passive-active jobs (diagonally from quadrant 1 to quadrant 4), and low strain-high strain (diagonally from quadrant 3 to quadrant 2) jobs.

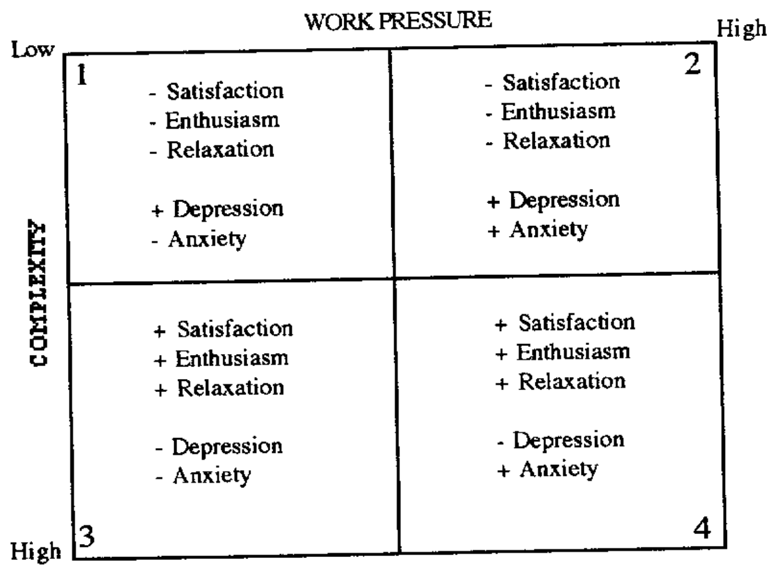


Figure 4.1. Attitudinal and affective outcomes of complexity and work pressure.

The outcomes shown in Figure 4.1 (quadrants 1 to 4 sequentially) are associated with "passive" jobs (low skill variety, autonomy, feedback, skill utilisation, supervisory support, high role ambiguity and low work pressure), "high strain" jobs (low skill variety, autonomy, feedback, skill utilisation, supervisory support, and high work pressure), "low strain" jobs (high skill variety, autonomy, feedback, skill utilisation, supervisory support, and low work pressure), and "active" jobs (high skill variety, autonomy, feedback, skill utilisation, supervisory support, clear role definition, and high work pressure) respectively.

Table 4.3

Standard Multiple Regression With Dependent Variable the First Canonical Variate

Independent Variables	β	Bivariate r	% Unique Variance	F	Sig F
Skill Variety	.008	.383	.002	.144	n.s.
Task Identity	-.016	.267	.018	1.227	n.s.
Task significance	.021	.303	.026	1.735	n.s.
Autonomy	.118	.415	.734	49.676	$p<.001$
Feedback	.152	.415	1.395	94.421	$p<.001$
Skill Utilisation	.231	.482	3.315	224.407	$p<.001$
Supervisory Support	.429	.611	15.067	1019.873	$p<.001$
Work Pressure	-.068	-.028	.384	26.005	$p<.001$
Role Ambiguity	-.131	-.310	1.534	103.820	$p<.001$
Attentional Demand	-.023	.215	.037	2.525	n.s.
Education	-.044	.073	.118	7.997	$p<.01$
Sex	.037	-.015	.103	6.947	$p<.01$
Age	.039	.125	.109	7.400	$p<.01$
Tenure	-.092	.029	.529	35.776	$p<.001$
Organisational Level	.099	.199	.396	26.804	$p<.001$
R	.73924				
R^2	.54647				
Adjusted R^2	.54425				
Total Unique Variance:	23.767%				
Total Shared Variance:	30.88%				

Note: N = 3,354. The dependent variable is a composite consisting of intrinsic job satisfaction, and the well-being variables.

Table 4.4

Standard Multiple Regression With Dependent Variable the Second Canonical Variate

Independent Variables	β	Bivariate r	% Unique Variance	F	Sig F
Skill Variety	-.125	-.259	.578	24.393	$p<.001$
Task Identity	.059	.002	.238	10.051	$p<.01$
Task significance	-.062	-.196	.237	9.991	$p<.01$
Autonomy	.007	-.105	.003	.110	n.s.
Feedback	.052	-.043	.162	6.832	$p<.01$
Skill Utilisation	.028	-.128	.049	2.083	n.s.
Supervisory Support	.000	.014	.000	.000	n.s.
Work Pressure	-.377	-.464	11.888	501.744	$p<.001$
Role Ambiguity	-.122	-.156	1.319	55.675	$p<.001$
Attentional Demand	-.088	-.248	.555	23.407	$p<.001$
Education	-.003	-.154	.000	.027	n.s.
Sex	-.045	.097	.152	6.423	$p<.05$
Age	.009	-.040	.006	.269	n.s.
Tenure	.011	-.049	.007	.306	n.s.
Organisational Level	-.099	-.236	.395	16.661	$p<.001$
R	.52210				
R^2	.27259				
Adjusted R^2	.26904				
Total Unique Variance:	15.589%				
Total Shared Variance:	11.67%				

Note: N = 3,354. The dependent variable is a composite consisting of anxiety, depression, relaxation, and enthusiasm.

For "passive jobs" the outcomes are: dissatisfaction, lack of enthusiasm, lack of relaxation, depression, and low anxiety (quadrant 1); for "high strain" jobs the outcomes are dissatisfaction, lack of enthusiasm and relaxation, depression and anxiety (quadrant 2); for "low strain" jobs the outcomes are satisfaction, enthusiasm, relaxation, and low depression and anxiety (quadrant 3); and for "active jobs" the outcomes are satisfaction, enthusiasm, relaxation, anxiety and low depression (quadrant 4). The model predicts that enriched job characteristics will be associated with job satisfaction and low depression, while impoverished jobs will be associated with job dissatisfaction and depression. High work pressure will be associated with high anxiety, while low pressure will be associated with low anxiety.

A test of Karasek's and Warr's Models

Although the primary analyses based on canonical correlations described earlier focused on linear effects, it was not possible through the same procedure to test simultaneously for higher order effects, which feature prominently in Warr's (1986; 1994) Vitamin Model, and Karasek's (1979) job-strain model. To test for curvilinear and moderator effects, two dependent variables were generated from the sums of the products of the standardised score for each original variable, and its associated standardised canonical coefficient from the primary analyses. These two dependent variables, representing the best linear combination of intrinsic satisfaction, enthusiasm, depression, anxiety and relaxation, were submitted to separate multivariate hierarchical regressions to test for curvilinear and moderator effects.

In the majority of the published papers the testing of the model (Karasek, 1979; Karasek & Theorell, 1990) was based on hierarchical multiple regression.

The procedure adopted, however, was defective. Apart from the inappropriate testing of interaction effects by Karasek in his original paper (Karasek calculated the differences between demand and control rather than a multiplicative term to test for these effects), other problems surfaced when the model was tested by other researchers (e.g., Ganster & Fusilier, 1989). In the published studies usually the linear trends in the model were controlled by entering them first in the analysis, followed by the interaction term. The moderator effect is assessed statistically by comparing the R^2 change increment over that achieved by the first step. This two-step approach, however, was criticised by Lubinski and Humphreys (1990) who argued that a statistically significant interaction may be spurious - the consequence of a higher-order trend (i.e., a quadratic term) sharing substantial amounts of variance with the product term (see also MacCallum & Mar, 1995). In such cases the quadratic term may better describe the covariation between the predictor set and the dependent variable. These authors advocated the testing of linear, quadratic, and interactive terms (in the sequence described) to guard against such possibility. Some researchers heeded this advice (e.g., Fletcher & Jones, 1993; Judd & McClelland, 1989) and when they tested Karasek's model, the interaction effects disappeared after controlling for the curvilinear trends in the data.

There was a belief among researchers also that the covariation between the individual components in the model and their product was acting against the confirmation of the Karasek model. This argument can no longer be sustained. Aiken and West (1991) noted that when linear components in a model are centred prior to the testing of an interaction term (Cronbach, 1987; Jaccard, Turrisi & Wan, 1990), in order to protect against multicollinearity, the covariances of the components in the model are dramatically reduced. Rather the reasons for the failure to detect moderator effects in most of the published studies appear to be methodological.

Another serious misconception inferred from the empirical literature is that, because statistical power was adequate in detecting first-order effects, the test also possessed adequate power for the detection of higher order effects, when in fact the design commanded less than the maximum possible statistical power (Jaccard & Wan, 1995; McClelland & Judd, 1993). Low power due to small sample sizes, restriction of range, and measurement error of the linear components, that was amplified when the product terms were generated, may have resulted in an inordinate number of Type II errors when testing Karasek's model. All these problems may have contributed to the extreme difficulty of detecting moderator effects in quasi-experimental studies (Morris, Sherman & Mansfield, 1986). This has prompted one researcher to comment that even if the explained variance due to the moderator effect was as little as one percent, it should be considered important (Evans, 1985). Problems of power and restriction of range may have also contributed to the non-significant results from the testing of Warr's model.

Analyses and results

Most of the major statistical problems identified in previous research have been taken into account in the present analyses. First, in compliance with the recommendation by Lubinski and Humphreys (1990), the quadratic components were entered in the second step of the analysis. This guarded against the possibility that a significant interaction term may have been spurious. At the same time the quadratic component tested for Warr's curvilinear relationships. Warr (1986) has argued that high levels of control or autonomy would lead to a reduction in levels of well-being. Second, the power of the test to detect differences was high given the large sample size, and wide range of responses in the variables of interest. Third, the high inter-correlation, between the original variables and their products for the interaction term, was reduced through centring prior to the inclusion of the quadratic and multiplicative terms in the analyses.

Table 4.5

Hierarchical Multiple Regression Analysis With Dependent Variable the First Canonical Variate

Variables	Step 1 β	Step 2 β	Step 3 β
Autonomy	$.428^{***}$	$.416^{***}$	$.416^{***}$
Work Pressure	$-.071^{***}$	$-.038^{*}$	$-.037^{*}$
Autonomy^2		$-.006^{n.s.}$	$-.007^{n.s.}$
Work Pressure^2		$-.121^{***}$	$-.122^{***}$
Autonomy X Work Pressure			$.012^{n.s.}$
R	.428	.443	.443
R^2	.183	.196	.197
ΔR^2	-	.014	.000
ΔF	370.574^{***}	28.056^{***}	$0.603^{n.s}$

Note: N = 3,354. *** = $p<.001$, ** = $p<.01$, * = $p<.05$.

Dependent variable is a composite consisting of intrinsic job satisfaction, and enthusiasm.

Quadratic and interaction terms have been centred prior to analysis.

The results shown in Table 4.5 indicate that there were significant linear components in the relationship between well-being (i.e., the first composite from the canonical correlation analysis), and autonomy (positive relationship) and work pressure (inverse relationship). However, only work pressure had quadratic significant effects, characterised by an inverted U relationship with well-being. No interaction effects were present.

Table 4.6

Hierarchical Multiple Regression Analysis With Dependent Variable the Second Canonical Variate

Variables	Step 1 β	Step 2 β	Step 3 β
Autonomy	.065***	.044*	.044*
Work Pressure	.455***	.445***	.446***
Autonomy^2		-.034$^{n.s.}$	-.034$^{n.s.}$
Work Pressure^2		.040*	.040*
Autonomy X Work Pressure			.002$^{n.s.}$
R	.466	.468	.468
R^2	.217	.219	.219
ΔR^2	-	.002	.000
ΔF	458.767***	4.400*	0.0139$^{n.s.}$

Note: N = 3,354. *** = p<.001, ** = p<.01, * = p<.05. Dependent variable is a composite consisting of anxiety, depression, and lack of relaxation, and enthusiasm.
Quadratic and interaction terms have been centred prior to analysis.

Table 4.6 shows that there were significant linear components between distress (i.e., the second composite from the canonical correlation analysis), and autonomy and work pressure. The quadratic term resulted in only one significant effect. Work pressure was significantly and positively related to distress, resulting in a U-curve relationship. No interaction effects between autonomy and work pressure was evident.

The results from Tables 4.5 and 4.6 show clearly that neither Warr's model, nor Karasek's, are supported when the best linear combination of the dependent variables is analysed multivariately with the independent variables of interest. However, the U-shaped relationship between work pressure (demands) and distress found in the analyses is consistent with Selye's (1976) stress and performance model of an optimal level of work demand. The results of the canonical correlation analyses, therefore, where only the linear relationships are considered, will be the focus of the interpretation and general discussion.

Study 2

Supplementary Analyses

The sample for these analyses came from a 1993 survey of a semi-government instrumentality (described more fully in chapter 2). Unlike the first sample used for the substantive analyses in this chapter, this sample included in addition to clerical/administrative personnel, middle management and executive personnel, unskilled and semi-skilled trades personnel. After listwise deletion 1,933 cases were made available for analysis.

The majority of instruments used for the replication were the same as those used previously. However, two measures (role ambiguity and attentional demand) were not included in the 1993 study, and the supervisory support measure was replaced with a five-item measure validated by Koys & DeCotiis (1991).

The results of the canonical correlation are shown in Table 4.7, and confirm those obtained earlier. Two orthogonal dimensions were extracted with canonical correlations .81 and .50 for the first and second dimension respectively.

For the first canonical variate (dependent set) high cross-loadings (i.e., ≥ .30) were achieved for *intrinsic satisfaction* (-.801), and to a lesser degree for *enthusiasm* (-.497), and *depression* (.417). For the independent variable set acceptable cross-loadings were obtained for *autonomy* (-.646), *skill variety* (-.589), *skill utilisation* (-.575), *supervisory support* (-.533), *feedback* (-.486), *task identity* (-.423), and *task significance* (-.410).

For the second canonical variate (dependent set) *anxiety* (.417) and *relaxation* (-.349) had acceptable cross-loadings. For the independent set only *work pressure* (.461) had a substantial cross-loading.

Overall, the results are in agreement with the typology shown in Figure 4.1; that is high strain jobs (quadrant 2) characterise this organisation. Low complexity (i.e., all the variables in the independent set have negative signs) is associated with job dissatisfaction, and lack of enthusiasm and high depression, while high work pressure is associated with anxiety and lack of relaxation. These results are not surprising for the organisation surveyed. Over the last few years the jobs of employees in this organisation have undergone re-structuring, while the threat of redundancies and privatisation has been a constant concern for the majority of employees.

For the hierarchical multiple regression (Table 4.8), with the dependent variable the first canonical variate from the replication analysis (Table 4.7), the results show that although autonomy has a strong linear component, neither the quadratic nor the interaction terms are significant, a result consistent with those shown in Table 4.5.

Table 4.7

Canonical Correlation (N = 1,667). Second Replication Sample

Variables	First Canonical Variate		Second Canonical Variate	
	Cross-Loadings	Standardised Coefficients	Cross-Loadings	Standardised Coefficients
Dependent Variable Set				
Intrinsic Satisfaction	-.801	-.904	.022	.201
Enthusiasm	-.497	-.146	-.029	.340
Depression	.497	-.146	-.029	.340
Anxiety	.218	.045	.417	.643
Relaxation	-.260	.021	-.349	-.633
Percent variance	*36.054*		*28.462*	*Total = 64.516*
Redundancy	*23.522*		*7.063*	*Total = 30.585*
Independent Variable Set				
Skill Variety	-.589	-.274	.219	.351
Task Identity	-.423	.030	-.012	-.027
Task Significance	-.410	-.016	.143	.059
Autonomy	-.646	-.399	.020	-.105
Feedback	-.486	-.080	.027	-.039
Skill Utilisation	-.575	-.279	.099	-.007
Supervisory Support	-.533	-.355	-.140	-.269
Work Pressure	-.014	.102	.461	.812
Education	-.034	.063	.090	.046
Age	-.151	-.034	.042	-.043
Sex	.048	-.043	-.071	.046
Tenure	-.158	-.022	.086	.079
Organisational Level	-.242	-.013	.149	-.009
Percent variance	*24.418*		*11.036*	*Total = 35.454*
Redundancy	*15.931*		*2.739*	*Total = 118.670*
Canonical Correlation	.808		.498	

For the second hierarchical regression (Table 4.9), with dependent variable the second canonical variate from the replication analysis, the results are also in agreement with those shown in Table 4.6; that is although there are strong linear and quadratic effects for work pressure there is no interaction present.

The results from the replication studies confirm those presented earlier, that neither Warr's model nor Karasek's model were supported with the present set of data. However, as a result of the testing of the quadratic effects in these analyses, Selye's (1976) model of a curvilinear relationship between stress and work demands has been replicated.

Table 4.8

Hierarchical Multiple Regression Analysis With Dependent Variable the First Canonical Variate

Variables	Step 1 β	Step 2 β	Step 3 β
Autonomy	.649***	.644***	.643***
Work Pressure	-.027n.s.	-.020n.s.	-.020n.s.
Autonomy^2		-.005n.s.	-.006n.s.
Work Pressure^2		-.058***	-.059***
Autonomy X Work Pressure			.009n.s.
R	.648	.651	.651
R^2	.420	.424	.424
ΔR^2	-	.003	.000
ΔF	699.743***	5.762**	0.284n.s.

Note: N = 1,935. *** = $p<.001$, ** = $p<.01$, * = $p<.05$. Dependent variable is a composite consisting of intrinsic job satisfaction and enthusiasm. Quadratic and interaction terms have been centred prior to analysis.

Table 4.9

Hierarchical Multiple Regression Analysis With Dependent Variable the Second Canonical Variate

Variables	Step 1	Step 2	Step 3
	β	β	β
Autonomy	-.013n.s.	-.013n.s.	-.013n.s.
Work Pressure	.448***	.438***	.440***
Autonomy^2		-.006n.s.	-.007n.s.
Work Pressure^2		.089***	.088***
Autonomy X Work Pressure			.034n.s.
R	.448	.456	.457
R^2	.200	.208	.209
ΔR^2	-	.008	.001
ΔF	241.677***	9.316***	2.879n.s.

Note: N = 1,935. *** = $p<.001$, ** = $p<.01$, * = $p<.05$. Dependent variable is a composite consisting of anxiety, relaxation, enthusiasm and depression.

Quadratic and interaction terms have been centred prior to analysis.

General Discussion

The results from the canonical correlation indicate that when a set of job-related variables is analysed simultaneously with a set of well-being variables (including intrinsic satisfaction, enthusiasm, depression, anxiety and relaxation), two orthogonal dimensions emerge. When the two sets of data were combined due to the similarity of the results (i.e., data from Levels 1-3, and data from Levels 4-8), the following were obtained. The composite of the first dimension, made up mainly of *intrinsic job satisfaction* and to a lesser extent by *enthusiasm* and *depression*, is related significantly to *supervisory support, skill utilisation, role clarity*, and *feedback*. The composite of the second dimension, that had *anxiety* as its main contributor and to a lesser degree *depression, lack of relaxation*, and *enthusiasm*, is related to work pressure and role ambiguity. Of particular interest is the finding that autonomy, although significantly related to the first dimension, did not contribute substantial unique variance (only .734%). Also, no personal and organisational characteristics were strongly related to either dimension. For the first dimension (i.e., intrinsic job satisfaction), educational attainment, sex, and age contributed collectively 0.33 percent of unique variance, while organisational level and tenure contributed approximately 0.4 and 0.5 percent respectively. For the second dimension (i.e., anxiety), sex contributed less than 0.2 percent, while organisational level approximately 4 percent of unique variance. The F values for education, age, and tenure were not significant.

The relationships between job characteristics and affective reactions are consistent with the literature. Consistent with the literature is also the independence of positive and negative affect (PA & NA), when the data analytic procedures are based on either principal-component or factor analysis. The most important variables identified through the two regression analyses (i.e., those that contributed more than 1% of unique variance) will be discussed in more detail below.

Social support has been frequently shown to have a buffering influence on stress (Fletcher & Jones, 1993; Kahn & Byosiere, 1992; Parkes, Mendham, & von Rabenau, 1994; Terry, Nielsen, & Perchard, 1993). Types of providers of social support are many; however, McIntosh (1991) has shown that when the sources of support provided by the supervisor, co-workers, and by family and friends are disaggregated, the amount of support provided by the supervisor is the most important in reducing strain. Cohen and Wills' (1985) results are consistent with these findings, as are those of Quinn and Staines (1979) and Terry et al. Terry et al. found that supervisory support (rather than co-worker or non work support) was significantly related to psychological well-being and job satisfaction after controlling for the effects of neuroticism. Also, Amick and Celentano (1991) with a large sample of postal workers found that, as a reaction to greater job demands and diminished control, influencing supervisory support was the most effective way to alter positively the level of a person's job satisfaction, and reduce psychosomatic symptoms. The importance of supervisory practices in affecting perceptions of job characteristics has been emphasised also by Cordery and Wall (1985).

Opportunity for skill use and role clarity have been identified by Warr (1986, 1994) as two job features that influence job-related mental health. The association between employee well-being and skill utilisation has been demonstrated in Kornhauser's (1965) seminal study on the mental health of US car workers. O'Brien (1983) has also shown that skill utilisation is an important job characteristic (distinct from skill variety) that is related to job satisfaction. The consequences of under utilisation of skills are boredom (Benyon & Blackburn, 1972) and job dissatisfaction (Caplan, Cobb, French, Harrison, & Pinneau, 1975), depression (Ganster, Fusilier, & Mayes, 1986), and generally poor physical and psychological well-being (Greenhaus, Bedeian & Mossholder, 1987; Kornhauser, 1965). Role clarity, or more precisely role ambiguity (as conceptualised by Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964), has been identified in many studies as a source of stress (Jackson & Schuler, 1985), the result of inadequate information made available to a worker to carry out his/her tasks. Negative outcomes due to this stressor have been reported in the literature and include among others, heart disease, job dissatisfaction, and depression (French & Caplan, 1970; Margolis, Kroes & Quinn, 1974).

Feedback is the extent to which a worker receives information relating to the performance of his or her work. Among the five "core" job characteristics it has been accorded (with autonomy) more importance within the Job Characteristics model (Hackman & Oldham, 1975) than the other three core dimensions, that is, feedback is weighted more than skill variety, task identity, or task significance. Although feedback is a source of motivating potential, it has also been associated with a number of negative outcomes such as feelings of unhappiness with one's personal accomplishments, burnout, and depersonalisation (Maslach & Jackson, 1981).

Work pressure, a construct similar to "job demands" or "workload" has been identified as a stressor. In particular, perceptions of quantitative overload or underload (i.e., too many or too few tasks to be completed in a given time) has been associated with dissatisfaction (Caplan et al., 1975; Parkes, 1991), and anxiety (Warr, 1990_a), or boredom, depression, and job dissatisfaction in the case of underload (Sutherland & Cooper, 1988).

Recently, Wall, Jackson, Mullarkey and Parker (1996) operationalised control as the combination of timing control and method control. Their multivariate and univariate hierarchical analyses were supportive of Karasek's model. The conclusion reached by these researchers is that the operationalisation of control as a composite of autonomy, skill complexity, creativity, and the ability to learn new things (as originally formulated by Karasek) introduced measurement error in the analyses. This perhaps accounted for the inconsistent results in the empirical literature. Wall et al.'s results although informative must be regarded as tentative, however, since the variance associated with possible curvilinear trends in the data was not removed prior to testing for interaction effects.

Overall the results of the canonical correlation analyses are consistent with Broadbent's (1985) findings. In a five-sample study, investigating the impact of job design on affective outcomes through interviews of assembly line workers (operating under paced and unpaced conditions), Broadbent found that depression was associated with social interaction (this was interpreted as social support), while anxiety was associated with the demands imposed by machine-pacing. Warr's (1990_a) results also emphasised the differential association between anxiety-contentment and work overload (i.e., job demands) on the one hand, and depression-enthusiasm and job complexity and skill use on the other. It is becoming increasingly clear from these studies, and from the present results, that psychological distress or well-being is not dependent on a synergistic interaction between job characteristics and job demands - because the two sets of variables and their outcomes are orthogonal to each other - but that the additive combination of the two sets of independent variables lead to differentiated outcomes represented in Figure 4.1. This is essentially Warr's (1990_a) position. The implication emanating from this interpretation renders the Karasek's interaction model unsustainable. In agreement with the differential sourcing of outcomes, therefore, it is inappropriate to label job demands *stressors*, or job characteristics and social support *buffers*, when in fact their influences cannot be evaluated in isolation. Both sets of variables have the potential to behave either as stressors or motivators. For example, Karasek (1989) suggests that there are situations where the job strain model predicts increased motivation and learning, the result of high decision latitude and high job demands. In this instance job demands are not viewed as stressors, but as contributing positively to a person's job rewards (Barnett, Marshall & Sayer, 1992). On the other hand, Karasek and Theorell (1990), in agreement with Warr's (1986) Vitamin Model, observe that exceptionally high levels of control and skill acquisition, associated with high status managerial and professional jobs, may become demands in themselves, and contribute to "executive stress" instead of acting as moderators; although it is primarily the jobs of blue collar workers with constraints on decision making that are affected by strain (Karasek, 1979).

We may conclude, therefore, from the results of the present study, that the additive combination of the two sets of independent variables lead to levels of psychological distress or well-being. However the *outcomes themselves* may be subject to an interaction effect. This possibility may come about through a cognitive mechanism (cognitive set) that either amplifies or dampens affect (Diener, Colvin, Pavot, & Allman, 1991) and can carry over from one affective state to another of similar hedonic tone, leading to a condition of generalised psychological distress or well-being. There is also empirical evidence from the clinical literature, that the comorbidity of anxiety and depression is qualitatively different from either one of these conditions considered separately. For example, Clark, Beck and Stewart (1990) have shown that a mixed psychiatric outpatient sub-sample (displaying symptoms of *both* anxiety and depression) experienced symptoms indicative of "a more severe form of psychological distress" (p.153), than either the purely anxious, or the purely depressed groups. The argument, therefore, whether the influence of the independent variables on well-being is additive or synergistic, appears to be a moot point.

The results of the three canonical correlation analyses (based on three separate samples) suggest that the two orthogonal dimensions, with their sets of independent and dependent variables, would lead to a situation that is consistent with a "synergistic approach", even though the two sets of independent variables may act additively. One, therefore, has to question the necessity of invoking a moderator model such as Karasek's, especially when neither the analyses in the present study nor the empirical literature is supportive of an interaction effect.

The hierarchical regression analyses performed in this study, to test Karasek's model using composite measures of affective well-being and intrinsic job satisfaction, did not find any support for the model. It may be, however, that the control variable was inadequately operationalised (i.e., autonomy) in this study in terms of "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Oldham, 1976, p. 258). However, the construct of "control" may be multidimensional. For example, Ganster (1989) has suggested that control at work covers various domains such as work tasks, work pacing, work scheduling, the physical environment, decision-making, other people, and mobility. Although the use of Hackman and Oldham's (1976) autonomy measure in this study captures the ability to schedule and determine the way work is carried out, it may still be too narrow (see for example, Jackson, Wall, Martin & Davids, 1993).

An interesting point to consider with the model shown in Figure 4.1 is whether, for example, a persistent high level of anxiety would ultimately lead to depression and job dissatisfaction, even though important job content variables, such as skill utilisation, feedback, role clarity and supervisory support, are available at high levels. Is it possible that the positive outcomes from an "active" job would change into outcomes consistent with a "high strain" job (i.e., job dissatisfaction) without any concomitant changes in the job features? Within the Karasek framework the answer would be emphatically "no", since the job features would act as "buffers". However, again within the clinical literature, anxiety has been often treated as the precursor of depression (Barlow, 1991).

This suggests two possibilities. First, anxiety may trigger depression even in the absence of any other work-related causal mechanism that affects depression directly. Second, depressive episodes that have their sources external to the immediate work context, such as family conflict (e.g., Frone, Russell, & Cooper, 1992; Williams, & Alliger, 1994) may contribute to a generalised psychological condition that affects work outcomes. For example, would not an individual with job-related anxiety and context-free depression be subject to the amplification mechanism referred to earlier, and ultimately to a condition of generalised psychological distress? The sources of psychological well-being or distress based on Warr's model offer, therefore, possibilities that deserve further examination. However, the availability of context-free well-being and life satisfaction data are needed to answer these questions. Because no such information was collected for this study, some exploratory analyses will be carried out with reference to job-related well-being in the chapters that follow, to examine the causal relations among attitudinal and affective outcomes.

One potential problem with this study is the use of self report data and the possibility that the relationships between the set of dependent variables (intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation) and the set of independent variables (job characteristics, and "stressors") were due to the influence of positive and negative affectivity (Brief, Burke, George, Robinson, & Webster, 1988; Watson, Pennebaker, & Folger, 1987). Burke, Brief, and George (1993) argued that "...self reports of negative features of the work situation and negative affective reactions may both be influenced by NA, whereas self-reports of positive aspects of the work situation (e.g., social interaction on the job) and positive affective reactions may both be influenced by PA" (p. 410). However, although Williams & Anderson (1994) found evidence that the influences of PA and NA were present in their data, they concluded that these effects "were shown to have little impact on the parameter estimates representing the relationships among substantive constructs" (p. 325). Similar conclusions were reached by Chen and Spector (1991). Furthermore, it was shown in the instrumentation section (Chapter 3) that both *MPS* and *work pressure* were linearly and significantly related to occupational complexity (organisational levels were categorised into clerical, supervisory, middle management, and upper management occupations). As was expected, higher MPS and work pressure scores were associated with more complex jobs. This evidence offers strong support for the construct validity of the measures. One, of course, could argue that people with certain personality characteristics are drawn and selected to specific jobs (either complex or simple). In the same vein one could also argue, for example, that long-term exposure to work pressure associated with more complex jobs would lead to either negative or positive affectivity (Schmitt, 1994). This later view appears more credible when one considers that two large independent samples were used in this study (with 1,667 and 1,418 cases respectively), and this would have guarded against the possibility that individual level personality characteristics played a significant part on the results.

The statistical analyses described in this chapter demonstrated that the use of separate job-related affects in organisational research, such as anxiety, depression, intrinsic job satisfaction, enthusiasm, and relaxation, when considered holistically, can greatly enhance our understanding of the relationships between affective outcomes and job content variables. A variant of Warr's model based on monopolar dimensions of well-being may be used, therefore, to assess either psychological well-being (the co-occurrence of intrinsic job satisfaction, enthusiasm and relaxation) or distress (a combination of anxiety and depression), rather than the more elusive construct of "stress", that is beset with conceptual, and methodological problems.

CHAPTER V

Partialling the Cognitive and Affective Components of Intrinsic Job Satisfaction

Locke (1976) defined job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences." This definition that has guided several decades of job satisfaction research (Organ & Near, 1985) implies that feelings are the consequence of a cognitive appraisal of the working environment. This appraisal of the external circumstances of work has been measured with such instruments as the Minnesota Satisfaction Questionnaire, or MSQ (Weiss, Dawis, England, & Lofquist, 1967), the Brayfield and Rothe (1951), Quinn and Staines (1979), and Warr, Cook and Wall (1979) questionnaires (Warr, 1991).

Recent studies of dispositions and job-related affect (Arvey, Bouchard, Segal, & Abraham, 1989; Gerhart, 1987; Staw, Bell & Clausen, 1986; Schmitt & Pulakos, 1985; Staw & Ross, 1985; Staw et al., 1986), however, have suggested that job satisfaction is a function of stable personality characteristics (Staw et al., 1986). In support of this argument Costa and McCrae (1988) reported high 6-year test-retest correlations of emotional temperament known as Positive Affectivity (PA) and Negative Affectivity (NA) (Watson, 1988;

Watson, Clark & Tellegen, 1988; Watson & Tellegen, 1985). PA and NA are two dimensions that were found to be related to the personality constructs of extroversion and neuroticism respectively (Eysenck & Eysenck, 1985; Larsen & Ketelaar, 1989; Meyer & Shack, 1989; Williams, 1989). Other researchers have claimed that these predispositions have a strong genetic component. For example, Tellegen, Lykken, Bouchard, et al. (1988) found that about half of the variance in PA and NA could be due to genetic factors. Also, Avrey et al. (1989) with a sample of 34 monozygotic twins reared apart found approximately 30% of the variance in general job satisfaction to be attributable to genetic factors. These empirical findings, however, have been criticised by Davis-Blake and Pfeffer (1989), and Gerhart (1987) on conceptual and methodological grounds. In particular Davis-Blake and Pfeffer (1989), argued that "organizational settings are strong situations that have a large impact on individual attitudes and behavior" (p. 387), and, therefore, may act to limit the effects of dispositions. Furthermore, "over time, individuals' dispositions are significantly affected by the organizations in which they participate" (p. 389).

The most serious charge, however, directed at those who advocate a dispositional basis for job satisfaction, is the lack of methodological rigour in ruling out alternative explanations of the results (Judge & Hulin, 1993). Gerhart (1987), for example, criticised the research of Staw and Ross (1985), responsible to a large extent for the current resurgence of dispositional research, on various grounds. These researchers investigated the determinants (trait and organisational factors) of job satisfaction among middle-aged men (between the ages of 45 and 59 in 1966, and between the ages of 50 and 64 in 1971). Their results indicated that neither pay nor changes in occupational status accounted for as much variance as prior job satisfaction, suggesting a dispositional explanation. Gerhart (1987) argued that middle-aged men are less likely to experience significant changes in their work situation than other age cohorts; that the test-retest correlation for both pay and occupational status was .84 between 1966 and 1971, indicating the stability of organisational factors over job satisfaction which had a test-retest correlation of .29 for the same period; and that the measure of situational factors relative to those of dispositions were unreliable "resulting in a serious underestimation of the effects of these situational factors on job satisfaction" (p. 367). Cropanzano and James (1990) echoed these sentiments and criticised the Arvey et al. study also on methodological grounds. Their most convincing argument was that there is a tendency for certain environments and genotypes to covary, and this may distort estimates of both environmental and genetic variation. In attempting to replicate Staw and Ross's (1985) results, Gerhart (1987) used a sample with a larger age range, and an objective measure of job complexity derived from the Dictionary of Occupational Titles (DOT). He concluded that "situational factors such as job complexity are important predictors of job satisfaction, consistent with Hackman and Oldham's (1975, 1976) job design model" (p. 366). Davis-Blake and Pfeffer (1989) pointed to the difficulties in interpreting correlational results over time, on which rested the empirical evidence for the dispositional approach. They argued that a significant positive correlation between job attitudes during an earlier time period, and job attitudes during a later time period may not be taken as evidence that a stable disposition affects those attitudes. They concluded that "until researchers who are interested in the intertemporal stability of job attitudes are able to convincingly measure and control for the nature of jobs, it will be unclear whether job satisfaction is stable over time because most individuals possess a disposition to be satisfied (or dissatisfied), or because most individuals tend to move through a series of relatively similar jobs that are either satisfying or dissatisfying" (p. 395). Gutek and Winter (1992) using cross-sectional and longitudinal data showed that the purported consistency of job satisfaction was not robust. Shift in frames of reference (i.e., response-shift bias) of respondents over time provided a better explanation for consistency in job satisfaction scores than did individual traits or dispositions.

A strong challenge to the contention that job satisfaction is dispositional comes from Hershberger, Lichtenstein and Knox (1994). These researchers used a more robust design than the one employed by Arvey et al. (1989) to investigate monozygotic twins reared together and apart (n = 90 and n = 49 respectively), and dizygotic twins reared together and apart (n = 91 and n = 96 respectively), and modelled the genetic effects on job satisfaction. These effects, however, were shown to be non-significant. The findings from the Hershberger et al. study is not encouraging for those holding a dispositional view of job satisfaction.

There are a number scales available that measure the affective component of job attitudes, such as Bradburn's (1969) affect-balance scales, or Warr's (1990_a) more work-oriented scales of enthusiasm-depression and anxiety-contentment. The conceptual framework of affective well-being by Warr locates these two dimensions in a space defined by the orthogonal axes of arousal and pleasure (or job satisfaction) as shown in Figure 1. Warr's (1986) argument that in measuring job satisfaction "no consideration is taken of level of arousal" (p. 163), implies that job satisfaction measures capture cognitions, while anxiety-contentment and depression enthusiasm measures capture affect. This view, however, is not consistent with the empirical evidence. The question whether conventional measures of job satisfaction reflect primarily cognitive evaluations rather than affective states has been raised by Organ and Near (1985). Brief and Roberson (1989) pursued this inquiry in order to demonstrate the relative contribution of cognition and affect in measures of job satisfaction. In their study they included three widely-used job satisfaction instruments: the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969), the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967) and the Faces scales (Kunin, 1955). The partitioning of the job satisfaction scales in terms of affect and cognition was based on measures of positive and negative affect (the Job Affect Scale by Brief, Burke, George, Robinson, & Webster, 1988) and job cognitions. Job cognitions were tapped by asking respondents to indicate (on a five-point scale) the extent to which 20 statements about their jobs were either true or false. The summing of the responses was taken, therefore, as an index of the perceived work environment.

The authors performed three separate regression analyses, where the cognitive and affective components were used as predictors for each job satisfaction measure. Results indicated that, in every instance, cognitions accounted for the largest percentage of unique variance. The researchers also found that there were differences among the satisfaction scales in terms of their relationship with the predictors. The Faces measure was associated significantly with positive and negative affect and job cognitions. The JDI was associated with negative affect and cognitions, while the MSQ was associated with cognitions only. This result is not unexpected. The MSQ asks respondents to evaluate aspects of the working environment such as the opportunity to use one's abilities, pay, the quality of supervision, etc. There are no questions relating to emotions associated with work. By contrast, the Faces measure does not ask respondents to evaluate the working environment; instead they are asked to respond to facial expressions that best describe their feelings at work.

Moorman (1993) also reports a study by Williams (1988) who evaluated the relative presence of cognition and affect in measures of job satisfaction. These measures included the Facet Free Job Satisfaction Scale (Quinn, &

Staines, 1979), The JDS satisfaction scale (Hackman, & Oldham, 1980), and the Brayfield-Rothe Satisfaction Scale (1951). Results indicated that, of all the job satisfaction measures used in this study, the Brayfield-Rothe scale was the least cognitive (16% was attributed to cognition, and 22% to affect), while the Facet Free scale was the most cognitive (18% was attributed to cognition, and 10% to affect). Job satisfaction scales, therefore, show considerable variability in terms of capturing cognitions and affect.

Unlike the research by Brief and Roberson (1989) that treated affect as a dispositional variable (i.e., positive and negative affectivity), the present study treats job-related affect (i.e., enthusiasm, depression, anxiety and relaxation) as dependent variables. It is appropriate to treat the job-related affect measures as dependent variables in this instance, because they represent *states* (or outcomes) as opposed to traits. As was mentioned earlier, affective states are a function of the person and the situation (George, 1992). Also, the present study differs from those reported earlier in that it considers the relationship between a comprehensive range of job characteristics and other job features on the one hand, and intrinsic job satisfaction and Warr's (1990_a) job-related affective measures on the other. The analysis, where all variables are considered simultaneously, is designed to derive weights for the calculation of scores to be used subsequently in other analyses. Following the results from the canonical correlation (chapter 4) where two orthogonal dimensions were identified, the two research hypotheses are:

$H_{5.1}$ Job complexity and supervisory support will be more strongly related to cognitions rather than job-related affect; and

$H_{5.2}$ Work pressure will be more strongly related to job-related affect rather than cognitions.

Sample

The data set used for this study was the same as the one used for the analyses in chapter 4. After deletion of 596 cases due to missing information, 3,107 cases were made available.

Instrumentation

Items from the Warr et al. (1979) job satisfaction scale were used. Following a common factor analysis of the 15-item scale, four items were finally selected to represent intrinsic satisfaction. Only intrinsic job satisfaction (rather than extrinsic or total job satisfaction) was included in this study, based on Arvey et al.'s (1989) hypothesis that genetic influences would be stronger for intrinsic than for extrinsic job satisfaction. The following four items were selected, because they loaded high and unambiguously on the intrinsic job satisfaction construct: recognition you get for good work; amount of responsibility you are given; chance of promotion; and attention paid to suggestions you make.

Using confirmatory factor analysis with LISREL VII, the discriminant validity of measures used to assess intrinsic job satisfaction, and monopolar job-related affect (i.e., enthusiasm, depression, anxiety, and relaxation) was supported.

Table 5.1. shows that in every case, when the estimated correlation parameter Φ was either fixed at 1.00, or set free to vary, the differences between the chi-squares of any two estimated constructs were statistically significant. That is, even after a Bonferroni adjustment to account for the number of tests, the χ^2 of

the free parameter was substantially lower ($p < .01$). This is a clear indication that intrinsic job satisfaction and job-related affect represent different constructs.

Table 5.1

Discriminant Validity of Intrinsic Job Satisfaction and Job-Related Affect

	Intrinsic Satisfaction with:			
Model	Anxiety	Relaxation	Enthusiasm	Depression
χ^2 (df)	3777.50 (14)	1868.39 (9)	1482.97 (14)	2366.05 (14)
Fit Indices	GFI = .763	GFI = .880	GFI = .871	GFI = .803
for $\Phi(1,2)$	AGFI = .525	AGFI = .719	AGFI = .742	AGFI = .607
fixed at 1	RMSR = .224	RMSR = .203	RMSR = .180	RMSR = .288
χ^2 (df)	115.87 (13)	33.84 (8)	88.38 (13)	63.35 (13)
Fit Indices	GFI = .991	GFI = .997	GFI = .993	GFI = .995
for $\Phi(1,2)$	AGFI = .981	AGFI = .992	AGFI = .986	AGFI = .990
set free	RMSR = .051	RMSR = .031	RMSR = .034	RMSR = .032

Note: GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; RMSR = Root Mean Square Residual.

Table 5.2

Canonical Correlation (N = 3,086). Entire Sample

Variables	First Canonical Variate		Second Canonical Variate	
	Cross-Loadings	Standardised Coefficients	Cross-Loadings	Standardised Coefficients
Dependent Variable Set				
Intrinsic Satisfaction	.706	.765	.007	-.048
Enthusiasm	.540	.287	.013	-.390
Depression	-.423	-.112	-.149	.314
Anxiety	-.171	.071	-.455	-.869
Relaxation	.392	.021	.304	.587
Percent variance	*42.230*		*23.641*	*Total = 65.871*
Redundancy	*23.077*		*6.444*	*Total = 29.522*
Independent Variable Set				
Skill Variety	.383	.010	-.258	-.240
Task Identity	.267	-.022	.003	.113
Task Significance	.303	.028	-.195	-.119
Autonomy	.415	.160	-.104	.014
Feedback	.415	.206	-.042	.100
Skill Utilisation	.481	.313	-.127	.055
Supervisory Support	.611	.580	.015	.002
Work Pressure	-.028	-.092	-.464	-.723
Ambiguity	-.310	-.177	-.157	-.233
Attentional Demand	.215	-.031	-.247	-.168
Education	.072	-.060	-.157	-.006
Age	.126	.054	-.039	.019
Sex	-.015	.050	.097	-.086
Tenure	.030	-.124	-.049	.020
Organisational Level	.199	.134	-.235	-.190
Percent variance	*17.872*		*12.873*	*Total = 30.745*
Redundancy	*9.767*		*3.509*	*Total = 13.276*
Canonical Correlation	.739		.522	

Similar conclusions were reached by Agho, Price and Mueller (1992) when they investigated the discriminant validity of job satisfaction and positive and negative affectivity.

Analyses and Results

A canonical correlation analysis was performed with the entire sample (N = 3,086) in order to calculate standardised canonical coefficients. Table 5.2 shows the results from this analysis. These results are consistent with those of chapter 4, where analyses with two independent samples were performed. Like the earlier results two dimensions were identified with canonical correlations of .74 and .52 respectively. Both canonical variate pairs accounted collectively for 95.18% of the variance in the solution.

The first canonical variate extracted 42.23% of variance from the criterion set and 17.87% of variance from the predictor set. For redundancies, the first criterion set variate accounted for 23.08% of variance in the predictor set, and the first predictor set accounted for 9.78% of variance in the criterion set.

The second canonical variate extracted 23.64% of variance from the criterion set, and 12.87% of the variance from the predictor set. For redundancies, the second criterion set variate accounted for 6.44% of variance in the predictor set, and the second predictor set variate accounted for 3.51% of variance in the criterion set. Considering both canonical variates, approximately 29.52% of the criterion set variability, and 13.28% of the predictor set variability was accounted for.

The cross-loadings (with a loading of .30 or better as candidate for interpretation) for the first canonical variate is defined mainly (with cross-loadings in parentheses) by *intrinsic job satisfaction* (.71), *enthusiasm* (.54), *depression* (-.42), and *relaxation* (.39). The independent variable set in the first canonical variate is defined by *supervisory support* (.61), *skill utilisation* (.48), *autonomy* (42), *feedback* (.42), *skill variety* (.38), *task significance* (.30), and *role ambiguity* (-.31). The dependent variable set in the second canonical variate is mainly defined by *anxiety* (-.46) and *relaxation* (.30). The independent variable set in the second canonical variate is defined exclusively by *work pressure* (-.46).

The standardised weights from the two canonical variates were used to compute scores from the sums of the products of the weights, and the standardised scores on the variables (Cliff, 1987). These scores represented the linear combinations of the set of independent variables.

Canonical correlation was described in the previous chapter, when it was used to evaluate simultaneously the relationship between intrinsic job satisfaction and job-related affect vis-a-vis the set of independent variables made up of perceived job characteristics and other job features, supervisory support, organisational level, and personal characteristics. The two sets of variables were treated then as if there was a clear distinction between them (i.e., dependent versus independent variables). However, canonical correlation analysis may also be applied when the two sets of variables have equivalent status; that is, no clear-cut distinction could be made between dependent and independent variables (Cliff, 1987).

It would be possible, therefore, to treat the set of dependent variables as independent, and through hierarchical regressions explore the relative contribution of intrinsic job satisfaction and job-related affect considered as a set.

To test the hypothesis that job complexity and supervisory support would be more strongly related to cognitions than job-related affect ($H_{5.1}$), and work pressure would be related more strongly to job-related affect than to cognitions ($H_{5.2}$), three hierarchical regressions were conducted with composite measures the bottom half of the first and second canonical variates. The results from these three analyses are shown in Tables 5.3, 5.4, and 5.5

In the hierarchical regression shown in Table 5.3 the "dependent" variable (the composite from the bottom half of the first variate), indicated that when *intrinsic job satisfaction* was entered first it explained 49.88% of the variance. When the *well-being* measures were entered second, they added collectively an additional 4.77% of total variance explained. However, when the order of entry was reversed (Table 5.4), and the *well-being* measures were entered first in a single step, the variance explained was 32.52%. When *intrinsic satisfaction* entered the second step of the analysis the variance explained increased by an additional 22.13%. The squared multiple correlation at the second step of the analysis (i.e., total variance explained was 54.65%) showed that intrinsic job satisfaction and the well-being measures collectively contributed 24.50% of "unique variance", and 30.15% of "shared variance". Hypothesis $5._1$ was, therefore supported.

For the second canonical variate the results of the hierarchical regression shown in Table 5.5 were clear-cut. Even when *intrinsic satisfaction* was entered first, the variance explained from this variable was close to zero. For the well-being variables the variance explained was 27.26%. Unambiguously, the second canonical variate is defined exclusively by the well-being measures, and in particular by *anxiety* and *relaxation.* Hypothesis $5._2$ was also supported. Further analyses showed that anxiety contributed 10.86% of unique variance, relaxation 4.03%, enthusiasm 1.76%, and depression 1.24%.

Supplementary Analyses

The results from chapters 4 and 5 indicate that intrinsic job satisfaction and anxiety are independent measures. Table 5.1 shows the magnitude of the chi-square when it was hypothesised that intrinsic job satisfaction and anxiety are the same constructs (χ^2 = 3,777.50, df 14), as opposed to the magnitude of chi-square when the correlation between constructs was set free (χ^2 = 115.87, df 13). These results indicate that an individual may be feeling high levels of anxiety, and at the same time experiencing levels of intrinsic job satisfaction that range from high to low. The consistent negative association between measures of job satisfaction and work anxiety often reported in the literature (for example, Spector & O'Connell, 1994) may, therefore, be spurious. However, the relationship between intrinsic job satisfaction and depression is moderate and inverse. Are the reported moderate zero-order correlations between anxiety and job satisfaction, which show a strong relationship with anxiety, due to depression? To test for this possibility the intercorrelations among the three variables (i.e., intrinsic job satisfaction, anxiety and depression) were used to partial out (in a first-order partial analyses) the effects of anxiety first, and depression second, in their relationship with intrinsic job satisfaction. The first-order partial correlations reported below were corrected for the unreliability of anxiety and depression based on the formula by Cohen and Cohen (1983).

The relationship between intrinsic job satisfaction and depression was still substantial when anxiety was controlled, and in the same direction (from r = -.45 to r = -.42). However, when controlling for depression, the relationship between intrinsic job satisfaction and anxiety was reduced considerably, and the relationship was in the opposite direction (r = -.20 to r = .08). These results generalise to other populations with substantially different measures, as will be shown from data (N = 502) derived from the Victorian Quality of Life Panel

Study (Heady & Wearing, 1992). Heady & Wearing reported intercorrelations among life satisfaction (Satisfaction with Life Scale by Diener, Emmons, Larsen, & Griffen, 1985), depression (the Beck Depression Inventory, Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and anxiety (Spielberger's, 1979, State Anxiety Scale). First-order partial correlations were computed (from Heady and Wearing, p. 45), and the association between life satisfaction and depression, when controlling for anxiety, was -.46 (from r = -.59), and between life satisfaction and anxiety, when controlling for depression .073 (from r = -.39).

Table 5.3

Hierarchical Multiple Regression with Dependent Variable a Composite From the First Canonical Variate, and with "Predictors" the Well-Being and Intrinsic Satisfaction Measures

	Step 1 β	Step 2 β
Intrinsic Satisfaction	.706***	.566***
Enthusiasm		.212***
Depression		-.083***
Anxiety		.052**
Relaxation		.016 n.s.
R	.706	.739
R^2	.499	.546
ΔR^2		.048
F Change	3068.946***	80.971***

Note: The contribution of unique variance for each variable was: 22.13% for intrinsic satisfaction, 1.91% for enthusiasm, 0.315% for depression, 0.145% for anxiety, and 0.011% for relaxation. N = 3,156.

Table 5.4

Hierarchical Multiple Regression with Dependent Variable a Composite From the First Canonical Variate, and with "Predictors" the Well-Being and Intrinsic Satisfaction Measures

Variable	Step 1 β	Step 2 β
Enthusiasm	.408***	.212***
Depression	-.250***	-.083***
Anxiety	.098***	.052**
Relaxation	.039$^{n.s.}$	.016$^{n.s.}$
Intrinsic Satisfaction		.566***
R	.570	.739
R^2	.325	.546
ΔR^2		.221
F Change	371.233***	1502.536***

Table 5.5

Hierarchical Regression with Dependent Variable a Composite From the Second Canonical Variate, and with "Predictors" the Well-Being and Intrinsic Satisfaction Measures

Variable	Step 1 β	Step 2 β
Intrinsic Satisfaction	.006$^{n.s.}$	-.026
Enthusiasm		-.204***
Depression		.164***
Anxiety		-.454***
Relaxation		.306***
R	.006	.522
R^2	.000	.273
ΔR^2		.273
F Change	0.11$^{n.s.}$	288.517***

Note: The contribution of unique variance for each variable was: 10.86% for anxiety, 4.03% for relaxation, 1.76% for enthusiasm, 1.24 for depression, and 0.05% for satisfaction.

Discussion

The results of the analyses showed that, when intrinsic job satisfaction and job-related affect measures (with acceptable levels of discriminant validity) were used concurrently as outcome variables in a study - which included as predictors a comprehensive list of job characteristics and other work and organisational variables - almost 28% of the variance among the dependent variables was shared. The evidence from this analysis has demonstrated that intrinsic job satisfaction scales overlap substantially with the affect scales, and they cannot, therefore, be seen purely as cognitive evaluations of the working environment. However, intrinsic job satisfaction and job-related affect (specifically depression and enthusiasm) collectively show substantial unique variance (approximately 22% for intrinsic job satisfaction, and 5% for well-being), a result consistent with the literature. This renders the inclusion of both these measures desirable in organisational research, in cases where their predictors include measures of job characteristics and supervisory support. Scales of job-related affect (anxiety and relaxation) will be particularly useful when the independent variable is work pressure or subjective workload. Overall, the results indicate that reactions to job characteristics and supervisory support reflect mainly cognitions (i.e., the appraisal of one's job), while those of work pressure or workload are associated with affective states; that is, anxiety or relaxation, reflecting either a sense of "motor readiness" and apprehension, or a "state of order and efficiency in one's job" respectively (Burke, Brief, George, Roberson & Webster, 1989, p. 1097).

On the basis of the results reported in this study, researchers may find it desirable in the interest of parsimony to opt for the intrinsic job satisfaction scale, rather than the bipolar depression-enthusiasm scale (alternatively the monopolar equivalent). No great loss of information will result from the elimination of this scale, when the research focus is on job characteristics and support. As was shown in this study, and reported elsewhere, the association between satisfaction and depression is strong and inverse (Lewinsohn, Redner, & Seeley, 1991). The causal mechanism also has been shown to be from satisfaction to depression, that is, low satisfaction "is a risk factor for future depression" (Lewinsohn et al., p. 156). The depression scale may offer, therefore, little information regarding the prognostication of future levels of satisfaction, unless of course it could be shown that intrinsic job satisfaction and depression are in a reciprocal association. Furthermore, as was shown earlier, measures of depression could be used to control the spurious association between intrinsic job satisfaction and anxiety. In light of these results the role of negative affectivity in predicting job satisfaction (see for example Levin & Stokes, 1989) ought, therefore, to be further examined.

When the research focus includes in addition to measures of job characteristics and supervisory support measures of work pressure or workload, however, either the entire job-related affect scales ought to be used, or alternatively the intrinsic job satisfaction scale, supported by Warr's (1990$_a$) anxiety-contentment scale (or the monopolar equivalent).

CHAPTER VI

A Causal Model of Job-Related Well-Being

In the previous chapters an attempt was made to define with some precision the meaning of job-related affect and intrinsic job satisfaction. It was shown, for example, that job-related affect consists of four monopolar dimensions (enthusiasm, relaxation, anxiety and depression), while intrinsic job satisfaction and job-related affect show acceptable levels of discriminant validity. These five distinct constructs have differential associations with job characteristics and other features of the working environment. Enthusiasm and depression were shown to be more strongly related to intrinsic job satisfaction than anxiety and relaxation. Although intrinsic job satisfaction measures are presumed to reflect cognitive evaluations of the working environment, they capture, in addition, substantial levels of job-related affect. However, intrinsic job satisfaction is more strongly related to supervisory support and task complexity than to job demands or work pressure. By contrast job-related affect is strongly related to work pressure or job demands.

The purpose of this chapter is to develop a structural model of intrinsic job satisfaction and job related affect and test specific hypotheses relating to the causal ordering of these variables. Using cross-sectional and longitudinal data the consistency of intrinsic job satisfaction and job-related affect will be investigated. To examine the possibility that consistency in attitudes or affect is due to a framing artefact, the invariance of the measurement and structural models over time will be assessed using structural equations modelling. It would then be possible to eliminate any rival hypotheses that argue for a shift in frame of reference of respondents as an explanation for the observed consistency in job attitudes and job-related affect. In addition, this study will show that job-related affect is linked in a causal framework with intrinsic job satisfaction. Such a causal framework should add to our understanding of the role of job-related affect and job satisfaction in the determination of employee well-being.

Model Development

The first step in model development is the specification of a structural equation model indicating the causal mechanisms responsible for the effects of the exogenous variable(s) on the endogenous or jointly dependent variables (i.e., intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation). This process is essential for the development of a theoretical model, because the hypothesised direct effects between the variables can be tested empirically. Although this process is no guarantee that the correct model will be formulated, it has a definite advantage over the practice of determining the causal effects mechanically (Saris & Stronkhorst, 1984).

Based on the results of the canonical correlation analysis, a model was hypothesised which assumed that job complexity and job demands affect directly intrinsic satisfaction and anxiety respectively. The results of the canonical correlation analysis and the standard multiple regressions in Tables 4.1, 4.2 and 4.3 indicate that supervisory support, complexity and work pressure are significantly related to organisational level. To overcome some of the problems associated with common method variance, organisation level was taken as a proxy measure of "job complexity". Although this measure is crude in assessing objective job characteristics at the individual level, the use of perceived job characteristics, as a more appropriate index of job complexity, may be confounded with job satisfaction (Roberts & Glick, 1981). As was mentioned in the instrumentation section, work pressure and the Motivational Potential Score, or MPS, are linearly related to organisational level. Campbell (1988) in his review of job complexity has indicated that many researchers have operationalised the job complexity construct through the use of MPS scores. Organisational level as a measure of job complexity, therefore, is not only acceptable because of its intuitive appeal, but was also shown to be significantly related to MPS and work pressure levels.

In the proposed model "job complexity" (the exogenous variable, or predetermined variable) leads directly to the independent dimensions of intrinsic job satisfaction and anxiety. Intrinsic job satisfaction is the result of a cognitive appraisal of the work environment (see, for example, Locke, 1976 for assumptions relating to the causal direction of cognition and affect), which leads to positive engagement and activation (enthusiasm), while anxiety is the result of experiencing work pressure or job demands, which lead to negative activation and appropriate physiological responses.

To help with the formulation of the causal model the "true" correlations among the key variables were calculated by correcting for attenuation (Walker & Lev, 1953). These are shown in Table 6.1. Based on these correlations the possibility of co-occurrence of affective responses and intrinsic satisfaction (that is, the possibility, for example, that a person could be both depressed and highly satisfied with one's job *at the same time*) is evaluated in terms of strength of association and direction of the relationship. A correlation of .50 or higher, for example, was taken as an indication of a high association, while a correlation of less than .30 as low.

The analysis in Table 6.1 shows that intrinsic satisfaction is compatible with enthusiasm (r = .61), anxiety (r = -.26) and relaxation (r = .48), while the co-occurrence of intrinsic satisfaction and depression is incompatible (r = -.55). Enthusiasm is compatible with anxiety (r = -.27) - people with the Type A personality characteristics are prime examples of this (Watson, *et al.*, 1987) - and relaxation (r = .80), but incompatible with depression (r = -.71). Depression is compatible with anxiety (r = .73) but incompatible with relaxation (r = -.61). Finally, anxiety is incompatible with relaxation (r = -.60). In the model intrinsic satisfaction and the sub-dimensions of job-related well-being were designated endogenous variables.

Table 6.1
Disattenuation of Observed Inter-Correlations Among Intrinsic Job Satisfaction and Well-Being Variables

Variables	Satisfaction	Enthusiasm	Depression	Anxiety	Relaxation
Satisfaction	1.00	.49*	-.44	-.20	.37
Enthusiasm	.61	1.00	-.51	-.22	.66
Depression	-.55	-.71	1.00	.60	-.50
Anxiety	-.26	-.27	.73	1.00	-.48
Relaxation	.48	.80	-.61	-.60	1.00

Note: Adjustment of the observed correlations were achieved by dividing the observed correlation between two variables, by the product of the square root of their alpha reliabilities. Observed correlations are above the diagonal.

Figure 6.1 shows the hypothesised causal relationships among the variables. Although the labels given to the sub-dimensions of well-being by Warr (1990_a) were retained for this study, the reader is cautioned against attributing to some of these (for example, "depression" and "anxiety") definitions of psychopathology (Clarke, 1991, for example, suggests that "depressed mood", should be used when referring to normal populations rather than "depression"). "Depression" in the present context, therefore, is characterised by lack of arousal due to "loss or deprivation" (for example, loss of skill, Warr, 1990_a, p. 204) rather than to "hopelessness" (Barlow, 1991, p. 66). Equally, "anxiety" should be interpreted as a "response to a threat or danger" (Warr, 1990_a, p. 204) either immediate or potential, rather than "helplessness" (Barlow, 1991, p. 60). In the same paper Barlow has suggested that although low positive affect (Warr's "depression") and high negative affect (Warr's "anxiety") are related to dysphoria (i.e., clinical depression) and anxiety respectively, they are not identical.

That high and low state-PA (enthusiasm and depression respectively) and high and low state-NA (anxiety and relaxation respectively) are causally related has been empirically shown in a number of studies. For example, Almagor and Ehrlich (1990) report a distinct seven-day cycle for state-PA and state-NA, with a peak in state-NA occurring approximately three days after that of the state-PA. Also, Diener, Colvin, Pavot and Allman (1991) have shown that intense state-PA is often preceded by state-NA, and that intense state-PA may have costs that counterbalance their desirable nature through increases in state-NA.

In the proposed model complexity leads directly to intrinsic satisfaction and anxiety (high negative affect), and satisfaction leads to enthusiasm (high positive affect) and relaxation (low negative affect), while suppressing depression (low positive affect)[2].

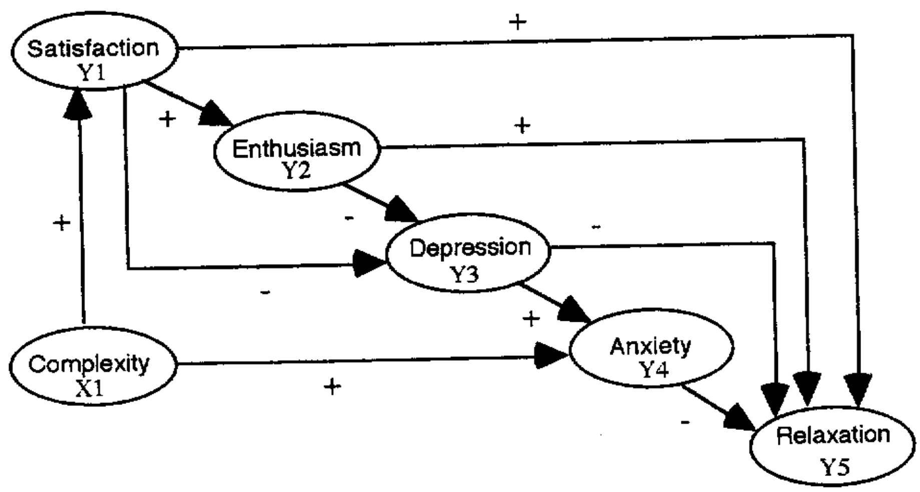


Figure 6.1. Preliminary causal model of job-related well-being.

Note 2. Burke, Brief, George, Roberson and Webster (1987) have linked enthusiasm and depression to the regulatory system of the right hemisphere and parietal regions of the brain. Increase activity in the arousal system (that underlies responsivity from the external environment) has been associated with an increase in positive mood, while a reduction in right-hemispheric activity has been associated with depression.

Enthusiasm in turn leads to relaxation and suppresses depression. The causal direction from enthusiasm to relaxation could not be substantiated by reference to the empirical literature, but it is unlikely that an individual with a score high in enthusiasm would be beset by feelings of meaninglessness. Rather the cognitive processing of such an individual would reflect a "state of order and efficiency in one's job or life-style" (Burke et al., 1987, p. 1097) - the characteristic of relaxation.

In the model depression leads to an increase in anxiety (as was mentioned earlier anxiety has direct causal links with job complexity) while it suppresses relaxation. This model suggests that intrinsic job satisfaction, enthusiasm, relaxation, depression, and anxiety conjointly determine an individual's level of well-being.

The proposed model further suggests, that depression is more likely to lead to an increase in anxiety, rather than the opposite. The causal paths between these two constructs have not been clearly demonstrated in the literature, and the present model specification is contrary to the view of some researchers (e.g., Alloy, 1991; Barlow, 1991). The reason for the causal direction in the model is that anxiety seems unlikely to lead to depression, if intrinsic satisfaction and enthusiasm are high. As was mentioned earlier (see Table 6.1), intrinsic satisfaction and enthusiasm are incompatible with depression (Watson, Clark and Carey, 1988; Headey & Wearing, 1992). Also, Lewinson, Redner and Seeley (1991) observed that "a central component of the phenomenology of depression is a pervasive sense of *dis*satisfaction" (p.143). The initial causal path to depression, therefore, is from *dissatisfaction* - Lewinsohn, Redner, & Seeley (1991) provided empirical evidence which showed that "low life satisfaction is a risk factor for future depression" (p. 156) - and lack of enthusiasm (the result of a reduction in pleasurable engagement due, for example, to an absence of social support, low skill utilisation, lack of autonomy and feedback, etc.) and *not* from anxiety (the result of jobs characterised by high job demands or work pressure). The evidence from the canonical correlation (see Table 4.1) clearly points to this differential source for depression and anxiety.

As shown in the model depression would lead to an increase in anxiety and this is due to uncertainty about the future, stemming from an impoverishment of the job content, and, also, as Diener et al.(1991) have suggested, when a negative emotion is present, other emotions of similar hedonic tone tend to co-occur. This possibly comes about through a cognitive mechanism (cognitive set) that amplifies or dampens affect (Diener et al., 1991) and can carry over from one affective state to another. A condition of generalised psychological distress would then be present. Tellegen (1985), for example, has suggested that there is a higher order factor subsuming both anxiety and depression. Watson & Clark (1984) have labelled this general distress factor "negative affectivity", or NA, and was found to be related to anxious and depressive symptoms (Watson, Clark & Carey, 1988). Under such circumstances the emotional state of a person would be characterised by high levels of *both* depression (low positive affect) and anxiety (high negative affect), which would then become self-reinforcing. A person's well-being, on the other hand, would be conjointly determined by enthusiasm (high positive affect) and relaxation (low negative affect).

Hypotheses and Specification of Model Structural Equations

Specification of the causal mechanisms for the variables in the model can be formulated through a series of linear structural equations. The effects matrix containing the parameters is denoted β (BETA), and contains the effects of the endogenous variables (y) on each other. For the matrix containing the effects of the exogenous variables (x) on the endogenous variables (y) the parameters are denoted γ (GAMMA). In the equations, the "disturbance term" ζ represent known and unknown influences omitted from the model. The effects described above are independent of each other and, therefore, the assumption of additivity is held for all of them (Saris & Stronkhorst, 1984).

A series of simultaneous equation models without reciprocal causality (referred to as "recursive models"), and formulated as five separate hypotheses, will be used to test the model. The choice of a recursive model is pragmatic. Such a model is possible of being identified if all important variables are incorporated in the model. This, however, is not the case with the non recursive models (i.e., models with reciprocal causal effects). Such models may still remain unidentified, even when all known common causes are introduced in the model (Saris & Stronkhorst, 1984).

$H_{6.1}$ Relaxation (y_5) is proportionally affected by anxiety (y_4), depression (y_3), enthusiasm (y_2), and intrinsic satisfaction (y_1).

$$y_5 = \beta_5 y_4 + \beta_5 y_3 + \beta_5 y_2 + \beta_5 y_1 + \zeta_5$$

$H_{6.2}$ Anxiety (y_4), is proportionally affected by job complexity (x_1), and depression (y_3).

$$y_4 = \beta_4 y_3 + \gamma_4 x_1 + \zeta_4$$

$H_{6.3}$ Depression (y_3) is proportionally affected by enthusiasm (y_2), and intrinsic satisfaction (y_1).

$$y_3 = \beta_3 y_2 + \beta_3 y_1 + \zeta_5$$

$H_{6.4}$ Enthusiasm (y_2) is affected by intrinsic satisfaction (y_1).

$$y_2 = \beta_2 y_1 + \zeta_2$$

$H_{6.5}$ Intrinsic satisfaction (y_1) is affected by job complexity (x_1).

$$y_1 = \gamma_1 x_1 + \zeta_1$$

The hypotheses will be tested by examining the γ_{ij} coefficients and the size of the direct effects on y_i of a one unit change in x_i, and the β_{ij} coefficients and the size of the direct effect on y_i of a one unit change in y_j holding all other variables constant. If a coefficient is not significant (e.g., T value < 2 in the LISREL program) then we would assume that the causal mechanism as specified in the model does not exist.

Preliminary Test of a Model

Analysis of Cross-Sectional Data

To test the model formulated earlier, two independent random samples of 500 each were drawn from a total of N = 2,883 (reduction in N is due to missing data and the listwise selection of cases, and exclusion of those cases who participated in both surveys).

An initial structural linear relations model with the LISREL 7 program using maximum-likelihood estimates with one of the samples (the estimation sample; the other sample was the hold-out group for cross-validation purposes) provided information about the relative importance of path coefficients. Because the use of latent variable models with multiple indicators are complex (Schmitt & Bedeian, 1982), the decision was made not to break the various scales into their several manifest variables. This strategy is based on the assumption that the observed variables are perfectly correlated with the latent variables that they measure - a not altogether true representation (Bollen, 1989). However, the present analysis relies on cross-sectional data, which are unsuitable for drawing inferences on causation. It is, therefore, exploratory in nature. A more comprehensive testing of the model using longitudinal data, and with the biasing effects of measurement error taken into consideration, will be presented later.

As a preliminary step a just identified model was obtained in order to evaluate the relative strength of all path coefficients. Using the variance-covariance matrix as input, this preliminary analysis was just identified with zero degrees of freedom, and as a consequence fitted the data perfectly. Inspection of the statistical significance of the individual path coefficients (statistical significance in LISREL are based on T values greater than 2) identified two redundant (i.e., not statistically significant) path coefficients from those specified in the original model. In the revised over-identified model presented in Figure 6.3, and in the subsequent analyses these paths (satisfaction to relaxation, and depression to relaxation) were constrained. The revised model with both paths eliminated fitted the data well. The χ^2,with 7 degrees of freedom, was 6.47 (p = .381), the goodness-of-fit index (GFI) was .995, while the adjusted goodness-of-fit index (AGFI) and the root mean square residual (RMSR) were .985 and .020 respectively. For the GFI and AGFI values greater than .90 are considered acceptable, while for the RMSR a value smaller than .05 (when the input matrix is based on correlations) is recommended.

For the validation phase the multi-sample procedure provided by LISREL was used. However, before any such analysis could be performed the researcher must first determine that there are statistical equalities between the two sets of data. Otherwise, we are running the risk of treating the measures as if they were scaled the same in both groups, while in fact they may not be the same (Bollen, 1989). A pre-condition for such analyses, however, is that the groups are independent and randomly selected. As described earlier, since both of these conditions were met, a preliminary step in a series of related analyses was to test the equivalence of the variance-covariance matrix Σ in both groups. Failure to reject the null hypothesis in this preliminary test is interpreted as evidence of invariance across groups. This omnibus test resulted in $\chi^2(28\ df) = 21.42$, and $p = .807$, confirming the invariance of the matrices. For the next step the analysis proceeded with the testing of a hierarchy of increasingly restrictive assumptions (Bollen, 1989). The first, and least restrictive, assumption was that the dimensions and patterns of fixed and free parameters in B (path coefficients among endogenous variables), Γ (path coefficients between exogenous and endogenous variables), Ψ (variance of endogenous variables), and Φ (variance of exogenous variables) were equal across both samples. This baseline model was then compared to a model in which the structural parameters B and Γ were assumed, in addition, to have invariant path coefficients. The results of this analysis showed an acceptable fit, so the invariance of Ψ and Φ could be tested. Normally, the variance-covariance of Φ should be tested after the testing of Ψ (Bollen, 1989), but since there was only one exogenous variable, Φ and Ψ were tested together. Acceptance of the equality assumption was based on an increase in χ^2 between two contiguous analyses which did not exceed the critical value associated with the additional degrees of freedom (Jöreskog and Sörbom, 1984).

Table 6.2 shows the results of the analyses involving increasingly restrictive models. In all instances the fit indices are acceptable and the increases in χ^2 are not statistically significant. The assumption, therefore, that the same model operates in both samples was upheld.

Table 6.2

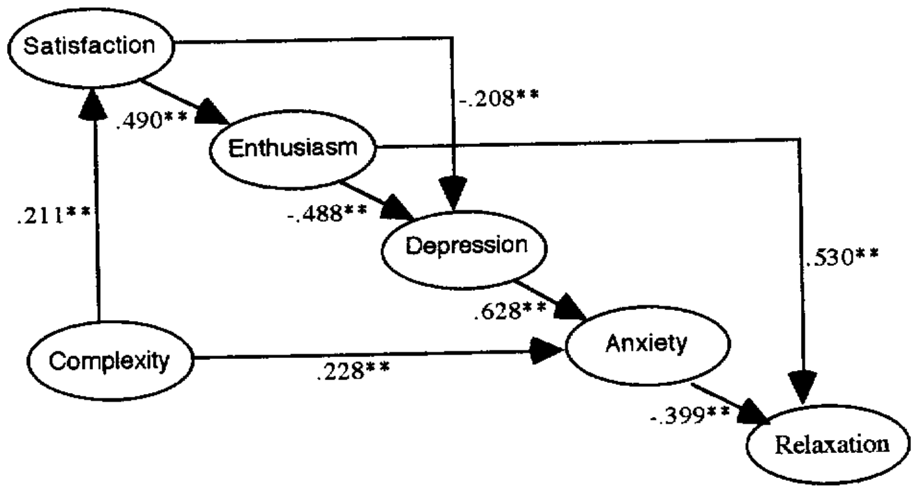
Testing for Invariance in Model Structure in Two Randomly Selected Samples

Hypothesis	χ^2	df	Prob.	$\Delta\ \chi^2$ (df)	GFI	RMSR	χ^2 /df
H_{form}	13.60	14	.480	-	.995	.020	.971
$H_{\Gamma B}$	21.96	22	.462	8.36 (8df)	.992	.038	.998
$H_{\Gamma B \Psi \Phi}$	34.40	29	.225	12.44 (7df)	.989	.064	1.19

Note: The baseline model (H_{form}) has the same model specification in both groups. Invariance restrictions are imposed in the subsequent models. GFI = Goodness of Fit Index; RMSR = Root Mean Square Residual. For each sample n = 500.

Results and Discussion

The multi-sample analysis resulted in a good fit with χ^2 (14) = 13.60, GFI = .995, RMSR = .020, p = .480, χ^2/df = .96, RNI = .994, TLI = 1.00. Hypotheses $H_{6.2}$, $H_{6.3}$, $H_{6.4}$, and $H_{6.5}$, were supported. Hypothesis $H_{6.1}$ was, however, partially supported. Relaxation is proportionally affected by anxiety and enthusiasm, but the paths from depression and intrinsic job satisfaction to relaxation (as shown in Figure 6.1) are redundant.



Note: Path coefficientsshown are standardised (**= p<.01)

Figure 6.2. Causal model of job-related well being.

Figure 6.2 shows that job complexity influences directly intrinsic satisfaction and anxiety. Intrinsic satisfaction in turn leads to enthusiasm, and both these variables lead to a reduction in depression. Enthusiasm leads to relaxation, while depression leads to an increase in anxiety. Anxiety in turn leads to a decrease in relaxation. All the coefficients shown in Figure 6.2 are standardised and are statistically significant at the .01 probability level. The squared multiple correlations for structural equations, representing "variance explained", for the individual parameters were: 4.5% for intrinsic job satisfaction, 24.1% for enthusiasm, 38.0% for depression, 42.0% for anxiety and 58.7% for relaxation.

The small percentage of variance explained for intrinsic job satisfaction was not surprising, given that the operationalisation of complexity was based on a crude measure (i.e., all individuals at the same organisational level shared identical complexity scores). Complexity, therefore, was not related specifically to the individual level jobs.

The analysis described above cannot be taken as evidence of a causal mechanism; rather it provided us with certain *inferences* about causality (Hayduk, 1987). A stronger basis for making causal inferences may only be achieved through the use of longitudinal data, and even then other criteria are required to firmly support the causal directions identified (Anderson & Gerbing, 1988; Breckler, 1990).

In the chapters that follow the issues expressed earlier will be pursued in more detail. The model will be tested using longitudinal data and two competing hypotheses will be evaluated: job-related affect leads to intrinsic job satisfaction; and intrinsic job satisfaction leads to job-related affect.

CHAPTER VII

Test of a Model of Intrinsic Job Satisfaction and Job-Related Affect

In this chapter the model formulated in chapter 6 will be tested using longitudinal data. The model under consideration suggested that job complexity - an objective index measured through the proxy variable of organisational level - influences intrinsic job satisfaction and anxiety. These two variables in turn lead to other affective outcomes. However, because the longitudinal data for testing the model came from only one organisational level, no objective measurement of job complexity was available to relate it to the attitudinal and affective outcomes. Although individual level measures of job complexity were available (i.e., MPS scores) these were considered unsuitable. The reason is that both intrinsic job satisfaction and complexity scores came from the same source, thus creating problems of common method variance (Spector, 1992). In this study, therefore, only the relationships among the variables of interest (i.e., intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation) will be assessed longitudinally. The main investigation will focus on whether intrinsic job satisfaction leads to affective reactions or vice versa.

Two studies have investigated the effects of well-being on job satisfaction recently. Using longitudinal data Watson and Slack (1993) examined the extent to which employee satisfaction was related to the two emotional traits of PA and NA. Their results indicated that "emotional temperament, major job changes, and occupational quality variables each made independent contributions to the prediction of job satisfaction" (Watson & Slack, 1993, p. 181). However, the fundamental question as to why job satisfaction and PA and NA are related remained unanswered. First, analyses were based on a series of hierarchical regressions, and, therefore, it was not possible to show the causal ordering of these variables. Second, job satisfaction was measured only at Time 2, so that changes in this variable over a period of time could not be assessed. The idea that job satisfaction influences job-related affect, rather than the other way around, was dismissed by the researchers as unlikely. Watson and Slack (1993) argued that NA and PA are personality traits with "a substantial genetic component" (p. 199) and, therefore, could not be viewed as simple by-products of job satisfaction. Yet, their own analysis identified some inconsistent relationships over time. For example, negative job changes were related (negatively) to PA at Time 1 and Time 2, but were related (positively) to NA at Time 2 *only*. They concluded that "these discrepant findings are puzzling and clearly require replication before they can be interpreted" (p. 190). No attempt was made to take into account the interaction of dispositional variables (state PA and NA) with situational variables, and how the causal ordering of job satisfaction and job-related affect may have contributed to these *puzzling* results.

The second study by Judge and Hulin (1993) relied on cross-sectional data (from health workers, of which 99% were female) to develop a causal model of affective disposition, subjective well-being and job satisfaction. The causal model - that affective disposition leads to subjective well-being, which in turn leads to job satisfaction - was tested from data obtained from two different sources (self-report and "significant others") to test for the confounding effects of common method variance. They concluded that there was a "strong support for a dispositional basis of both subjective well-being and job satisfaction" (p. 415). Given the cross-sectional nature of the data, however, this conclusion is premature. In addition, in the model subjective well-being and job satisfaction were in a reciprocal relationship. Re-estimating the model by constraining the path coefficients to be equal allowed one to test for the statistical difference of these path coefficients. The results indicated that "subjective well-being is not a significantly better predictor of job satisfaction than job satisfaction is of subjective well-being" (p. 404). The question as to whether job satisfaction leads to job-affect, or vice versa, or that job satisfaction and job-related affect are in a reciprocal relationship, still remains unresolved.

Research Hypotheses

The causal relationships among the satisfaction and affect variables over time will be tested through the full *x-y* LISREL model, and the MLE procedure. Three competing hypotheses with their corresponding models (models 1 to 3) will be tested. These hypotheses derive from the theoretical model of intrinsic job satisfaction and job-related affect formulated earlier, a necessary first step if one is to avoid exploring the data and increasing the chances for "overfitting" the model (James, Mulaik and Brett 1982). The primary hypothesis to be tested is the following:

$H_{7.1}$ Intrinsic job satisfaction causes an increase in enthusiasm and a decrease in depression.

However, even if Model 1 is found to be consistent with the data, there is always the possibility that an equivalent model (a model that has the same number of degrees of freedom and identical fit functions) will fit the data equally well (Breckler, 1990). The most plausible and theoretically justifiable alternative to Model 1 is Model 2 expressed in the following hypothesis:

$H_{7.2}$ Enthusiasm and depression cause intrinsic job satisfaction.

In case where Models 1 and 2 are shown to be non-equivalent (i.e., goodness of fit statistics are not identical for the two models), a chi-square difference test comparing these two models is not possible, because both models have the same number of degrees of freedom. An alternative strategy, therefore, would be to compare Models 1 and 2 with a nested third mode (Model 3), which has fewer number of free parameters. In this instance, Model 3 makes the assumption that each exogenous variable is causally linked to its counterpart over time; that is, intrinsic job satisfaction at Time 1 causes intrinsic job satisfaction at Time 2, or depression at Time 1 causes depression at Time 2, etc. This model is the most parsimonious of the other two, and as such a chi-square difference test would establish whether the freeing of the two additional parameters in each model (links from intrinsic job satisfaction to enthusiasm and depression for Model 1, and links from enthusiasm and depression to intrinsic job satisfaction for Model 2) were justified (i.e., the freeing of these two parameters led to a statistically "better-fitting" model). The hypothesis associated with Model 3, therefore, is:

$H_{7.3}$ Apart from exerting influences on themselves over time, intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation are not causally related to one another.

Methods

Sample

A sample (which was independent of the other two samples described earlier) of 247 clerical employees who participated in both surveys was used. Twenty-seven (27) cases were eliminated due to missing information or inadequate matching of responses of the two sets of data. In the absence of name identification, the matching of cases over time was based on date of birth, years of service with the organisation, sex, and organisational unit. Following a listwise selection procedure, an acceptable number of cases (N = 220) was finally made available for the analyses.

Respondents were base-grade (Level 1) white collar employees from 21 departments of the WA Public Service located throughout the state. It included organisations such as education, health, transport, police, treasury, community services, etc. Responses from each department ranged from 1 to 31, with the majority of departments (12) contributing fewer than 10 cases. The mean age for the sample was 32.64 years (SD = 10.73), and the range was from 17 to 64 years. The mean tenure period was approximately 6 years (SD = 5.06), and it ranged from 1 to 24 years. Sixty respondents were male (27.3%) and 160 female (72.7%). This sex distribution reflected the actual gender ratio in the population of workers in this organisation. A comparison of MPS scores over both administrations of the questionnaire indicated that the perceived job characteristics of Level 1 officers did not change significantly (M = 112.98, SD = 78.24, at time 1; M = 107.25, SD = 74.10, at time 2; t = 1.02, df = 219, p>.05).

The sample size was deemed appropriate for structural equation modelling. Although there are no precise rules specifying the magnitude of sample size for such an analysis, some have recommended a sample size ranging between 100 and 200 cases. Sample sizes of less than 100 are generally considered too small for estimation procedures that make assumptions about population distributions (Breckler, 1990). Anderson and Gerbing (1988) argue that a sample size of 150 or more will be required "to obtain parameter estimates that have standard errors small enough to be of practical use" (p. 415), while Hoelter (1983) advocates the testing of models on a critical sample size (Critical N) of 200, no matter what the size of the original sample. For a reliable assessment of a model, Bentler and Chou (1987) have recommended a minimum ratio of sample size to number of free parameters of 5:1. For all structural equations models tested in this study, this requirement is met by the sample size of 220.

The test statistic (χ^2) for assessing model fit is sensitive to departures from normality of the variables in the analysis. To examine the univariate normality of all variables, visual inspections were carried out of stemleaf, normal, and detrended plots, supported by skewness and kurtosis statistical tests. No major violations of univariate normality were detected to warrant transformation of variables (skewness values ranged from 1.35 to 0.01 [M = .39], and kurtosis values ranged from 1.52 to -0.33 [M = .09]). However, even though most of the variables in the analysis were found to be approximately normally distributed individually (a precondition for a multivariate normal distribution), this is no guarantee that their multivariate distribution will be normal (Norusis, 1990). Some researchers have argued that with the maximum likelihood method it is unlikely that estimates would be affected from certain types of moderate non-normal multivariate distributions such as skewness (e.g., Bollen, 1989; Chou, Bentler, & Satorra, 1991). However, it could still be possible for the χ^2 and standard errors to be downwardly biased, leading to an inflated number of statistically significant parameters (Byrne, 1994). Maximum likelihood estimation procedures are not particularly robust against violations of normality due to kurtosis (Hu, Bentler, & Kano, 1992). The multivariate normality of data may be tested with programs such as EQS (Bentler, 1989). However, there is no absolute standard for determining when a sample can be considered non-normal (Byrne, 1994).

Instruments

Affective well-being. Affective well-being was tapped using the 12 items developed by Warr (1990_a) to measure four monopolar dimensions (anxiety, relaxation, enthusiasm, and depression). Each scale comprises three items from the original Warr (1990_a) measures.

Intrinsic job satisfaction. Four items comprise the measure of intrinsic job satisfaction from the seven-item scale by Warr, Cook & Wall (1979). More information on the scale items for affective well-being and intrinsic job satisfaction are given in chapter 2.

Model Specification

Fixed and Free Parameters

In hypotheses $H_{7.1}$, $H_{7.2}$, and $H_{7.3}$, no causal links were specified across time between intrinsic job satisfaction and anxiety and relaxation, or between enthusiasm and depression, and anxiety and relaxation. Empirically intrinsic job satisfaction and enthusiasm and depression were shown to be independent of anxiety and relaxation. Following Breckler's (1990) recommendations of providing sufficient details of the analysis to permit replication by others, the input correlation matrix for the LISREL analysis and the standard deviations (essential information for generating the covariance matrix), are shown in Table 7.1. Also, the three models to be evaluated, and the parameters that were set free for estimation in each are shown in Table 7.2. As can be seen from Table 7.2, Models 1 and 2 (associated with hypotheses $H_{7.1}$ and $H_{7.2}$ respectively) contain more free parameters and serve as a basis of comparison for Model 3. This model with its associated hypothesis ($H_{7.3}$) is nested within the more general Models 1 and 2. However, as was mentioned earlier Model 1 and Model 2 are not nested within each other and, therefore, cannot be compared directly for statistically significant differences in model fit.

To compare the structural parameters over time the covariance matrix was used (Hughes, Price, & Marrs, 1986; Loehlin, 1992). The causal variables were the endogenous variables at T_1 (i.e., intrinsic job satisfaction, enthusiasm, depression, anxiety and relaxation). The paths between the endogenous variables were specified as in Figure 6.2. However, the exogenous variable "job complexity" could not be applied to this sample as was mentioned earlier, because all cases were from one organisational level. The paths from job complexity to intrinsic job satisfaction and anxiety were removed, and replaced with the new causal variables. For Model 3 the exogenous variables had only free paths to their counterparts at T_2. All other paths were constrained to zero. For Model 2 the paths were specified as for Model 3, but with the paths from enthusiasm (enthusiasm at T_1) to intrinsic job satisfaction (intrinsic job satisfaction at T_2), and depression (depression at T_1) to intrinsic job satisfaction (intrinsic satisfaction at T_2) set free. Model 1 had the same parameter specification as Model 3 with two additional parameters set free. These were from intrinsic job satisfaction (intrinsic satisfaction T_1) to enthusiasm and depression (enthusiasm and depression T_2).

Table 7.1

Correlation Matrix and Standard Deviations for LISREL Input for Path Analysis

Variables	SD	1	2	3	4	5	6	7	8	9	10
1. Satisfaction	1.29	1.00	5538	-5502	-3343	5277	5045	3735	-3093	-2565	3507
2. Enthusiasm	1.20		1.00	-5856	-2524	7370	4001	5637	-3217	-1819	4619
3. Depression	0.99			1.00	5633	-6054	-3966	-3955	5176	4142	-3842
4. Anxiety	0.90				1.00	-4688	-2304	-1444	2770	3668	-2200
5. Relaxation	1.14					1.00	3543	4343	-3338	-3219	4730
6. Satisfaction	1.28						1.00	5809	-5482	-3801	4758
7. Enthusiasm	1.23							1.00	-5145	-2657	7500
8. Depression	1.14								1.00	6932	-5611
9. Anxiety	1.01									1.00	-4895
10. Relaxation	1.17										1.00

Note: Variables 1-5 are associated with Time 1 data; variables 6-10 are associated with Time 2 data. Decimal points were omitted for intercorrelations. N = 220.

Table 7.2

Model Descriptions

Model	Free Parameters	Description
1	γ1,1; γ2,1,;γ3,1; γ2,2; γ3,3; γ4,4; γ5,5; β2,1; β3,1; β3,2; β5,2; β4,3; β5,4	Sat1-> Sat2, **Sat1->Enth2**, **Sat1->Dep2**, Enth1->Enth2, Dep1->Dep2, Anx1->Anx2, Relax1->Relax2; Sat2->Enth2, Sat2->Dep2, Enth2->Dep2, Enth2->Relax2, Dep2->Anx2, Anx2->Relax2
2	γ1,1; γ1,2; γ2,2; γ1,3; γ3,3; γ4,4; γ5,5; β2,1; β3,1; β3,2; β5,2; β4,3; β5,4	Sat1-> Sat2, **Enth1->Sat2**, Enth1->Enth2, **Dep1->Sat2**, Dep1->Dep2, Anx1->Anx2, Relax1->Relax2; Sat2->Enth2, Sat2->Dep2, Enth2->Dep2, Enth2->Relax2, Dep2->Anx2, Anx2->Relax2
3	γ1,1; γ2,2; γ3,3; γ4,4; γ5,5; β2,1; β3,1; β3,2; β5,2; β4,3; β5,4	Sat1-> Sat2, Enth1->Enth2, Dep1->Dep2, Anx1->Anx2, Relax1->Relax2; Sat2->Enth2, Sat2->Dep2, Enth2->Dep2, Enth2->Relax2, Dep2->Anx2, Anx2->Relax2

Note: Sat = satisfaction, Enth = Enthusiasm, Dep = Depression, Anx = Anxiety, Relax = Relaxation. The 1 and 2 after the variable description denotes exogenous variables (1) and endogenous variables (2). Bold lettering describe paths that are fixed in Model 3.

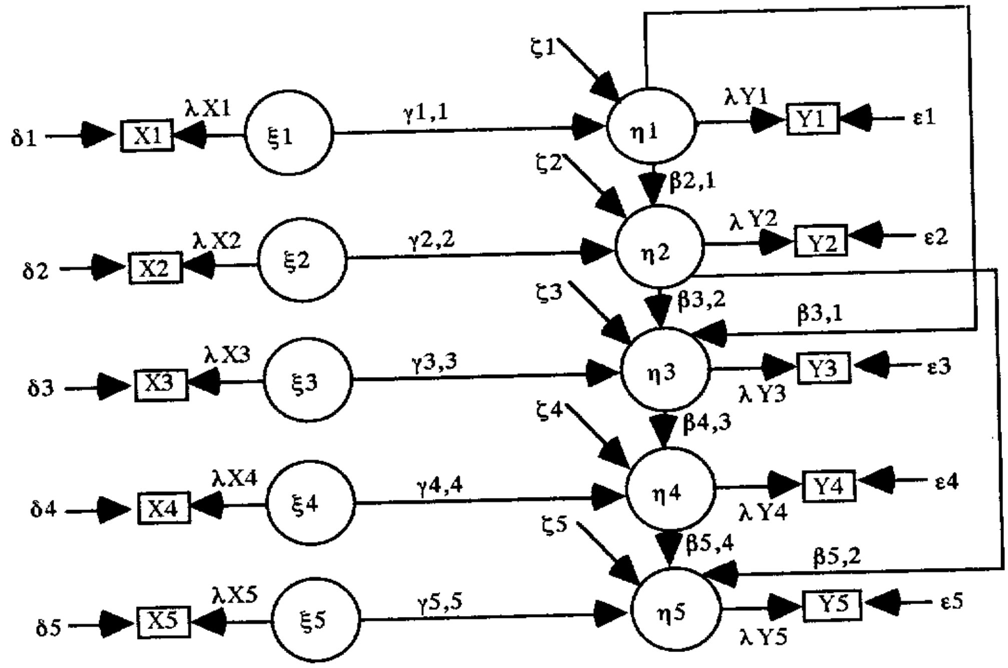


Figure 7.1. LISREL structural equation specification for Model 3.

Figure 7.1 shows the parameter specification for the theoretically most parsimonious model (Model 3). The symbols used in this figure to represent the measurement and structural parameters are consistent with the LISREL notation (Jöreskog & Sörbom, 1989). The exogenous and endogenous constructs are represented as latent variables (ξ_1 to ξ_5 and η_1 to η_5 respectively). Factor loadings are represented by "λ", measurement errors by "δ" and "ε", path coefficients by "γ" and "β", and residuals by "ζ". The residuals ζs, associated with errors in prediction, are not estimated directly; rather their variances in the matrix Ψ are estimated from the data. Because the full *x-y* LISREL model was used to evaluate causal relationships, neither correlated errors of measurement, nor correlations among constructs across time were possible - *x* and *y* parameters are represented in different matrices.

A Two-Step Estmation Procedure

In this analysis a two-stage process of structural equation modelling was adopted in which the measurement model was first estimated. This measurement model was then "fixed" in the second stage of the analysis when the structural model is estimated (Anderson & Gerbing, 1988). The reason for this is to prevent the interaction of measurement and structural models. Because here we are dealing with a theoretical framework which is only tentative, this staged procedure would help maximise the interpretability of the measurement and structural models (Hair, Anderson, Tatham & Black, 1992).

Unlike the exploratory path analysis described earlier based on cross-sectional data, where the biasing effects of the measurement error was not taken into consideration, this analysis will take into account measurement error, thus providing a more accurate estimate of the causal relationships. Although multiple indicators were available for each construct, these were not used in the analysis. Instead each construct was defined by a single indicator based on its reliability (Kenny, 1979). The loadings λ and measurement errors δ and ε were, therefore, calculated from the reliabilities of the constructs. The reliability for each construct has been demonstrated in much larger samples than the present (see chapter 3), and were shown to range from 76 to 85 - quite acceptable for structural equations analysis. By "fixing" the reliability, one is able to ***maintain some control over the meaning of the construct***, because it restricts an indicator to an amount of variance appropriate for the particular construct (Hair, Anderson, Tatham & Black, 1992).

The reliability of each indicator was fixed by specifying the value of the loading (λ) as the square root of the estimated reliability, while the amount of random error variance (δ and ε) was obtained from the following formula: $\Theta_\delta = (1-r_{xx})\sigma^2_x$; that is, 1 minus the reliability value, and because the input matrix was the covariance matrix, this was multiplied by the variance of the measured variable (Gerhart, 1987; Williams & Hazer, 1986). In Figure 7.1 the loadings LX1-LX5, LY1-LY5, and error variances δ_1-δ_5 and $\varepsilon_1-\varepsilon_5$ were fixed. Because the same constructs were considered on both occasions (Time 1 and Time 2), and these will be shown to be invariant over time (in the section that follows), loadings and error variances were fixed at the same values for corresponding indicators (i.e., LX1 and LY1 loadings were the same, as were the δ_1 and ε_1 variances). Information on the reliability and variances (standard deviations squared) of the variables are shown in Table 3.4.

Testing for measurement invariance across time

Before proceeding with an analysis of any longitudinal data, it is necessary to show that the intrinsic job satisfaction and affect constructs being measured on both occasions remained substantially the same. As was mentioned earlier we are running the risk, otherwise, of treating the measures as if they were scaled the same on both occasions, while in fact these constructs may have undergone change. Schmitt (1982), for example, observed changes in variances, covariances, and factor loadings when comparing responses or workers to the same questionnaire shortly after they regained employment following involuntary job loss. The study showed that work experiences had altered the meaning of key work-related constructs over time. The potential confounding effects of gamma change (a redefinition or reconceptualisation of some domain) and beta change (a recalibration of the measurement continuum) have been well documented in the organisational literature (Bedeian, Armenakis & Gibson, 1980; Golembiewski, Billingsley & Yeager, 1976; Terborg, Howard & Maxwell, 1980; Zmud & Armenakis, 1978). The methodology for detecting gamma and beta change usually necessitates the use of "then" (Terborg, Howard & Maxwell, 1980), or "ideal" measures (Zmud & Armenakis, 1978). However, more recently some researchers (Schaubroeck & Green, 1989; Schmitt, 1982) have advocated the use of confirmatory factor analytic procedures to assess these changes.

In this study the invariance of constructs across time was tested by means of the Maximum Likelihood Estimation (MLE) method provided by LISREL 7 (Jöreskog & Sörbom, 1989), and using its multi-sample procedure. The invariance of constructs is tested through the simultaneous estimation of the model using the data from T_1 and T_2. In this study the equivalence of the models may be tested through the following series of increasingly restrictive hypotheses by means of incremental fit indices, based on the statistical significance of an increase in chi-square between two models (Bentler & Bonnet, 1980). The first hypothesis ($H_{7.4}$) tests that the five-factor structure underlying intrinsic job satisfaction and well-being is invariant across time ($H_{7.4}$ Λ_{T1}; Λ_{T2}, = 5). The second hypothesis ($H_{7.5}$) tests that the pattern of factor loadings (in addition to $H_{7.4}$) is invariant across time ($H_{7.5}$ $\Lambda_{T1} = \Lambda_{T2}$). The third hypothesis ($H_{7.6}$) tests that the error/uniqueness (in addition to $H_{7.4}$ and $H_{7.5}$) is invariant across time ($\Theta_{\delta 1} = \Theta_{\delta 2}$). The final hypothesis ($H_{7.7}$ $\Phi_{T1} = \Phi_{T2}$) tests that the variance-covariance matrix Φ is invariant in addition to the restrictions imposed by $H_{7.4}$, $H_{7.5}$, and $H_{7.6}$; and although the testing of $H_{7.6}$ before the testing of $H_{7.7}$ is somewhat arbitrary, there is often greater interest in ascertaining that the measurement error is the same across time, as Bollen (1989) has noted, rather than whether the covariances of the latent variables are equivalent.

Jöreskog (1971) has suggested that the equivalence of the two variance-covariance matrices should be tested first as a pre-condition for proceeding with the testing of any other hypotheses on invariance. However, others have argued that this is not a necessary prerequisite due to the oft-observed contradictory findings (i.e., invariance achieved at every level even in the absence of equivalence in the variance-covariance matrices; see, for example, Alwin & Jackson, 1980; Byrne, 1989). On this basis, the hypothesis of invariance of factor structure was tested first, and used as the baseline model for the testing of subsequent analyses.

The LISREL analysis for the invariance of measurement (lambda, or Λ and Theta, or Θ) and structural models (Φ, or Phi) was based on a sequence of tests for nested models. The data set at Time 1 was compared to the data set at Time 2 for invariance.

Table 7.3 shows that the model of factorial invariance over time (Model A) generated an acceptable goodness of fit, χ^2 (188) = 342.42, χ^2/df = 1.82, TLI = .953, BBI = .923. This nested model was compared with the results from the analysis of invariance of factor loadings $H_{7.5}$, in addition to the restriction of factorial invariance. The increase in chi-squared for model B ($\Delta\chi^2$ = 16.85 with 16 df) was not statistically significant, and the invariance of factor loadings over time ($H_{7.5}$) was, therefore, accepted. For Model C, looking at the invariance of error/uniqueness over time, in addition to the invariance of factor loadings, the results were not statistically significant ($\Delta\chi^2$ = 15.81 with 16 df). The invariance of factor loadings and error/uniqueness over time ($H_{7.6}$) was also accepted, as was the invariance of factor loadings, error uniqueness, and variance-covariance of the Φ matrix ($\Delta\chi^2$ = 10.62 with 10 df). The final hypothesis ($H_{7.7}$) was, therefore, supported.

Table 7.3

Testing for Measurement Invariance of Job-Related Well-Being Across Time

	χ^2	df	$\Delta\chi^2$	Δdf	GFI	RMSR	χ^2/df	TLI	BBI
Model A ($H_n = 4$)	342.42	188	-	-	.914	.089	1.82	.953	.923
Model B (H_Λ)	359.27	204	16.85	16	.909	.116	1.76	.956	.919
Model C ($H_{\Lambda\Theta}$)	375.08	220	15.81	16	.905	.109	1.70	.960	.915
Model D ($H_{\Lambda\Theta\Phi}$)	385.70	230	10.62	10	.904	.109	1.68	.961	.913

Note 1: The differences in χ^2 between competing models are not statistically significant (p>.05), and hypotheses $H_n = 4$, $H_{\Lambda\Theta}$ and $H_{\Lambda\Theta\Phi}$ are also accepted.

Note 2: GFI = Goodness-of-Fit Index; RMSR = Root Mean Square Residual; TLI = Tucker-Lewis Index; BBI = Bentler-Bonett Index. N = 220.

The factorial invariance of the model was also tested through a two-step procedure suggested by Skaalvik and Hagtvet (1990) in their study investigating self-concept over time. This procedure involves the estimation of the measurement model at T_1 and the insertion of the T_1 factor loadings as fixed parameters in the factor matrix for T_2. The model is then assessed by means of incremental fit indices described earlier. The test of invariance would involve the comparison of goodness of fit between the model at T_2, where the parameters λ were calculated freely, and the model at T_2 where the parameters λ were fixed. In each occasion the covariances among factors (Φ matrix), and the variances of the error/uniqueness (Θ_δ matrix) were set free. The rationale for this procedure is to avoid "interpretational confounding" through "the assignment of empirical meaning to an unobserved variable which is other than the meaning assigned to it by an individual a priori to estimating unknown parameters" (Burt, 1976, p. 4).

The analysis yielded a result ($\chi^2_{1,\text{fixed}}(110) = 191.38 - \chi^2_{1,\text{free}}(94) = 161.87$) which was statistically significant (a difference of 29.51 with 16 degrees of freedom, $.05 < p < .01$ was found). However, only one parameter ("optimistic") contributed to the problem. By setting this parameter free the results were acceptable (χ^2 difference was 22.27, and with 15 degrees of freedom the results were not statistically significant). Overall, the results of both analyses indicate that the measurement model (Lambda X, and Theta-delta) and the structural model (Phi) remained invariant across time.

Results

An inspection of the LISREL and the incremental fit indices results in Table 7.4 indicate that Model 1 is the best fitting model. Although the chi-square for Model 1 was statistically significant (χ^2 (22) = 40.02, p = .011), it provides a strong fit to the data according to all other indicators. Specifically, the GFI (.965), AGFI (.912) and RMSR (.036) are within the recommended range. Also the normed chi-square (χ^2 /df, Jöreskog, 1969) of 1.82 is below the upper threshold of 2.00 (Carmines & McIver, 1981), and the TLI and BBI are well above the cut-off point of .90 (Marsh, Balla & McDonald, 1988; McDonald &

March, 1990). When compared to the other two models the PNFI is better, although not indicative of substantial model difference (Williams & Hazer, 1986). When Model 3 was compared with Model 1 the difference was statistically significant (χ^2 (24 df) 65.59 - χ^2 (22 df) 40.02 = 25.57, p <.05). Model 1, therefore, provides an improvement over Model 3, which has paths from intrinsic job satisfaction (T_1) to enthusiasm and depression (T_2) fixed.

Table 7.4

Results of LISREL Analyses

Model	df	χ^2	GFI	AGFI	RMSR	χ^2/df	BBI	TLI	PNFI
1	22	40.02*	.965	.912	.036	1.82	.968	.970	.474
2	22	63.41*	.946	.866	.066	2.88	.950	.931	.465
3	24	65.59*	.944	.871	.067	2.73	.949	.937	.464

Note 1. * All χ^2 are statistically significant. GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; RMSR = Root Mean Square Residual; TLI = Tucker-Lewis Index; BBI = Bentler-Bonett Index; PNFI = Parsimonious Normed Fit Index.

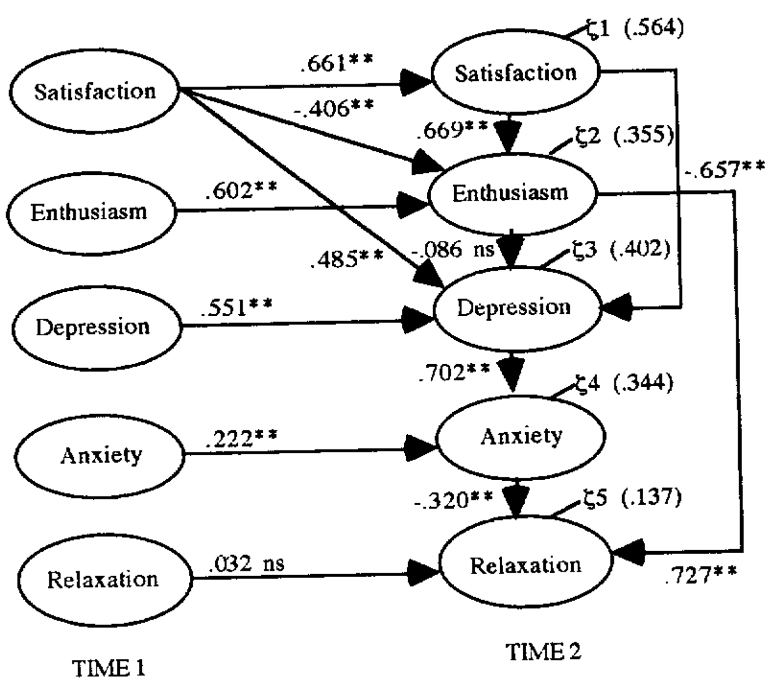
Note 2. The differences in χ^2 between Model 1 and Model 3 is statistically significant (χ^2 difference with 2 df = 25.57, p<.001). The differences in χ^2 between Model 2 and Model 3 is not statistically significant (χ^2 difference with 2 df = 2.18, p>.05).

With the same number of degrees of freedom, Model 2 shows an increase in chi-square over Model 1 (χ^2 = 63.41 as opposed to χ^2 = 40.02) indicating a deterioration in model fit. Although the GFI, BBI and TLI are acceptable (>.90), the AGFI (.866) is below the recommended level. The RMSR (.066) also shows an increase as does the χ^2/df = 2.88. For Model 2, the fixing of the paths from enthusiasm and depression (T_1) to intrinsic job satisfaction (T_2) did not show any noticeable deterioration in model fit over Model 3 (χ^2 (24 df) 65.59 - χ^2 (22 df) 63.41 = 2.18, p>.05). An inspection of the T-values for the path coefficients from enthusiasm and depression (T_1) to intrinsic job satisfaction (T_2) showed that these were not significant (<.2). The conclusions reached from this analysis is that from the two competing hypotheses (i.e., intrinsic job satisfaction causes enthusiasm and depression $H_{7.1}$; and enthusiasm and depression cause intrinsic job satisfaction $H_{7.2}$), $H_{7.1}$ is more representative of the data.

The standardised path coefficients for the best-fitting model (Model 1) are shown in Figure 7.2. An advantage of the standardised solution is that it makes possible the comparisons of the coefficients, because all variables are expressed in the same measurement units (Saris & Stronkhorst, 1984). Because no cross-validation sample was available with which to evaluate the result, the Root Mean Square Error of Approximation (RMSEA, Steiger, 1990) was calculated using LISREL 8 (Jöreskog & Sörbom, 1993). This criterion shows the extent to which the model would fit the population covariance matrix, if such a matrix was available (Brown & Cudeck, 1993). Byrne (1994) has reported that acceptable values range between .05 (good fit) to .08 (reasonable errors of approximation in the population). In the present case the RMSEA was within the acceptable range (.061). The 90% confidence interval for the index was between .029 and .091.

Two useful measures in evaluating the structural equations is the squared multiple correlations for structural equations, and the total coefficient of determination for structural equations, which evaluates the effects of several relationships jointly, and is analogous to a squared multiple correlation (Hughes, Price & Marrs, 1986). The total coefficient of determination for structural equations for Model 1 was .769. This represents the proportion of variance

(76.9%) in the five endogenous variables (η_1 to η_5) accounted for by the five exogenous variables (ξ_1 to ξ_5). The squared multiple correlation for structural equations for the individual endogenous variables (representing variance explained) were: 43.6% for intrinsic job satisfaction (η_1), 64.5% for enthusiasm (η_2), 59.8% for depression (η_3), 65.6% for anxiety (η_4), and 86.3% of explained variance for relaxation (η_5).



Note: Path coefficients shown are standardised.
** = p<.01

Figure 7.2. Path coefficients of best-fitting model.

Model 1 could have been substantially improved by calculating two relationships in the model that were not estimated. The freeing of the paths from depression (T_1) to anxiety (T_2) and relaxation (T_2) would have resulted in a reduction in the chi-square statistic by at least 10 points - the combined value of the modification indices (Breckler, 1990). The modification indices for the path from depression to anxiety was 5.14, and for the path from depression to relaxation was 5.31 - sufficiently large to warrant the freeing of these parameters. Had these additions to the model been tested, the overall chi-square with 20 degree of freedom would have been non-significant, and the model would have been acceptable on purely statistical criteria (p>.05). However, in the absence of a cross-validation sample these relationships were not calculated, because *post hoc* model fitting is considered problematic (Cudeck & Browne, 1983). Data exploration capitalises on chance, and although the model developed from such a process might provide a good description of the data set, it may not describe any other data set (Saris & Stronkhorst, 1984). Scepticism about the generalisability of models resulting from data-driven modifications of the initial model are, therefore, valid (MacCallum, Roznowski & Necowitz, 1992). The additional relationships in the model under consideration, however, can be theoretically justified as was pointed out earlier, and need to be taken into consideration in future testing of the model.

Discussion

Strong support was found in this study for the hypothesis that intrinsic job satisfaction causes job-related affective responses (enthusiasm and depression), rather than the alternative hypothesis that argued for job-related affective responses (enthusiasm and depression) as the cause for intrinsic job satisfaction. Specifically, these two alternative models were compared with a nested model which had these paths fixed at zero (i.e., no paths were hypothesised). When the paths from enthusiasm and depression (T_1) to intrinsic job satisfaction (T_2) were fixed, no significant deterioration in model fit occurred. However, the fixing of the paths from intrinsic job satisfaction (T_1) to enthusiasm and depression (T_2) led to a substantial deterioration in model fit, or conversely, the freeing of these paths were associated with an improvement in model fit.

Standardised path coefficients for Model 1 are shown in Figure 7.2. Inspection of the beta paths lends further support to the model specification shown in Figure 6.2. All the path coefficients among the endogenous variables in Figures 6.2 and 7.2 show similar associations and influences of strength - with one exception. The beta coefficient showing the path from enthusiasm to depression is now not significant. This is due to the influence of intrinsic job satisfaction (T_1) on depression (T_2), which has replaced that of enthusiasm (T_2).

With the exception of relaxation, all gamma paths linking the T_1 variables to their counterpart at T_2 are statistically significant. However, the standardised coefficients for intrinsic job satisfaction, enthusiasm and depression are substantial relative to the coefficient for anxiety (standardised coefficients for intrinsic job satisfaction, enthusiasm and depression were .661, 602, and .551 respectively, as opposed to a standardised coefficient of .222 for anxiety). Anxiety is weakly predicted from its counterparts at T_1. However, this may be due to the possibility that state anxiety is not affected greatly by dispositional factors, a conclusion that is contrary to the current belief about the pervasive influence of negative affectivity (e.g., in the literature negative affectivity has been tapped through high PA items including anxiety). Another possibility may be that another variable (for example, state depression) is modifying the relationships over time, giving support to a causal mechanism among affective responses. This last interpretation is supported when one takes into account the modification indices from the LISREL output, which indicated that an improvement in model fit would have resulted if the paths from depression (T_1) to anxiety (T_2) and relaxation (T_2) were set free. The sizeable squared multiple correlations for anxiety and relaxation (65.6% and 86.3% of variance explained respectively), confirms (from the total direct and indirect effects supplied by the LISREL analysis) that these two variables are better predicted by the combination of the other variables in the equation (particularly depression). This suggests that the measurement of a particular affective reaction over time, say anxiety, may lead to erroneous conclusions if the total affective space is not taken into consideration.

An examination of the disturbance terms ($\zeta 1$ το $\zeta 5$) shown in Figure 7.2, representing the cumulative effects of influences not included in the model (the effects of unknown and omitted variables, and measurement error), shows that intrinsic satisfaction had a value of .564 (η_1), while the value for relaxation (η_5) was .137. Clearly the endogenous variable "relaxation" is very well explained by the variables in the equation (only 13.7% of variance remains unexplained), while intrinsic job satisfaction is less so (56.4% of variance remains unexplained). This is evidence that intrinsic job satisfaction is not dispositional, since more than half of the variance remains unexplained. For intrinsic job satisfaction to be considered dispositional we would have expected, for example, intrinsic job satisfaction at T_1 to have predicted a greater proportion of intrinsic job satisfaction at T_2 than was the case.

The magnitude of the disturbance term for intrinsic job satisfaction is to be expected. No job-related causal variables were included in the model, and, therefore, their influence could not be taken into account in predicting intrinsic job satisfaction over time. Gerhart (1987), for example, found prior job satisfaction to predict subsequent satisfaction, but also found that job complexity was a strong predictor of job satisfaction. This omission may account for the high disturbance term relative to the disturbance terms of the other endogenous variables. Some may argue that among the omitted variables in predicting intrinsic job satisfaction is some personality variable (e.g., either positive or negative affectivity). However, this is highly unlikely. When enthusiasm and depression (T_1) were modelled to lead to intrinsic job satisfaction (T_2) the path coefficients were not significant. In this analysis, state-PA and state-NA measures were included (anxiety, depression, enthusiasm, and relaxation), and these are conceptually closer to positive and negative affectivity (some have even suggested that they may be substituted for these trait measures) than intrinsic job satisfaction, which has a substantial cognitive component (see Chapter 5). Personality variables known to affect satisfaction may be ruled out as candidates for the omitted variables, and, therefore, the search for these variables needs to be directed at external sources. Some support for this view was given earlier with the cross-sectional data, when intrinsic job satisfaction was found to be a consequence of job complexity (see Figure 6.2).

Although the modification indices indicated that paths from depression to anxiety and from depression to relaxation would have enhanced model fit, this was not pursued. The unavailability of a cross-validation sample made the modification of this model inappropriate. One strategy would have been to split the sample into two - one to develop the model and the other to validate the solution (Cudeck & Browne, 1983; Saris & Stronkhorst, 1984). However, this would had reduced the sample size to levels where the desirable asymptotic properties of full-information ML estimators would have been difficult to attain (Anderson & Gerbing 1988). In addition, the substantive hypothesis in this study was to investigate whether intrinsic job satisfaction causes enthusiasm and depression, or enthusiasm and depression cause intrinsic job satisfaction, and not whether anxiety causes depression or vice versa.

Of special interest is the association between intrinsic job satisfaction, and the endogenous variables enthusiasm and depression. Although intrinsic job satisfaction is inversely related to depression and positively related to enthusiasm when these two variables are surveyed at one point in time, the relationships are reversed when the association is viewed longitudinally. One possible explanation for the inconsistency might be that the intrinsic job satisfaction of the respondents deteriorated over the period of the surveys as a result of changes in their jobs, and this was manifested as an increase in depression and decrease in enthusiasm. However, an examination of the perceived job characteristics of participants did not indicate any fundamental change in their job content. For example, MPS scores remained substantially the same over the survey period ($t = 1.02$, df = 219, $p > .05$). Other organisational variables may be, therefore, responsible for the causal relationships shown in Figure 7.2.

This longitudinal study is an improvement over some studies reported in the literature (e.g., Judge & Hulin, 1993), which were based on cross-sectional data and looked at contemporaneous relationships. As Breckler (1990) pointed out causal inferences from such analyses are clearly not justified. The investigation of latent variable causal models, where variables are sequenced in time, has the advantage of permitting a fairly unambiguous direction of causality, although even then this may not always be the case (Loehlin, 1992). Also, an improvement over previous research is the examination of the measurement and structural models over time to ensure that changes in the focal research variables were not due to an unmeasured response-shift bias (Gutek & Winter, 1992). Accordingly, evidence was presented which indicated that over time respondents did not change the meaning of job attitudes and job-related affect.

The research design would have been greatly enhanced with the addition of a third wave of data collection. It would have been possible then to observe whether the influence of intrinsic job satisfaction and job-related affect is reciprocal. Also, the availability of a sample from a more heterogeneous population (i.e., one that included respondents from a range of hierarchical levels) would have provided a more realistic assessment of the variables over time.

Overall, the results reinforce the view that intrinsic job satisfaction relates to job and organisational characteristics, and, therefore, could not be considered dispositional. Job design variables and organisational characteristics are likely to influence intrinsic job satisfaction, and as a consequence, the overall well-being of the worker (Martin & Wall, 1989; Warr, 1994). What needs to be demonstrated is that, through the minimal manipulation of an organisational variable (objectively measured), changes in intrinsic job satisfaction and job-related affect ensue. In order to pursue this proposition we need to turn our attention next to the consideration of such an organisational variable, namely tenure, and its short- and long-term effects on intrinsic job satisfaction and well-being. Tenure was selected for investigation because it provides an opportunity for objective measurement - albeit not at the level of individual jobs. Tenure, furthermore, is not inherently confounded with the intrinsic job satisfaction and well-being variables, a problem associated with other measures (e.g., perceived job characteristics) as argued by Roberts and Glick (1981).

CHAPTER VIII

The Influence of Organisational Tenure on Intrinsic Job Satisfaction and Well-Being

Following from the results of the path analysis, where it was shown that intrinsic job satisfaction is causally related to affective well-being, the aim of this chapter is to test the proposition that intrinsic job satisfaction is subject to organisational influences. If it could be shown, for example, that an organisational variable (such as tenure), which could be objectively assessed, influences differentially intrinsic job satisfaction depending on the time dimension, then the argument for a genetic basis to account for intrinsic job satisfaction would be considerably weakened. To test this proposition, two large and independent cross-sectional data sets will be used to derive a model, and then test this model on a longitudinal sample to verify that trends occur developmentally.

Organisational Tenure and Job Satisfaction

Career stage theorists have long suggested that there is a developmental effect in work adjustment, and that developmental stages or transitions are associated with certain age ranges (Arnold & Feldman, 1986; Bedeian, Pizzolatto, Long & Griffeth, 1991; Dalton, Thompson & Price, 1977; Schein, 1978). According to this view, certain work factors (e.g., need for training, additional responsibilities, etc.) may differentially affect people depending on the stage of their career (Levinson, Darrow, Klein, Levinson, & McKee, 1978;

Thomas, 1979). In addition, these stages have been used to explain the relationship between age and job satisfaction (Kacmar & Ferris, 1989). Others, however, (e.g., Bedeian, Ferris & Kacmar, 1992; White & Spector, 1987) have argued that job satisfaction, in addition to being job specific, is also time dependent, and that the influence of age on job satisfaction is indirect and acts through other variables (e.g., tenure).

The debate as to the importance of age versus tenure in predicting job satisfaction is on-going. It extends to an examination of non-linear trends between age and job satisfaction, and tenure and job satisfaction. Warr (1992) recently has provided empirical evidence that the relationship between age and occupational well-being (enthusiasm-depression and anxiety-contentment) is non-linear. To support his argument, Warr also cites a study conducted by Handyside (1961) that suggested a decrease in job satisfaction among young British men and women after the initial employment period, followed by a consistent increase in job satisfaction throughout the middle adult years. However, Bedeian, Ferris and Kacmar (1992) explored non-linear relationships between facets of satisfaction and tenure after controlling for age, and found statistically significant results when the quadratic terms entered the analysis in an hierarchical fashion. They concluded that tenure is a more consistent and stable predictor of job satisfaction than chronological age. Unfortunately, all these studies are based on cross-sectional data, which creates difficulties when it comes to drawing inferences about developmental trends. A thorough literature search failed to locate any studies based on longitudinal data exploring these non-linear relationships, while at the same time controlling for the effects of either age or tenure.

The idea of a developmental cycle for intrinsic job satisfaction and generally for occupational well-being due to tenure, based on increased person-organisation fit (Chatman, 1989), has intuitive appeal. Tenure (rather than age) as an organisational variable accommodates a number of employment trends that are occurring today in Western societies such as: the changing composition of the workforce (e.g., more females entering the labour market than was previously the case, and may not follow the same developmental cycle as men); new patterns of employment (e.g., a trend towards part-time, temporary, and contract employees with a minority of "core" full-time permanent employees as described by Atkinson, 1984); more frequent lay-offs (euphemistically termed downsizing or rightsizing), and longer periods of unemployment between jobs (necessitating the person to repeat the cycle more than once); the introduction of new technology and the subsequent re-classification of employees to a related if not entirely new occupational field; and government legislation (e.g., Equal Employment Opportunity legislation that makes illegal the setting of retirement at a specific age). The age - career stage argument, therefore, that employees follow an orderly career progression throughout their employment history, can no longer be sustained.

The rationale for the developmental model of occupational well-being based on tenure may perhaps be described as follows. Upon entering an organisation employees are enthusiastic over their new work role and with the prospect of achieving their work aspirations among other things (honeymoon stage). This initial enthusiasm may be misplaced. In the absence of any realistic job previews (Wanous, 1977), prior to or shortly after entering an organisation, the individual may hold unrealistic expectations. This may lead to job dissatisfaction (disillusionment stage) and possible turnover (McEvoy & Cascio, 1985). If the employee survives this stage, a period is entered where the person-organisation fit shows increasing levels of improvement (adjustment stage) with positive outcomes for intrinsic job satisfaction (Smart, Elton & McLaughlin, 1986). This trend should continue until the last stages of employment when the person slowly withdraws psychologically from the organisation in preparation for retirement (disengagement).

In this study, the proposition will be tested that soon after joining an organisation, intrinsic job satisfaction will show an initial decline followed by a steady increase over time, after controlling for the effects of job complexity and age. Although the testing of the full model (from the honeymoon to the disengagement stage) would require the examination of linear, quadratic and cubic terms to determine the best fitting model, only the linear and quadratic terms will be considered. This is due to the small number of respondents at the tail of the tenure distribution, and the absence of information concerning their imminent retirement.

The hypothesis is therefore as follows:

$H_{8.1}$ There will be a positive curvilinear relationship between organisational tenure, and intrinsic job satisfaction.

The testing of the model for the cross-sectional analyses will be based on hierarchical multiple regression where all variables will be assessed at the point of entry. To obviate any computational errors due to multicollinearity, when the original variables are raised to the power, Cronbach (1987) suggests centring the predictors; that is, transforming the original variables by subtracting the mean value from each score in order to form the quadratic terms. Following this recommendation, age and tenure were centred prior to entering the analysis.

Study 1

Method

Sample

Two cross-sectional samples from the Western Australian Public Service were used for this study. The first sample (Sample 1), from a survey conducted in 1989, consisted of 3,044 white collar employees (reduced to 2,888 due to missing information, and elimination of outliers) from 44 departments of the Western Australian Public Service. The sample represented approximately 60% of all employees classified "Level One" (lowest white collar classification in the organisation). Although only one organisational level was surveyed, there was considerable task heterogeneity within this level, with respondents engaged in nineteen distinct task groupings. These ranged, for example, from accounting tasks (processing accounts, performing mathematical calculations, etc.), to laboratory tasks (conducting experiments, collecting samples for analyses, etc.), to filing tasks. Of the sample 25% (748) were male and 75% (2,245) female employees, reflecting the actual gender ratio composition of the work force in that organisation.

The second sample (Sample 2) was surveyed one year later in 1990. It represented a random sample of 3,535 white-collar employees from all organisational levels (Levels 1 to 8) from 21 departments of the same organisation. This sample represented approximately 30 per cent of all employees in the departments surveyed. Broadly, the eight classifications may be grouped into clerical (Level 1), supervisory (Levels 2 and 3), middle management (Levels 4 and 5) and higher management (Levels 6 to 8). Within these groupings the sex distribution was: 316 male and 799 female for clerical; 526 male and 315 female for supervisory; 791 male and 253 female for middle management; and 456 male and 69 female for higher management (184 cases had missing information on sex and/or classification). The sex distribution within these classifications approximated the actual male/female ratio in the population of employees within the organisation.

To establish the independence of this sample from the first sample reported earlier, all employees who responded to the 1989 survey, or who were classified as "Level One" officers, were excluded from the analysis. The final sub-sample consisted of 2,319 employees.

Procedure

The procedure for the administration of the questionnaire is described in chapter 2.

Instruments

Affective well-being. Affective well-being was tapped using the 12 items developed by Warr (1990_a) to measure two bipolar dimensions of affective well-being: ***anxiety-contentment***, and ***depression-enthusiasm***. Sevastos, Smith and Cordery (1992), evaluating the bipolar dimensionality of the well-being items, however, presented evidence which did not support the hypothesised underlying dimensionality of the instrument. Subsequent to this paper a re-analysis of the data presented in chapter 3 demonstrated that affective well-being is best described as four monopolar dimensions, rather than a two bipolar ones. Affective well-being is measured in this study, therefore, in terms of four scales, each comprising three items from the original Warr (1990_a) measures.

The observed variables (and their latent constructs in parentheses) for each dimension are: calm, contented, relaxed (relaxation); uneasy, worried, tense (anxiety); gloomy, depressed, miserable (depression); and enthusiastic, cheerful and optimistic (enthusiasm). Respondents were asked to think of the past few weeks and indicate the extent to which they felt any of the above-mentioned adjectives. Scores range from 1 (never) to 6 (all of the time).

Intrinsic job satisfaction. Four items comprise the measure of intrinsic job satisfaction from the seven-item scale by Warr, Cook & Wall (1979). More information on the scale is given in chapter 2.

The Job Diagnostic Survey (JDS). The five Hackman and Oldham (1975) "core" dimensions were assessed using the revised positive-worded (Idaszak & Drasgow, 1987; Kulik, Oldham & Langer, 1988) 15-item JDS scale, which was shown to fit better the five-factor structure underlying the instrument (Cordery & Sevastos, 1993). There are five sub-scales in this instrument comprising skill variety, task identity, task significance, autonomy, and feedback. Chapter 2 contains additional information on these scales.

A range of biographical information was also collected including date of birth, and commencement date with the organisation.

Results

Using the sample from the 1989 study, that included respondents from one organisational level (Level 1), a hierarchical polynomial regression was performed with intrinsic job satisfaction as the dependent variable. Independent variables were MPS, age, and tenure (total length of service) which entered the analysis on the first, second, and third steps respectively. The second-order polynomial term "tenure" entered the analysis on the fourth step to determine if the increment in the proportion of the criterion variance explained reached statistical significance. The analysis controlled for the effects of the natural covariation between age and tenure, and the tendency of the MPS to vary systematically with organisational tenure as employees move into increasingly more complex jobs with the passage of time.

Results are shown in Table 8.1. Linear and quadratic terms were assessed at the point of entry. MPS was entered on the first step of the analysis. As expected the results were statistically significant (F = 1233.65, p <.001). When age was entered on the second step of the analysis additional variance was explained; and when tenure entered the analysis on the third step, both the linear components of age and tenure reached statistical significance. Although the linear component of organisational tenure was statistically significant, the variance explained was small (0.1%, p < .05). However, when the non-linear component entered the analysis on the fourth step it explained additional variance (0.6%, p < .001). This additional variance, although not substantial, is greater than the one contributed by the linear component. The relationship between intrinsic job satisfaction and organisational tenure, therefore, is best represented by a quadratic trend. By examining the sign of the slope coefficient (which was positive) a U-shaped relationship was indicated.

To illustrate the relationship between intrinsic job satisfaction and tenure, mean values were plotted and are shown in Figure 8.1. These values were arrived at by categorising the entire sample on the basis of standard deviations from the mean (M = 5.35, SD = 5.99).

Through this procedure six groups were formed. Details of this categorisation are shown in Table 8.2. The range of tenure years was between less than one year (group 1) to more than 22.7 years (group 6). A one-way analysis of variance across these groups indicated that groups 6 and 1 were statistically different from groups 2, and group 6 from group 3 (Tukey,

$p < .05$). To emphasise the non-linear trend, a line of best fit was superimposed on the plotted values in Figure 8.1.

Table 8.1

Hierarchical Polynomial Regression Analysis for Estimation Sample. Significance of Beta Weights at Each of Four Steps

	Step 1 β	Step 2 β	Step 3 β	Step 4 β
MPS	.547***	.540***	.542***	.544***
Age		.077***	.094***	.096***
Tenure			-.036*	-.122***
Tenure^2				.116***
R	.547	.552	.553	.559
R^2	.299	.305	.306	.312
ΔR^2	- -	.006	.001	.006
ΔF	1233.65***	24.66***	4.33*	26.11***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. N = 2,892. The quadratic term (tenure squared) was centred.

Table 8.2

Relationship Between Intrinsic Job Satisfaction and Tenure. Number of Cases, Means, and Standard Deviations of Categorical Data

	TENURE CATEGORIES					
	1	2	3	4	5	6
Years	≤ 1	>1-5.4	>5.4-11.4	>11.4-17.5	>17.5-23.5	>23.5
CASES	343	1,641	553	261	108	44
MEANS (SD) (Intrinsic Job Satisfaction)	4.23 (1.22)	3.99 (1.25)	4.05 (1.22)	4.16 (1.30)	4.20 (1.24)	4.66 (1.41)

Note: Plotted means are shown in Figure 8.1.

Of interest is an additional analysis performed where MPS and organisational tenure were controlled (in the first and second steps of the analysis), and age and age squared entered the analysis on the third and fourth steps respectively. Both the linear and the quadratic terms failed to account for additional statistically significant variance (R^2 change = 0.00, F change = 1.37, $p > .05$; and R^2 change = 0.00, F change = 0.03, $p > .05$, respectively). Since Warr (1992) did not control for the effects of tenure in his analysis (Warr did not control for organisational tenure, and entered age and the quadratic term of this variable before job tenure) his conclusions on the non-linear relationships between age and occupational well-being are open to question.

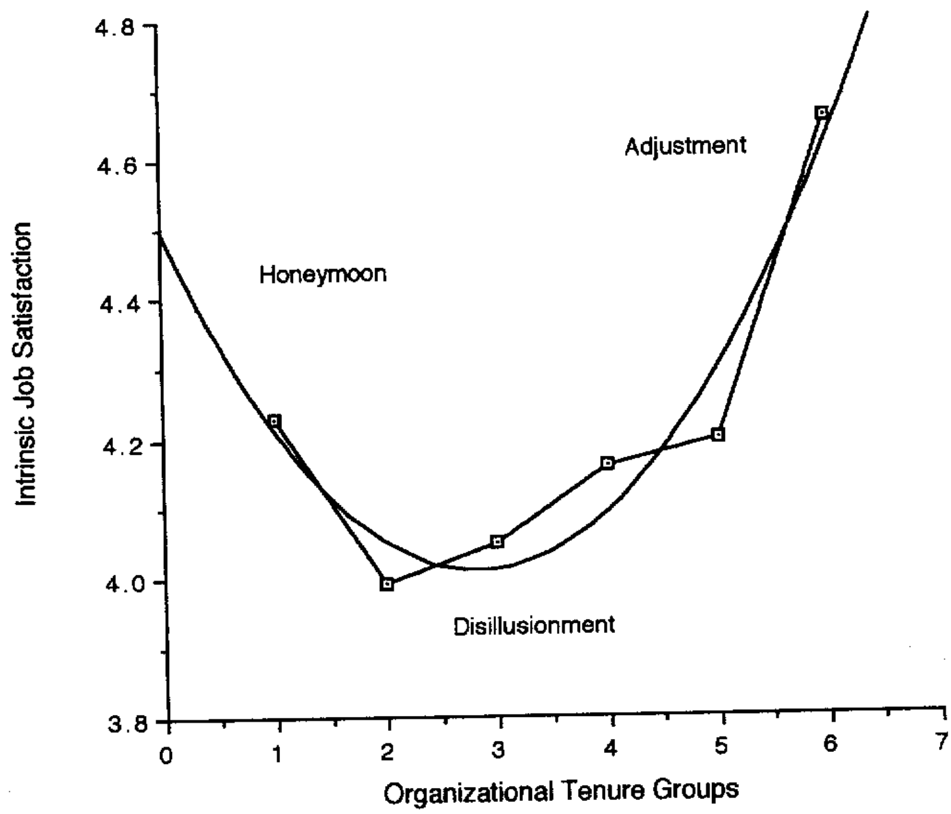


Figure 8.1. Relationship between intrinsic job satisfaction and tenure.

Table 8.3

Hierarchical Polynomial Regression Analysis of Replication Sample. Significance of Beta Weights at Each of Four Steps

	Step 1 β	Step 2 β	Step 3 β	Step 4 β
MPS	.437***	.443***	.443***	.437***
Age		-.051**	-.021	-.000
Tenure			-.065**	-.050***
Tenure^2				.025**
R	.437	.440	.444	.447
R^2	.191	.194	.197	.200
ΔR^2	- -	.003	.003	.003
ΔF	547.62***	7.50**	9.35**	8.26**

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. N = 2,321. The quadratic term (tenure squared) was centred.

Replication Of Results

To replicate the results reported in Table 8.1 a more heterogeneous sample was used. This sample ($N = 2{,}321$) consisted of employees from organisational levels 2 to 8, and had classifications ranging from supervisory to professional and executive personnel.

The non-linear regression conformed to the procedure adopted for the first analysis; that is MPS and age were entered in the first and second steps of the analysis respectively. Tenure was entered in the third step, and the quadratic term in the fourth step. Results of this analysis are shown in Table 8.3.

After controlling for the effects of job complexity by entering the MPS on the first step of the analysis, age was entered on the second step. Consistent with the analysis shown in Table 8.1, the increment in variance explained for age was statistically significant. On the third step (tenure), and on the fourth step (tenure squared) the contribution of additional variance explained was also statistically significant. The linear tenure term showed a negative relationship with intrinsic job satisfaction (i.e., intrinsic job satisfaction decreased with tenure), while the quadratic term suggested that the relationship with intrinsic job satisfaction could be described as curvilinear (the positive beta sign indicated that there was a U relationship). Although the strength of the curvilinear relationship between intrinsic job satisfaction and tenure is not as strong in the second sample, these results are consistent with those shown in Table 8.1, and are, therefore, generalisable for the public sector population.

Although the results shown in Tables 8.1, and 8.3 are consistent they are cross-sectional and, therefore, cannot be taken as evidence that these trends occur developmentally. A comprehensive testing of the model proposed above would require the collection of data at different points in time, and over an extended period, while the sample must have unrestricted range on tenure. The present sets of data, however, do not lend themselves to this thorough type of analysis. We may, however, test the proposition that intrinsic satisfaction decreases for short-tenured employees after an initial period of enthusiasm (lasting approximately < 1 year). Equally, we would expect longer-tenured employees (i.e., > 5 years) to show increasingly higher levels of intrinsic satisfaction with length of service (see Table 8.2).

Study 2

In this study longitudinal data were used, collected over a two-year period, to test the proposition that intrinsic job satisfaction, and job-related well-being (enthusiasm, depression, anxiety and relaxation) change as a function of tenure.

Sample

Amongst those participating in the 1990 survey (described earlier) were also 247 randomly selected base level employees (Level 1), who responded to the survey conducted one year earlier. This group formed the longitudinal sample. Matching of responses over time was based on date of birth of respondent, sex, department, and year of commencement with the organisation. Missing information reduced this sample to 220 cases.

In addition to ensuring that the sample characteristics of the estimation and longitudinal samples were as equivalent as possible, the present study controls for organisational characteristics other than the nature of work (e.g., financial and non-financial rewards, status, political power, etc., associated with hierarchical level) that might influence the level of respondents' intrinsic satisfaction.

Procedures for the administration of the questionnaire were the same as those followed in Study 1.

Testing the Hypothesis With Longitudinal Data

To test for the possibility that organisational tenure accounts for the results described earlier, a repeated measures multivariate analysis of covariance (MANCOVA) was performed with the longitudinal data ($N = 220$). Since all previous studies exploring the relationship between tenure, or age, and occupational well-being, were done on cross-sectional analyses, no specific developmental frame signalling the onset of these cycles could be applied with confidence for the categorisation of tenure. Furthermore, this cycle may be organisational specific, depending, for example, on the size of the organisation, and policies for integrating the new employee into the organisation. In the absence of clear guidelines as to what constitutes short and long tenure, the results of the one-way analysis of variance based on Sample 1 (i.e., Level 1 officers), that showed a decrease in intrinsic job satisfaction after one year, and a gradual increase in intrinsic satisfaction after five years (see Table 8.2), was deemed the most appropriate. This categorisation resulted in almost two equal groups (sample 1, $n = 109$ and sample 2, $n = 111$). Further categorisations of these two groups to test trends, when the size effects of tenure on intrinsic satisfaction were anticipated to be of medium magnitude ($d = .50$), would have resulted in loss of power (Cohen, 1988). Differences in intrinsic satisfaction across groups with small membership would have been difficult to detect. Although the categorisation of the sample that was finally decided upon may not be ideal, it could be argued that the probability of the short-tenure group showing a deterioration in occupational well-being (as it enters the disillusionment stage) would be greater relative to the long-tenure group (other things being equal). The hypothesis to be tested, therefore, is:

$H_{8.2}$ When assessed over two time periods, employees with shorter organisational tenure would show a reduction in intrinsic job satisfaction and affective well-being, while those with longer organisational tenure (i.e., > 5 years) will show an increase in intrinsic job satisfaction and affective well-being.

The characteristics of the short- and long-tenure groups are shown in Table 8.4. Although the sex composition in both samples may appear anomalous, it is representative of the organisation at this occupational level (Z approximation, 1-tailed test, $p > .05$ for sample 1 and sample 2).

Table 8.4

Sample Characteristics of Short- and Long-Tenure Employees

Variables		Overall (*N* = 220)	Short-Tenure (≤ 5 years) (*n* = 109)	Long-Tenure (> 5 years) (*n* = 111)
Age				
	M	32.64	30.20	35.04
	SD	10.73	10.52	10.43
	Range (years)	17-64	17- 60	22-64
Tenure				
	M	5.99	2.26	9.67
	SD	5.06	1.02	4.75
	Range (years)	1-24	1 - 4	5 - 24
Sex				
	Men	60 (27.3%)	28 (25.7%)	32 (28.8%)
	Women	160 (72.7%)	81 (74.3%)	79 (71.2%)

Results

The factorial design for the MANCOVA had one between-subject factor ("tenure", defined in terms of length of service with the organisation and categorised from 1 to 4 years tenure for the short-tenure group; and 5 plus years of tenure for the long-tenure group), and one within-subject one ("time" for the longitudinal measurement). The dependent variables were intrinsic job satisfaction and all the four well-being dimensions (i.e., enthusiasm, depression, anxiety and relaxation). Adjustments were made for two variables, age and MPS, which were entered into the analysis as covariates to neutralise their influence on the dependent variables. These two variables were shown to be significantly related to the well-being measures (Sevastos et al., 1992). Both covariates were considered reliable for MANCOVA - one of them (age) perfectly reliable.

Although the number of cases in each group was nearly equal, the robustness of the MANCOVA solution was nevertheless tested through the multivariate test for homogeneity of dispersion matrices (Box's M), which did not indicate any departure from normality - $F\,(105,\ 138475) = 1.04$, $p > .05$. The effects of tenure on the DVs after adjustment for covariates were investigated in univariate and Stepdown analyses, in which intrinsic satisfaction was given the highest priority, enthusiasm second priority, followed by depression, anxiety and relaxation consistent with the model developed in chapters 6 and 7. Homogeneity of regression was achieved at each step when tested in a separate analysis. When adjustments were made for the covariates, the multivariate tests for factors "tenure group" and "time" were not significant ($p > .05$, based on the Pillais criterion). In addition, inspection of the univariate tests on the individual dependent variables showed that no variable reached statistical significance for the factor "time" ($p < .05$). However, using the Pillais criterion, the multivariate results of the interaction between "tenure group" and "time" were significant ($p < .01$). The univariate F tests indicated that only intrinsic job satisfaction and depression were statistically significant ($p < .05$ after adjustment for Type I error). Because these variables were intercorrelated the results were evaluated with stepdown *F*. Stepdown analysis supported the univariate results for both variables. Results are shown in Table 8.5.

When the priority of entry of intrinsic job satisfaction and depression was switched (i.e., depression was entered first, followed by enthusiasm, *then* intrinsic job satisfaction), observing the recommended procedure for stepdown analysis by Koslowsky and Caspy (1991), intrinsic job satisfaction remained statistically significant ($p < .01$).

The association between the dependent and independent variables, however, was weak ($\eta^2 = .07026$); that is only 7% of variance in the best linear combination of the dependent variables was accounted for by group membership.

Table 8.6 shows the observed and adjusted means for all variables. The adjusted means for intrinsic satisfaction and depression for the low-tenure group show a significant reduction in intrinsic satisfaction and a significant increase in depression relative to the long-tenure group over time.

Table 8.5

Results of the MANCOVA Showing Univariate and Stepdown F for All Effects

Effect	DV	Univariate *F*	df	Stepdown *F*	df
Covariates	Time 1				
	Satisfaction	36.04	2/216	36.04***	2/216
	Enthusiasm	38.64	2/216	117.41***	2/215
	Depression	14.61	2/216	2.57	2/214
	Anxiety	5.11	2/216	1.72	2/213
	Relaxation	19.89	2/216	1.45	2/212
	Time 2				
	Satisfaction	30.94	1/217	30.94***	1/217
	Enthusiasm	14.79	1/217	4.02*	1/216
	Depression	15.74	1/217	2.59	1/215
	Anxiety	2.20	1/217	0.29	1/214
	Relaxation	5.50	1/217	0.27	1/213
Group (G)	Satisfaction	0.80	1/216	0.80	1/216
	Enthusiasm	1.70	1/216	0.95	1/215
	Depression	0.02	1/216	1.22	1/214
	Anxiety	0.01	1/216	0.05	1/213
	Relaxation	0.44	1/216	0.09	1/212
	Satisfaction	0.03	1/217	0.03	1/217
Time (T)	Satisfaction	0.03	1/217	0.03	1/217
	Depression	1.75	1/217	0.47	1/215
	Anxiety	0.26	1/217	1.66	1/214
	Relaxation	0.05	1/217	1.67	1/213
G x T	Satisfaction	11.73**	1/217	11.73***	1/217
	Enthusiasm	1.36	1/217	0.00	1/216
	Depression	9.09**	1/217	4.14*	1/215
	Anxiety	2.36	1/217	0.00	1/214
	Relaxation	2.71	1/217	0.24	1/213

Note: *$p < .05$. ***$p < .001$. Univariate *F* have been adjusted for Type I error.

Table 8.6

Comparison of Means Between Short- and Long-Tenured Employees on Intrinsic Job Satisfaction and Well-Being Measures

	Short Tenure Group $n = 109$		Long Tenure Group $n = 111$	
	Observed *M & (SD)*	*M* Adjusted for Covariates	Observed *M & (SD)*	*M* Adjusted for Covariates
Satisfaction				
Time 1	4.07 (1.32)	4.09	3.82 (1.24)	3.80
Time 2	3.84 (1.28)	3.91	4.08 (1.28)	4.00
Enthusiasm				
Time 1	3.48 (1.24)	3.56	3.45 (1.16)	3.37
Time 2	3.27 (1.34)	3.39	3.37 (1.11)	3.25
Depression				
Time 1	2.05 (1.01)	2.00	2.07 (0.97)	2.12
Time 2	2.31 (1.24)	2.24	1.95 (1.01)	2.02
Anxiety				
Time 1	2.22 (0.77)	2.20	2.25 (1.01)	2.27
Time 2	2.28 (1.03)	2.27	2.12 (0.97)	2.12
Relaxation				
Time 1	3.50 (1.13)	3.56	3.48 (1.16)	3.42
Time 2	3.38 (1.24)	3.45	3.57 (1.09)	3.49

Note: Group 1 = short-tenure and Group 2 = long-tenure.

Discussion

The results of the MANCOVA lend support to the previously cited cross-sectional findings and confirm the hypothesis ($H_{8.2}$) that, when examined developmentally, longer tenure employees recorded an increase in their level of intrinsic job satisfaction. By contrast, short-tenured employees recorded a decrease in intrinsic job satisfaction. In addition, longer-tenure employees registered lower levels of job-related depression, while the opposite was true for shorter tenured employees. Evidence was presented also that linked intrinsic job satisfaction to depression but *not* to anxiety. A low level of intrinsic job satisfaction may be viewed, therefore, as a risk factor for the onset of depression.

Results are in agreement with previous studies that show satisfaction and depression to co-vary inversely. What is of interest is the finding (supported also by the work of Lewinsohn, Redner and Seeley, 1991, who investigated life satisfaction and depression) that this co-variation is open to influences that are ephemeral in nature. The main proposition investigated in this study, therefore, that job satisfaction is a trait as some researchers have suggested (e.g., Staw and Ross, 1985) cannot be sustained. By its very definition a "trait" implies stability over time and across different situations (Chaplin, John, and Goldberg, 1988). This stability in intrinsic job satisfaction was not evidenced in this study.

The analysis showed that although intrinsic job satisfaction and depression are strongly and inversely related they, nevertheless, contributed uniquely to the separation of the short- and long-tenured groups. Short-tenured employees showed over time a deterioration in their intrinsic job satisfaction and an increase in depression relative to the long-tenured employees. Job-related affect too, therefore, did not remain stable over time. The overall results agree with the findings by Newton and Keenan (1991) who investigated the stability of affect and job attitudes of respondents who moved from university to employment, or from one employer to another. Although there was stability in the *rank ordering* of individuals in their job affect and job attitude levels, relative to one another over a four-year period, these affective and attitudinal outcomes changed significantly over time and in concert with situational changes.

Although this study was not designed to assess the fit between the person and the work environment, an argument could be made that length of tenure facilitates the process of adjustment between employees and their organisation, and this leads to job satisfaction (Mortimer & Borman, 1988; Rounds, Dawis & Lofquist, 1987). Initially, however, the unmet expectations of newcomers may place them at high risk of becoming depressed (Feather & Davenport, 1981). The possibility of unmet expectations in the present case was real. Employee selection practices in the organisation surveyed relied on a comprehensive evaluation of a person's aptitudes, abilities and scholastic achievements. Hiring decisions were based on well-above average performance on such tests. Yet the task demands for entry level employees, as in the present case, were relatively low. Kulik, Oldham and Hackman (1987) have suggested that when environmental demands do not match a person's abilities they fail to satisfy the person's needs for growth and development. More seriously, however, skill under utilisation may lead to a condition of "learned helplessness" (Wortman & Brehm, 1975). By contrast, meta-analytic studies by Fried and Ferris (1987) have shown that MPS is strongly related to job satisfaction, employee satisfaction with growth opportunities at work, and employee internal work motivation. Brousseau's (1978) findings that high MPS scores are associated with freedom from depression support these conclusions.

There are human resources management (HRM) implications stemming from the present results. For example, it would be necessary for organisations to adopt a proactive stance, and tailor HRM programs for entry-level employees in addition to the standard induction programs lasting a few days, or even a few hours. These programs may include comprehensive interventions aimed at accelerating the integration of employees with the organisation, by offering team development, skill-related training, and career counselling. However, the importance of realistic job previews cannot be emphasised enough. Already, there is substantial research pointing to the necessity of providing applicants with a balanced view of the organisation before employment, so that employee dissatisfaction and turnover is minimised (McEvoy & Cascio, 1985).

One problem with assessing the effects of tenure on job satisfaction and well-being developmentally is the possibility of restriction of range. That is, employees who do not achieve adequate person-environment fit during the first years of employment leave the organisation, and only those able to achieve congruence remain (Spokane, 1987). Although this problem is more acute with cross-sectional data, within-between subjects designs are not immune to this problem.

This study was primarily concerned with understanding rather than with prediction. In the results section it was shown that the association between the dependent and independent variables was weak (only 7% of variance in the best linear combination of the dependent variables was accounted for by group membership). However, the exclusive use of effect size as a way of demonstrating the importance of empirical findings may convey very little regarding the theoretical significance of these findings as O'Grady (1982) pointed out. The use of minimal manipulation of the independent variable (in this case, time), as a strategy for showing the pervasiveness of effects, still accounted for variance in the dependent variables. Therefore, rather than question the significance of the findings emanating from this study, one should be encouraged that the power of the underlying processes associated with intrinsic job satisfaction and job-related affect were strong enough to survive the toughest test (Prentice & Miller, 1992).

CHAPTER IX

General Summary

This thesis examined Warr's (1990_a) job-related well-being and its relationship to intrinsic job satisfaction. More specifically the objectives of the study were to: i) examine the dimensionality of job-related affect; ii) compare the intrinsic job satisfaction scales versus the job-related affect scales to determine the overlap between the two; iii) relate intrinsic job satisfaction and job-related affective well-being to a set of independent variables, and identify the patterns of associations between the two sets of variables; and iv) develop a causal model of intrinsic job satisfaction and job-related affect to help explain psychological well-being or distress in organisations. The following results were obtained:

Job-Related Affective Well-Being is a Four-Factor Construct

The findings relate to Warr's (1990_a) framework of job-related well-being. Warr conceptualised affective well-being as a two-dimensional bipolar construct (anxiety-comfort and depression-enthusiasm) located diagonally in a space defined by the orthogonal dimensions of arousal and pleasure (or job satisfaction). Support for this model of affective well-being was based on a literature review on positive and negative affect. Although different labels to describe these two dimensions have been used by different researchers in the past, positive and negative affect (PA and NA) may be tapped though Warr's enthusiasm-depression and anxiety-comfort scales, respectively. Following orthogonal rotation from factor analytic studies, these two dimensions have consistently emerged with varying sets of descriptors, time frames, and response formats.

PA and NA have been measured as two monopolar (e.g., high positive affect and low positive affect), or two bipolar dimensions (e.g., enthusiasm-depression and anxiety-comfort). They may also be measured as state or trait PA and NA, depending on the time frame instructions. When measured with a short time frame in mind (for example, time ranging from a few hours to a few weeks) the affect represents state, and describes the interaction of dispositions and the environment, while a longer time frame would capture positive and negative affectivity representing enduring aspects of a person's personality.

Confirmatory factor analyses were used to test two alternative models of affective well-being: Warr's (1990_a) bipolar model of depression-enthusiasm, and anxiety-comfort, and a model consisting of four monopolar dimensions (i.e., anxiety, comfort, enthusiasm, and depression). The results based on two large data sets supported a four factor model of job related affect (enthusiasm, depression, anxiety, and relaxation), rather than the two bipolar factor model proposed by Warr (1990_a). These results were robust, because the dimensionality was tested across four distinct sub-samples from three different organisational levels. In every case the four-factor dimensionality of well-being was upheld. In addition, discriminant and convergent validities further corroborated the results, when every possible pair of well-being constructs were evaluated in turn. Additional support for the four-factor model of affective well-being was provided by the research of Burke et al. (1989). Confirmatory factor analytic evidence was presented by these researchers, that four similar dimensions to those suggested here were associated with the two major cortical regulatory systems (the left-laterised dopaminergic activation, and right-laterised noradregenic arousal systems).

The evidence presented in this study relating to the specificity of affects does not necessarily suggest a refutation of Warr's (1990_a) two bipolar model. Because measures of similar hedonic tone were found to be substantially interrelated, they may demonstrate the existence of two higher order factors. If this is the case, then the two models (i.e., one first order and one second order model) would exist concurrently (see, for example, Watson & Clark, 1992). Future research needs to explore this possibility.

Job-Related Affective Well-Being and Intrinsic Job Satisfaction Are Distinct Yet Interrelated Constructs

Confirmatory factor analysis indicated that intrinsic job satisfaction and the monopolar affect scales showed discriminant validity, indicating that they represent meaningful and distinguishable psychological constructs. However, because the constructs were substantially interrelated the amount of overlap between intrinsic job satisfaction and the affect scales were tested to determine the degree of overlap between the two. This procedure was necessary due to Warr's (1986) argument that in measuring job satisfaction no consideration was given to level of arousal. However, the results from this study showed that, when intrinsic job satisfaction and state job-related affect measures were used concurrently as outcome variables, almost 28% of the variance among these variables was shared. Because intrinsic job satisfaction and the affect scales overlap substantially, it cannot be considered simply as cognitive evaluations of the working environment. However, intrinsic job satisfaction and job-related affect collectively showed substantial unique variance (22% for intrinsic job satisfaction, and 5% for job-related affect) - a result that is consistent with the literature (Brief and Roberson, 1989; Organ and Near, 1985). Overall, the results indicate that reactions to job characteristics and supervisory support reflect mainly cognitive evaluations (and, therefore, job satisfaction scales are appropriate in this instance), while those of work pressure or demands reflect primarily affect, or more precisely state anxiety.

Intrinsic Job Satisfaction and Job-Related AffectiveWell-Being Are Differentially Related to Job Features

Multivariate analyses were used to evaluate simultaneously the relationship between intrinsic job satisfaction and affective well-being vis-a-vis a set of independent variables made up of perceived job characteristics, supervisory support, stressors, and other personal and organisational variables. Canonical correlation analyses, based on a estimation sample (made up of clerical and supervisory employees) and a replication sample (made up of managerial employees), identified two orthogonal dimensions. The first dimension was defined primarily by intrinsic job satisfaction that was related to supervisory support, skill utilisation, role clarity, and feedback, while the second dimension was represented by anxiety, which was strongly associated with work pressure (job demands). The results suggest that a person may be anxious at work due to high work pressure, and at the same time report high levels of intrinsic job satisfaction because of supervisory support and enriched job characteristics.

These results are also consistent with Broadbent's (1985) findings that depression is associated with social support, while anxiety is associated with the demands imposed by work pacing. Warr's (1990_a) results also emphasised the differential association between anxiety-contentment and job demands on the one hand, and depression-enthusiasm and job complexity and skill use on the other.

It is becoming increasingly clear from these studies - and from the present results - that psychological distress or well-being is not dependent on a synergistic relation between job characteristics and demands. The two sets of variables are orthogonal to each other. Within each set the additive combination of the independent variables lead to differentiated outcomes. Warr's (1990_b) position is supportive of this interpretation, and Karasek's interaction model as a consequence is unsustainable.

Empirically no support for Karasek's (1979) model was found in this study when the first and second canonical variates (derived from three independent samples) served as dependent variables in a hierarchical multiple regression. In every case the interaction terms testing Karasek's model were non-significant.

It was suggested in this study that although the additive combination of the two sets of independent variables lead to levels of psychological distress or well-being, the outcomes themselves may be subject to an interaction effect. For example, it is evident from the clinical literature that the comorbidity of anxiety and depression is qualitatively different from either one of these conditions considered separately (Clark, Beck and Stewart, 1990). This possibility may come about through a cognitive mechanism that either amplifies or dampens affect (Diener, Colvin, Pavot, & Allman, 1991), and can carry over from one affective state to another of similar hedonic tone. This in turn would lead to conditions of generalised psychological distress or well-being. It was shown in this study that when job demands are high and job complexity low, anxiety and depression co-occur. The outcomes from these conditions are consistent with Karasek's high-strain jobs, although no moderator variable was considered. If these results can be replicated in different samples one has to question the necessity of invoking a moderator model such as Karasek's, especially when neither the analyses in the present study nor the empirical literature is supportive of an interaction effect.

The approach of considering multiple dependent and independent variables in a single analysis has enhanced our understanding of the relationships between affective outcomes and job content variables. The monopolar dimensions of anxiety relaxation, enthusiasm, depression and intrinsic job satisfaction may be used, therefore, to assess either psychological well-being (the co-occurrence of intrinsic job satisfaction, enthusiasm and relaxation) or distress (a combination of anxiety and depression), rather than the more elusive construct of "stress". This multi-dimensional concept of psychological well-being or distress affords the researcher greater explanatory power, because it relates specific affects to specific outcomes - something which is not possible with the use of a synthetic measure such as "stress".

Intrinsic Job Satisfaction and Anxiety Jointly Contribute to Psychological Well-Being or Distress

A model of psychological well-being or distress was developed through a two stage process. First, the model was validated on two cross-sectional samples (one estimation sample, and one replication sample). Results based on path analysis were in accord with the evidence presented earlier that job complexity (this exogenous measure was objectively defined based on organisational level) led to two different psychological outcomes - intrinsic job satisfaction and anxiety. The results from the path analysis further indicated that intrinsic job satisfaction led to either an increase in enthusiasm and a reduction in depression, or a decrease in enthusiasm and an increase in depression depending on whether the valence of intrinsic job satisfaction is positive or negative. Equally, anxiety led to either relaxation, or lack of it. Connection between the two sets of variables (intrinsic job satisfaction, enthusiasm and depression on the one hand, and anxiety and relaxation on the other) was via depression to anxiety, and enthusiasm to relaxation.

Second, the model was tested with a longitudinal sample. However, the model was modified, because no objective external causal mechanism (such as job complexity) was available. The job complexity variable could not be operationalised, because all respondents in this sample were from one organisational level. The exogenous variable, therefore, was substituted with intrinsic job satisfaction, enthusiasm, depression, anxiety, and relaxation at Time 1. It was hypothesised that intrinsic job satisfaction would lead to job-related affect, rather than the alternative hypothesis that argued for the opposite direction. Results supported the hypothesis. Also, among the endogenous variable (i.e., intrinsic job satisfaction, enthusiasm, depression anxiety and relaxation at Time 2) relaxation was very well explained by the variables in the equation, with only 13.7% of variance not explained, while intrinsic job satisfaction had a much higher percentage (56.4) of unexplained variance. This was evidence that intrinsic job satisfaction at Time 2 was subject to other influences not contained within the group of exogenous variables.

At the same time a hypothesis was tested that intrinsic job satisfaction is dispositional. However, the results from the path analysis mentioned earlier (i.e., that intrinsic satisfaction was not well explained by the other exogenous variables) was not supportive of this conclusion. For intrinsic job satisfaction to be considered dispositional we would have expected, for example, intrinsic job satisfaction at Time 1 to have predicted a greater proportion of intrinsic job satisfaction at Time 2 than was the case. However, because no objectively defined variable was included in the analysis the results were not conclusive.

A more stringent test was carried out with the same sample to test the hypothesis that job satisfaction changes over time (and, therefore, arguing against a dispositional hypothesis). An objective organisational variable, namely tenure, was used to dichotomise the sample into long- and short-tenure groups. Dependent variables were intrinsic job satisfaction and the job-related affect variables. Preliminary analyses were carried out to develop a model of intrinsic job satisfaction based on tenure. Polynomial hierarchical regression was used for this purpose.

A large cross-sectional data set served as the estimation sample for developing the model. Results showed a curvilinear relationship between tenure and intrinsic job satisfaction, with intrinsic satisfaction decreasing after the first year of employment and slowly increasing thereafter to reach the initial levels by the fifth year of tenure. This information was used to test further the hypothesis that intrinsic satisfaction and job related well-being (anxiety, relaxation, enthusiasm and depression) would show a similar trend over time.

Based on the results of the hierarchical regression, the longitudinal sample was dichotomised into short-tenure employees (n = 109, and ranging from 1 to 4 years) and long-tenure employees (n = 111, those over 4 years of service). A MANCOVA was performed on the data after adjusting for age and Hackman and Oldham's (1976) MPS (an index of job complexity). Results indicated that short-tenure employees registered a deterioration in intrinsic job satisfaction and an increase in depression over time relative to the long-tenure employees. Although intrinsic job satisfaction and depression were strongly related they, nevertheless, contributed uniquely to the separation of the two groups. The combined evidence from the path analysis and the MANCOVA provide conclusive evidence that intrinsic job satisfaction is not dispositional.

Limitations of the Study

Major limitations of the study relate to issues of common method variance. These were as follows. First, no objective job characteristics were available at the individual level of analysis. Although a proxy measure for job complexity based on organisational level was used, this was not related to the level of individual jobs (and, as a consequence, weakened the association between individual job characteristics and psychological outcomes). Second, no objective measure of jobs was available when the analysis was based on data from one hierarchical level. This has seriously hampered the development and testing of a model based on longitudinal data that assigned causal mechanism to outside sources of influence (i.e., objective job characteristics). Third, the use of subjective measures of workload was inappropriate, because this measure may be inherently confounded with the anxiety measure. Because of this possibility great care was taken to use large sample sizes, and demonstrate the construct validity of the workload and anxiety measures through confirmatory factor analysis. Also, it was shown that subjective workload was linearly related to organisational level, thus demonstrating the construct validity of the measure. Notwithstanding these endeavours the possibility that both measures may be influenced to some degree by negative affectivity still remains. Fourth, the results from the structural equation modelling using longitudinal data was not cross-validated using a different sample. Ideally, a sample with a more heterogeneous composition would have answered some of the questions relating to the influence of anxiety over time in determining affective well-being. Finally, the modelling of reciprocal causal connections (which were absent from the current model) would have been possible only with a third wave of data collection.

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APPENDINX I

LISREL SPECIFICATION FOR TESTING INVARIANCE OF LONGITUDINAL DATA (CHAPTER 7)

FORM INVARIANT

```
"INVARIANCE OF PARAMETERS OVER TIME (TIME 1 DATA)"
DA NI = 16 NG = 2 NO = 220 MA = CM
LA
*
'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5547 1.00 .4606 .4535 1.00 .5825 .5392 .4437 1.00 -.5186 -.4476 -.3502
-.4229 1.00 .3030 .2288 .1949 .2942 -.4097 1.00 -.3413 -.1692 -.1966 -.1981
.5758 -.3688 1.00 .4468 .4735 .4125 .4478 -.4520 .4286 -.1486 1.00
.3898 .4435 .3718 .4359 -.5245 .6346 -.2732 .7268 1.00 -.3113 -.1535 -.1733
-.2628 .4679 -.3974 .6663 -.0883 -.2440 1.00 .4214 .4887 .3788 .4252 -.5427
.5718 -.3120 .6733 .6949 -.2830 1.00 -.4732 -.2189 -.2667 -.3496 .5786 -.5253
.6620 -.2239 -.3565 .6644 -.3878 1.00 -.5121 -.3705 -.2996 -.4290 .7581
-.4421 .6050 -.4206 -.4892 .5516 -.5190 .6298 1.00 .3760 .3795 .3655 .3550 -.4348 .4273
-.1376 .6601 .6255 -.1598 .6507 -.2165 -.3386 1.00 .3089 .2923 .2516 .3448 -.4228 .7067
-.3420 .5061 .6525 -.3251 .6737 -.4459 -.4378 .5317 1.00 -.4509 -.3230 -.2890 -.3813
.7536 -.4293 .5739 -.3653 -.4826 .4729 -.4412 .5945 .8294 -.2830 -.4214 1.00
SD
*
1.7993 1.5245 1.6325 1.5145 1.1864 1.3085 1.1384 1.3902 1.3625 1.0697 1.4258
1.2137 1.3334 1.4107 1.2867 1.1868
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO NX = 16 NK = 5 PH = ST
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1)
FR LX(5,2) LX(6,2)
FR LX(7,3) LX(8,3) LX(9,3)
FR LX(10,4) LX(11,4) LX(12,4)
FR LX(13,5) LX(14,5) LX(15,5) LX(16,5)
OU
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"INVARIANCE OF PARAMETERS OVER TIME (TIME 2 DATA)"
DA NI = 16 NO = 220 MA = CM
LA
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'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5422 1.00 .4575 .3967 1.00 .6250 .5901 .3958 1.00 -.4240 -.4081 -.3199
-.4014 1.00 .2838 .2878 .3095 .2580 -.3965 1.00 -.2681 -.1844 -.1547 -.2824
.4104 -.2966 1.00 .4711 .4634 .4020 .3999 -.5371 .4411 -.2687 1.00 .4066 .3595
.3424 .3610 -.5770 .5191 -.2797 .7423 1.00 -.2549 -.1560 -.1125 -.2519 .3689
-.3481 .5207 -.1470 -.2427 1.00 .4701 .4189 .4838 .3980 -.4876 .5370 -.2413
.6676 .7152 -.1761 1.00 -.2815 -.1884 -.1909 -.2826 .4178 -.4644 .4721 -.1934
-.3083 .5623 -.2803 1.00 -.3516 -.3833 -.3417 -.4109 .6416 -.4548 .3553 -.4475
-.5067 .4182 -.4880 .5229 1.00 .3315 .3557 .3731 .3135 -.3762 .3697 -.0639
.5745 .6066 -.0061 .6493 -.1385 -.3285 1.00 .3991 .3166 .3011 .3465 -.4698
.6643 -.3455 .5058 .6308 -.3855 .6198 -.4685 -.4735 .4504 1.00 -.3594 -.4309
-.3314 -.4909 .6006 -.4350 .3692 -.4506 -.5299 .4057 -.5013 .4367 .7891
-.3454 -.4345 1.00
SD
*
1.7896 1.6036 1.5807 1.5309 1.0643 1.2601 1.1036 1.3892 1.3426 1.1011 1.3753
1.0661 1.1885 1.4058 1.3538 1.0968
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO NX = 16 NK = 5 PH = ST
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1)
FR LX(5,2) LX(6,2)
FR LX(7,3) LX(8,3) LX(9,3)
FR LX(10,4) LX(11,4) LX(12,4)
FR LX(13,5) LX(14,5) LX(15,5) LX(16,5)
OU
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FORM & LAMBDA INVARIANT

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"INVARIANCE OF PARAMETERS OVER TIME (TIME 1 DATA)"
DA NI = 16 NG = 2 NO = 220 MA = CM
LA
*
'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5547 1.00 .4606 .4535 1.00 .5825 .5392 .4437 1.00 -.5186 -.4476 -.3502
-.4229 1.00 .3030 .2288 .1949 .2942 -.4097 1.00 -.3413 -.1692 -.1966 -.1981
.5758 -.3688 1.00 .4468 .4735 .4125 .4478 -.4520 .4286 -.1486 1.00
.3898 .4435 .3718 .4359 -.5245 .6346 -.2732 .7268 1.00 -.3113 -.1535 -.1733
-.2628 .4679 -.3974 .6663 -.0883 -.2440 1.00 .4214 .4887 .3788 .4252 -.5427
.5718 -.3120 .6733 .6949 -.2830 1.00 -.4732 -.2189 -.2667 -.3496 .5786 -.5253
.6620 -.2239 -.3565 .6644 -.3878 1.00 -.5121 -.3705 -.2996 -.4290 .7581
-.4421 .6050 -.4206 -.4892 .5516 -.5190 .6298 1.00 .3760 .3795 .3655 .3550 -.4348 .4273
-.1376 .6601 .6255 -.1598 .6507 -.2165 -.3386 1.00 .3089 .2923 .2516 .3448 -.4228 .7067
-.3420 .5061 .6525 -.3251 .6737 -.4459 -.4378 .5317 1.00 -.4509 -.3230 -.2890 -.3813
.7536 -.4293 .5739 -.3653 -.4826 .4729 -.4412 .5945 .8294 -.2830 -.4214 1.00
SD
*
1.7993 1.5245 1.6325 1.5145 1.1864 1.3085 1.1384 1.3902 1.3625 1.0697 1.4258
1.2137 1.3334 1.4107 1.2867 1.1868
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO LX = IN
OU
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"INVARIANCE OF PARAMETERS OVER TIME (TIME 2 DATA)"
DA NI = 16 NO = 220 MA = CM
LA
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'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5422 1.00 .4575 .3967 1.00 .6250 .5901 .3958 1.00 -.4240 -.4081 -.3199
-.4014 1.00 .2838 .2878 .3095 .2580 -.3965 1.00 -.2681 -.1844 -.1547 -.2824
.4104 -.2966 1.00 .4711 .4634 .4020 .3999 -.5371 .4411 -.2687 1.00 .4066 .3595
.3424 .3610 -.5770 .5191 -.2797 .7423 1.00 -.2549 -.1560 -.1125 -.2519 .3689
-.3481 .5207 -.1470 -.2427 1.00 .4701 .4189 .4838 .3980 -.4876 .5370 -.2413
.6676 .7152 -.1761 1.00 -.2815 -.1884 -.1909 -.2826 .4178 -.4644 .4721 -.1934
-.3083 .5623 -.2803 1.00 -.3516 -.3833 -.3417 -.4109 .6416 -.4548 .3553 -.4475
-.5067 .4182 -.4880 .5229 1.00 .3315 .3557 .3731 .3135 -.3762 .3697 -.0639
.5745 .6066 -.0061 .6493 -.1385 -.3285 1.00 .3991 .3166 .3011 .3465 -.4698
.6643 -.3455 .5058 .6308 -.3855 .6198 -.4685 -.4735 .4504 1.00 -.3594 -.4309
-.3314 -.4909 .6006 -.4350 .3692 -.4506 -.5299 .4057 -.5013 .4367 .7891
-.3454 -.4345 1.00
SD
*
1.7896 1.6036 1.5807 1.5309 1.0643 1.2601 1.1036 1.3892 1.3426 1.1011 1.3753
1.0661 1.1885 1.4058 1.3538 1.0968
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO LX = IN
OU
```

FORM, LAMBDA, & THETA-DELTA INVARIANT

"INVARIANCE OF PARAMETERS OVER TIME (**TIME 1 DATA**)"

DA NI = 16 NG = 2 NO = 220 MA = CM

LA

*

'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'

'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'

KM

*

1.00 .5547 1.00 .4606 .4535 1.00 .5825 .5392 .4437 1.00 -.5186 -.4476 -.3502

-.4229 1.00 .3030 .2288 .1949 .2942 -.4097 1.00 -.3413 -.1692 -.1966 -.1981

.5758 -.3688 1.00 .4468 .4735 .4125 .4478 -.4520 .4286 -.1486 1.00

.3898 .4435 .3718 .4359 -.5245 .6346 -.2732 .7268 1.00 -.3113 -.1535 -.1733

-.2628 .4679 -.3974 .6663 -.0883 -.2440 1.00 .4214 .4887 .3788 .4252 -.5427

.5718 -.3120 .6733 .6949 -.2830 1.00 -.4732 -.2189 -.2667 -.3496 .5786 -.5253

.6620 -.2239 -.3565 .6644 -.3878 1.00 -.5121 -.3705 -.2996 -.4290 .7581

-.4421 .6050 -.4206 -.4892

.5516 -.5190 .6298 1.00 .3760 .3795 .3655 .3550 -.4348 .4273 -.1376 .6601 .6255

-.1598 .6507 -.2165 -.3386 1.00 .3089 .2923 .2516 .3448 -.4228 .7067 -.3420

.5061 .6525 -.3251 .6737 -.4459 -.4378 .5317 1.00 -.4509 -.3230 -.2890 -.3813

.7536 -.4293 .5739 -.3653 -.4826 .4729 -.4412 .5945 .8294 -.2830 -.4214 1.00

SD

*

1.7993 1.5245 1.6325 1.5145 1.1864 1.3085 1.1384 1.3902 1.3625 1.0697 1.4258

1.2137 1.3334 1.4107 1.2867 1.1868

SE

1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14

MO LX = IN TD = IN

OU

```
"INVARIANCE OF PARAMETERS OVER TIME (TIME 2 DATA)"
DA NI = 16 NO = 220 MA = CM
LA
*
'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5422 1.00 .4575 .3967 1.00 .6250 .5901 .3958 1.00 -.4240 -.4081 -.3199
-.4014 1.00 .2838 .2878 .3095 .2580 -.3965 1.00 -.2681 -.1844 -.1547 -.2824
.4104 -.2966 1.00 .4711 .4634 .4020 .3999 -.5371 .4411 -.2687 1.00 .4066 .3595
.3424 .3610 -.5770 .5191 -.2797 .7423 1.00 -.2549 -.1560 -.1125 -.2519 .3689
-.3481 .5207 -.1470 -.2427 1.00 .4701 .4189 .4838 .3980 -.4876 .5370 -.2413
.6676 .7152 -.1761 1.00 -.2815 -.1884 -.1909 -.2826 .4178 -.4644 .4721 -.1934
-.3083 .5623 -.2803 1.00 -.3516 -.3833 -.3417 -.4109 .6416 -.4548 .3553 -.4475
-.5067 .4182 -.4880 .5229 1.00 .3315 .3557 .3731 .3135 -.3762 .3697 -.0639
.5745 .6066 -.0061 .6493 -.1385 -.3285 1.00 .3991 .3166 .3011 .3465 -.4698
.6643 -.3455 .5058 .6308 -.3855 .6198 -.4685 -.4735 .4504 1.00 -.3594 -.4309
-.3314 -.4909 .6006 -.4350 .3692 -.4506 -.5299 .4057 -.5013 .4367 .7891
-.3454 -.4345 1.00
SD
*
1.7896 1.6036 1.5807 1.5309 1.0643 1.2601 1.1036 1.3892 1.3426 1.1011 1.3753
1.0661 1.1885 1.4058 1.3538 1.0968
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO LX = IN TD = IN
OU
```

FORM, LAMBDA, THETA-DELTA, & PHI INVARIANT

```
"INVARIANCE OF PARAMETERS OVER TIME (TIME 1 DATA)"
DA NI = 16 NG = 2 NO = 220 MA = CM
LA
*
'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5547 1.00 .4606 .4535 1.00 .5825 .5392 .4437 1.00 -.5186 -.4476 -.3502
-.4229 1.00 .3030 .2288 .1949 .2942 -.4097 1.00 -.3413 -.1692 -.1966 -.1981
.5758 -.3688 1.00 .4468 .4735 .4125 .4478 -.4520 .4286 -.1486 1.00
.3898 .4435 .3718 .4359 -.5245 .6346 -.2732 .7268 1.00 -.3113 -.1535 -.1733
-.2628 .4679 -.3974 .6663 -.0883 -.2440 1.00 .4214 .4887 .3788 .4252 -.5427
.5718 -.3120 .6733 .6949 -.2830 1.00 -.4732 -.2189 -.2667 -.3496 .5786 -.5253
.6620 -.2239 -.3565 .6644 -.3878 1.00 -.5121 -.3705 -.2996 -.4290 .7581
-.4421 .6050 -.4206 -.4892
.5516 -.5190 .6298 1.00 .3760 .3795 .3655 .3550 -.4348 .4273 -.1376 .6601 .6255
-.1598 .6507 -.2165 -.3386 1.00 .3089 .2923 .2516 .3448 -.4228 .7067 -.3420
.5061 .6525 -.3251 .6737 -.4459 -.4378 .5317 1.00 -.4509 -.3230 -.2890 -.3813
.7536 -.4293 .5739 -.3653 -.4826 .4729 -.4412 .5945 .8294 -.2830 -.4214 1.00
SD
*
1.7993 1.5245 1.6325 1.5145 1.1864 1.3085 1.1384 1.3902 1.3625 1.0697 1.4258
1.2137 1.3334 1.4107 1.2867 1.1868
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO LX = IN TD = IN PH = IN
OU
```

```
"INVARIANCE OF PARAMETERS OVER TIME (TIME 2 DATA)"
DA NI = 16 NO = 220 MA = CM
LA
*
'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'
'WORRY' 'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'
KM
*
1.00 .5422 1.00 .4575 .3967 1.00 .6250 .5901 .3958 1.00 -.4240 -.4081 -.3199
-.4014 1.00 .2838 .2878 .3095 .2580 -.3965 1.00 -.2681 -.1844 -.1547 -.2824
.4104 -.2966 1.00 .4711 .4634 .4020 .3999 -.5371 .4411 -.2687 1.00 .4066 .3595
.3424 .3610 -.5770 .5191 -.2797 .7423 1.00 -.2549 -.1560 -.1125 -.2519 .3689
-.3481 .5207 -.1470 -.2427 1.00 .4701 .4189 .4838 .3980 -.4876 .5370 -.2413
.6676 .7152 -.1761 1.00 -.2815 -.1884 -.1909 -.2826 .4178 -.4644 .4721 -.1934
-.3083 .5623 -.2803 1.00 -.3516 -.3833 -.3417 -.4109 .6416 -.4548 .3553 -.4475
-.5067 .4182 -.4880 .5229 1.00 .3315 .3557 .3731 .3135 -.3762 .3697 -.0639
.5745 .6066 -.0061 .6493 -.1385 -.3285 1.00 .3991 .3166 .3011 .3465 -.4698
.6643 -.3455 .5058 .6308 -.3855 .6198 -.4685 -.4735 .4504 1.00 -.3594 -.4309
-.3314 -.4909 .6006 -.4350 .3692 -.4506 -.5299 .4057 -.5013 .4367 .7891
-.3454 -.4345 1.00
SD
*
1.7896 1.6036 1.5807 1.5309 1.0643 1.2601 1.1036 1.3892 1.3426 1.1011 1.3753
1.0661 1.1885 1.4058 1.3538 1.0968
SE
1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14
MO LX = IN TD = IN PH = IN
OU
```

TWO-STEP INVARIANCE ANALYSIS

(as per Skaalvik and Hagtvet (1990)

"INVARIANCE OF PARAMETERS OVER TIME (**TIME 1 DATA**)"

DA NI = 16 NO = 220 MA = CM

LA

*

'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'

'WORRY'

'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'

KM

*

1.00 .5547 1.00 .4606 .4535 1.00 .5825 .5392 .4437 1.00 -.5186 -.4476 -.3502

-.4229 1.00 .3030 .2288 .1949 .2942 -.4097 1.00 -.3413 -.1692 -.1966 -.1981

.5758 -.3688 1.00 .4468 .4735 .4125 .4478 -.4520 .4286 -.1486 1.00

.3898 .4435 .3718 .4359 -.5245 .6346 -.2732 .7268 1.00 -.3113 -.1535 -.1733

-.2628 .4679 -.3974 .6663 -.0883 -.2440 1.00 .4214 .4887 .3788 .4252 -.5427

.5718 -.3120 .6733 .6949 -.2830 1.00 -.4732 -.2189 -.2667 -.3496 .5786 -.5253

.6620 -.2239 -.3565 .6644 -.3878 1.00 -.5121 -.3705 -.2996 -.4290 .7581

-.4421 .6050 -.4206 -.4892 .5516 -.5190 .6298 1.00 .3760 .3795 .3655 .3550

-.4348 .4273 -.1376 .6601 .6255 -.1598 .6507 -.2165 -.3386 1.00 .3089 .2923

.2516 .3448 -.4228 .7067 -.3420 .5061 .6525 -.3251 .6737 -.4459 -.4378 .5317 1.00

-.4509 -.3230 -.2890 -.3813 .7536 -.4293 .5739 -.3653 -.4826 .4729 -.4412 .5945

.8294 -.2830 -.4214 1.00

SD

*

1.7993 1.5245 1.6325 1.5145 1.1864 1.3085 1.1384 1.3902 1.3625 1.0697 1.4258

1.2137 1.3334 1.4107 1.2867 1.1868

SE

1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14

(continued next page)

```
MO NX = 16 NK = 5 PH = SY,FI TD = SY,FI
FR LX(1,1) LX(2,1) LX(3,1) LX(4,1)
FR LX(5,2) LX(6,2)
FR LX(7,3) LX(8,3) LX(9,3)
FR LX(10,4) LX(11,4) LX(12,4)
FR LX(13,5) LX(14,5) LX(15,5) LX(16,5)
ST .70 LX(1,1) LX(2,1) LX(3,1) LX(4,1)
ST .70 LX(5,2) LX(6,2)
ST .70 LX (7,3) LX(8,3) LX(9,3)
ST .70 LX(10,4) LX(11,4) LX(12,4)
ST .70 LX(13,5) LX(14,5) LX(15,5) LX(16,5)
VA 1 PH(1,1) PH(2,2) PH(3,3) PH(4,4) PH(5,5)
FR PH(2,1) PH(3,1) PH(4,1) PH(5,1) PH(3,2) PH(4,2) PH(5,2) PH(4,3) PH(5,3) PH(5,4)
ST .50 PH(2,1) PH(3,1) PH(4,1) PH(5,1) PH(3,2) PH(4,2) PH(5,2) PH(4,3) PH(5,3) .50
PH(5,4)
FR TD(1,1) TD(2,2) TD(3,3) TD(4,4) TD(5,5) TD(6,6) TD(7,7) TD(8,8) TD(9,9)
FR TD(10,10) TD(11,11) TD(12,12) TD(13,13) TD(14,14) TD(15,15) TD(16,16)
ST .40 TD(1,1) TD(2,2) TD(3,3) TD(4,4) TD(5,5) TD(6,6) TD(7,7) TD(8,8) TD(9,9)
ST .40 TD(10,10) TD(11,11) TD(12,12) TD(13,13) TD(14,14) TD(15,15) TD(16,16)
OU NS
```

"INVARIANCE OF PARAMETERS OVER TIME (**TIME 2 DATA**)"

DA NI = 16 NO = 220 MA = CM

LA

*

'SAT4' 'SAT6' 'SAT10' 'SAT12' 'GLOOM' 'CALM' 'UNEASE' 'ENTHUS' 'CHEER'

'WORRY'

'CONTENT' 'TENSE' 'DEPRES' 'OPTIM' 'RELAX' 'MISER'

KM

*

1.00 .5422 1.00 .4575 .3967 1.00 .6250 .5901 .3958 1.00 -.4240 -.4081 -.3199

-.4014 1.00 .2838 .2878 .3095 .2580 -.3965 1.00 -.2681 -.1844 -.1547 -.2824

.4104 -.2966 1.00 .4711 .4634 .4020 .3999 -.5371 .4411 -.2687 1.00 .4066 .3595

.3424 .3610 -.5770 .5191 -.2797 .7423 1.00 -.2549 -.1560 -.1125 -.2519 .3689

-.3481 .5207 -.1470 -.2427 1.00 .4701 .4189 .4838 .3980 -.4876 .5370 -.2413

.6676 .7152 -.1761 1.00 -.2815 -.1884 -.1909 -.2826 .4178 -.4644 .4721 -.1934

-.3083 .5623 -.2803 1.00 -.3516 -.3833 -.3417 -.4109 .6416 -.4548 .3553 -.4475

-.5067 .4182 -.4880 .5229 1.00 .3315 .3557 .3731 .3135 -.3762 .3697 -.0639

.5745 .6066 -.0061 .6493 -.1385 -.3285 1.00 .3991 .3166 .3011 .3465 -.4698

.6643 -.3455 .5058 .6308 -.3855 .6198 -.4685 -.4735 .4504 1.00 -.3594 -.4309

-.3314 -.4909 .6006 -.4350 .3692 -.4506 -.5299 .4057 -.5013 .4367 .7891

-.3454 -.4345 1.00

SD

*

1.7896 1.6036 1.5807 1.5309 1.0643 1.2601 1.1036 1.3892 1.3426 1.1011 1.3753

1.0661 1.1885 1.4058 1.3538 1.0968

SE

1 2 3 4 6 15 5 13 16 7 10 12 8 9 11 14

(continued next page)

```
MO NX = 16 NK = 5 PH = SY,FI TD = SY,FI
VA 1.397 LX(1,1)
VA 1.108 LX(2,1)
VA 0.998 LX(3,1)
VA 1.113 LX(4,1)
VA 1.077 LX(5,2)
VA 1.105 LX(6,2)
VA 1.006 LX(7,3)
VA 1.227 LX(8,3)
VA 1.051 LX(9,3)
VA 0.916 LX(10,4)
VA 0.833 LX(11,4)
VA 1.036 LX(12,4)
VA 1.137 LX(13,5)
VA 1.176 LX(14,5)
VA 1.196 LX(15,5)
VA 1.056 LX(16,5)
VA 1 PH(1,1) PH(2,2) PH(3,3) PH(4,4) PH(5,5)
FR  PH(2,1) PH(3,1) PH(4,1) PH(5,1) PH(3,2) PH(4,2) PH(5,2) PH(4,3) PH(5,3) PH(5,4)
ST .50 PH(2,1) PH(3,1) PH(4,1) PH(5,1) PH(3,2) PH(4,2) PH(5,2) PH(4,3) PH(5,3) PH(5,4)
FR TD(1,1) TD(2,2) TD(3,3) TD(4,4) TD(5,5) TD(6,6) TD(7,7) TD(8,8) TD(9,9)
FR TD(10,10) TD(11,11) TD(12,12) TD(13,13) TD(14,14) TD(15,15) TD(16,16)
ST .40 TD(1,1) TD(2,2) TD(3,3) TD(4,4) TD(5,5) TD(6,6) TD(7,7) TD(8,8) TD(9,9)
ST .40 TD(10,10) TD(11,11) TD(12,12) TD(13,13) TD(14,14) TD(15,15) TD(16,16)
OU NS
```

APPENDIX II

LISREL SPECIFICATION FOR STRUCTURAL EQUATION MODELLING WITH LATENT VARIABLES (CHAPTER 7)

```
"PATH ANALYSIS OF LONGITUDINAL DATA - MODEL 1 (EXOGENOUS LINKED TO
THEIR ENDOGENOUS COUNTERPARTS)"
DA NI = 10 NO = 220 MA = CM
LA
*
'SATIN1' 'ENTHUS' 'DEPRES' 'ANGST' 'RELAX' 'SATIN2' 'ENTH' 'DEP' 'ANX' 'RLX'
KM
1.00 .5538 1.00 -.5502 -.5856 1.00 -.3343 -.2524 .5633 1.00 .5277 .7370 -.6054
-.4688 1.00 .5045 .4001 -.3966 -.2304 .3543 1.00 .3735 .5637 -.3955 -.1444
.4343 .5809 1.00 -.3093 -.3217 .5176 .2770 -.3338 -.5482 -.5145 1.00 -.2565
-.1819 .4142 .3668 -.3219 -.3801 -.2657 .6932 1.00 .3507 .4619 -.3842 -.2200
.4730 .4758 .7500 -.5611 -.4895 1.00
SD
*
1.2885 1.2024 .9906 .8984 1.1425 1.2842 1.2259 1.1421 1.0050 1.1731
SE
6 7 8 9 10 1 2 3 4 5
MO NY = 5 NX = 5 NE = 5 NK = 5 BE = SD PS = DI LX = FI LY = FI TE = FI TD = FI
FI BE(4,1) BE(5,1) BE(4,2) BE(5,3)
FI GA (2,1) GA(3,1) GA(4,1) GA(5,1)
FI GA(1,2) GA(3,2) GA(4,2) GA(5,2)
FI GA(1,3) GA(2,3) GA(4,3) GA(5,3)
FI GA(1,4) GA(2,4) GA(3,4) GA(5,4)
FI GA(1,5) GA(2,5) GA(3,5) GA(4,5)
VA .8718 LY(1,1) LX(1,1)
VA .9220 LY(2,2) LX(2,2)
VA .9220 LY(3,3) LX(3,3)
VA .8944 LY(4,4) LX(4,4)
VA .8944 LY(5,5) LX(5,5)
VA .3514 TE(1,1) TD(1,1)
VA .1915 TE(2,2) TD(2,2)
VA .1325 TE(3,3) TD(3,3)
VA .1805 TE(4,4) TD(4,4)
VA .2464 TE(5,5) TD(5,5)
OU SE TV RS MI SS EF
```

```
"PATH ANALYSIS OF LONGITUDINAL DATA - MODEL 2 (DEPRESSION SET FREE)"
DA NI = 10 NO = 220 MA = CM
LA
*
'SATIN1' 'ENTHUS' 'DEPRES' 'ANGST' 'RELAX' 'SATIN2' 'ENTH' 'DEP' 'ANX' 'RLX'
KM
1.00 .5538 1.00 -.5502 -.5856 1.00 -.3343 -.2524 .5633 1.00 .5277 .7370 -.6054
-.4688 1.00 .5045 .4001 -.3966 -.2304 .3543 1.00 .3735 .5637 -.3955 -.1444
.4343 .5809 1.00 -.3093 -.3217 .5176 .2770 -.3338 -.5482 -.5145 1.00 -.2565
-.1819 .4142 .3668 -.3219 -.3801 -.2657 .6932 1.00 .3507 .4619 -.3842 -.2200
.4730 .4758 .7500 -.5611 -.4895 1.00
SD
*
1.2885 1.2024 .9906 .8984 1.1425 1.2842 1.2259 1.1421 1.0050 1.1731
SE
6 7 8 9 10 1 2 3 4 5
MO NY = 5 NX = 5 NE = 5 NK = 5 BE = SD PS = DI  LX = FI LY = FI TE = FI TD = FI
FI BE(4,1) BE(5,1) BE(4,2) BE(5,3)
FI GA (2,1) GA(4,1) GA(5,1)
FI GA(1,2) GA(3,2) GA(4,2) GA(5,2)
FI GA(1,3) GA(2,3) GA(4,3) GA(5,3)
FI GA(1,4) GA(2,4) GA(3,4) GA(5,4)
FI GA(1,5) GA(2,5) GA(3,5) GA(4,5)
VA .8718 LY(1,1) LX(1,1)
VA .9220 LY(2,2) LX(2,2)
VA .9220 LY(3,3) LX(3,3)
VA .8944 LY(4,4) LX(4,4)
VA .8944 LY(5,5) LX(5,5)
VA .3514 TE(1,1) TD(1,1)
VA .1915 TE(2,2) TD(2,2)
VA .1325 TE(3,3) TD(3,3)
VA .1805 TE(4,4) TD(4,4)
VA .2464 TE(5,5) TD(5,5)
OU SE TV RS MI SS EF
```

```
"PATH ANALYSIS OF LONGITUDINAL DATA - MODEL 3 (SATISFACTION -> JOB-
RELATED AFFECT)"
DA NI = 10 NO = 220 MA = CM
LA
*
'SATIN1' 'ENTHUS' 'DEPRES' 'ANGST' 'RELAX' 'SATIN2' 'ENTH' 'DEP' 'ANX' 'RLX'
KM
1.00 .5538 1.00 -.5502 -.5856 1.00 -.3343 -.2524 .5633 1.00 .5277 .7370 -.6054
-.4688 1.00 .5045 .4001 -.3966 -.2304 .3543 1.00 .3735 .5637 -.3955 -.1444
.4343 .5809 1.00 -.3093 -.3217 .5176 .2770 -.3338 -.5482 -.5145 1.00 -.2565
-.1819 .4142 .3668 -.3219 -.3801 -.2657 .6932 1.00 .3507 .4619 -.3842 -.2200
.4730 .4758 .7500 -.5611 -.4895 1.00
SD
*
1.2885 1.2024 .9906 .8984 1.1425 1.2842 1.2259 1.1421 1.0050 1.1731
SE
6 7 8 9 10 1 2 3 4 5
MO NY = 5 NX = 5 NE = 5 NK = 5 BE = SD PS = DI LX = FI LY = FI TE = FI TD = FI
FI BE(4,1) BE(5,1) BE(4,2) BE(5,3)
FI GA(4,1) GA(5,1)
FI GA(1,2) GA(3,2) GA(4,2) GA(5,2)
FI GA(1,3) GA(2,3) GA(4,3) GA(5,3)
FI GA(1,4) GA(2,4) GA(3,4) GA(5,4)
FI GA(1,5) GA(2,5) GA(3,5) GA(4,5)
VA .8718 LY(1,1) LX(1,1)
VA .9220 LY(2,2) LX(2,2)
VA .9220 LY(3,3) LX(3,3)
VA .8944 LY(4,4) LX(4,4)
VA .8944 LY(5,5) LX(5,5)
VA .3514 TE(1,1) TD(1,1)
VA .1915 TE(2,2) TD(2,2)
VA .1325 TE(3,3) TD(3,3)
VA .1805 TE(4,4) TD(4,4)
VA .2464 TE(5,5) TD(5,5)
OU SE TV RS MI SS EF
```

APPENDIX III

LISREL SPECIFICATION FOR STRUCTURAL EQUATION MODELLING FOR TWO RANDOM SAMPLES (N = 500)

CHAPTER 6

```
"#1 RANDOM SAMPLE (1990 DATA) - LEVELS 1 TO 8 (GROUP 1) OVER-IDENDIFIED
MODEL"
DA NI = 7 NG = 2 NO = 500 MA = CM
LA
*
'CLAS' 'CARRYO' 'SATIN' 'ENTHUS' 'RELAX' 'ANGST' 'DEPRES'
CM
1 .1622 1 .1311 -.0810 1 .0787 -.1125 .4962 1 -.0376 -.3990 .3942 .6501 1 .1485
.5502 -.2159 -.2329 -.5135 1 -.0437 .2925 -.4497 -.5143 -.5137 .5733 1
ME
*
2.4220 2.6919 4.3190 3.4532 3.4498 2.3179 1.8958
SD
*
1.0536 .9503 1.1851 1.0620 1.0449 .8862 .8453
SE
3 4 7 6 5 1/
MO NY = 5 NX = 1 BE = SD PS = DI
FI BE(4,1) BE(5,1) BE(4,2) BE(5,3)
FI GA(2,1) GA(3,1) GA(5,1)
OU SE TV RS MI SS EF
```

```
"#2 RANDOM SAMPLE (1990 DATA) - LEVELS 1 TO 8 (GROUP 2) OVER-IDENTIFIED
MODEL"
DA NI = 7 NO = 500
LA
*
'CLAS' 'CARRYO' 'SATIN'  'ENTHUS' 'RELAX' 'ANGST' 'DEPRES'
CM
1 .2355 1 .2112 -.0433 1 .1219 -.2022 .4905 1 -.0480 -.4677 .3554 .6633 1 .1966
.5796 -.1886 -.3284 -.5774 1 -.0481 .3075 -.4467 -.5894 -.5541 .6133 1
ME
*
2.4920 2.7127 4.3665 3.5067 3.3580 2.4379 1.9690
SD
*
1.0603 1.0376 1.2180 1.1379 1.1573 .9478 .9324
SE
3 4 7 6 5 1/
MO NY = 5 NX = 1 BE = SD PS = DI
FI BE(4,1) BE(5,1) BE(4,2) BE(5,3)
FI GA(2,1) GA(3,1) GA(5,1)
OU SE TV RS MI SS EF
```