

EWQ

EWQ Documentation

TECHNICAL MANUAL



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Introduction

The Employee Wellbeing Questionnaire (EWQ) was developed in a programme of research on occupational stress, and has general relevance to psychological health at work, job satisfaction and job demands, or workload. The EWQ was developed and tested in a seven-year research programme, with subsequent rollout among several organizations.

The 59-item questionnaire is brief with easy-to-understand items and is suitable for use with individual employees or groups within many kinds of organizations. It has excellent psychometric properties, is easy to administer and assesses three core dimensions and six facets that have clear relevance to individuals and organizations. The main scales and facets are:

Psychological Health

Resilience
Positive Outlook
Physical Health

Job Satisfaction

Supervision
Supportive Colleagues
Engagement

Workload

When used at a group or organizational level, the EWQ can:

- Provide an audit of occupational stress and adjustment in employees.
- Identify specific jobs, departments and teams where there may be problems to do with workload, job satisfaction or psychological health.
- Measure the impact of organisational change programmes and stress management programmes.
- Evaluate employee counselling and Employee Assistance Programmes.
- Provide data to allow benchmarking of individuals or teams relative to organisation or industry norms.
- Provide longitudinal assessment of employee wellbeing through the use of annual surveys.
- Over time, measure the effect of programmes designed to improve employee wellbeing and job satisfaction.

THEORIES OF STRESS

Within the EWQ, two occupation-related variables of job satisfaction and psychological health are assessed. The former is largely determined by the job and working context, whereas psychological distress is affected by many factors apart from an individual's work, including their personal life, genetic predisposition and previous work experiences. Working conditions affect job satisfaction and psychological health, and in turn these factors affect an individual's behaviour in relation to work. People with low job satisfaction and low engagement give less of themselves at work and are more likely to contemplate leaving to find alternative employment than people with high job satisfaction.

There are many theories of occupational stress that try to link these and similar outcome measures to specific causes: all the theories have strengths and weaknesses and some of the main ones are outlined below.

The Stimulus-Response Model

The stimulus-response model of stress distinguishes between stressors as stimuli, or causes, and strains as consequences for the individual. The terms are borrowed from engineering: a stressor (or force) acts on a physical object and stress is the response in the object - strain is a measure of the damage or change in structure of the object as a result of the stress. Whilst the terms stress and strain are used inconsistently with respect to psychological stress (Knapp, 1988), most stress models incorporate these ideas. Stress was initially conceptualised as a physiological response (Cannon, 1932; Selye, 1936), Selye defined stress as a uniform, or generalised response to external stressors (Selye, 1974), in which the individual experiences physiological responses, including increased heart rate, muscle tension and respiration. These responses are essential for mobilising the body to react quickly to danger. The influence of this notion has survived, despite a wealth of contradictory evidence. Selye's theory suggests that there is a single underlying biological "stress" mechanism, whereas in

fact the relationship between the environment and biological processes is immensely diverse and complex (Hobfoll, 1989; Steptoe, 1983).

Apart from the problem of oversimplifying the relationship between people and their environment, the stimulus-response model has been criticised for circularity of definition (Briner & Reynolds, 1993; Hobfoll, 1989) because stressors are defined by the strain they produce, and strain is defined with reference to stressors.

The Job Demand/Control Model

The job demand/control model (Karasek & Theorell, 1990; Karasek, 1979; Karasek, Schwartz, & Theorell, 1982) assumes that occupational stress is a consequence of the interaction between job demand and job discretion. Job demand can be defined as perceived workload, and job discretion is the extent to which an employee exercises control over how they do their job. In this model, active jobs have high demand and high discretion, and are predicted to be less stressful than high strain jobs, which have high demand, but low discretion. It is quite clear that some people thrive on a very demanding work schedule, whereas others do not: the demand/control model suggests that this difference is due to differences in the jobs that people do rather than due to the differences between people. An implication of Karasek's model is that to reduce the strain caused by work it is not always necessary to reduce workload. Instead, high demand jobs can be made less stressful by increasing job discretion.

The research shows that discretion and demand are both important in predicting stress outcomes. Much of the evidence has come from longitudinal studies in Scandinavia, the UK and the United States (Landsbergis, 1988). Job demand and discretion (measured using questionnaires) are both associated with higher risk of coronary heart disease (CHD) and myocardial infarction (Karasek, Schwartz, & Theorell, 1982), and with self-reported psychological distress. High demand/low strain jobs are also associated with a higher risk of CHD than other jobs. However, there is little evidence for the interaction of demand and control in predicting outcomes,

particularly with psychological outcome measures (Landsbergis, 1988; Parkes, 1991). Instead, the evidence suggests that high workload is a risk factor for psychological distress, irrespective of the amount of freedom in a particular job.

Another problem with the model is that job demand and job discretion are strongly related to socio-economic status (Karasek, Schwartz, & Theorell, 1982, pp. 40-4S), which itself is associated with raised risk of CHD. High paced work with little job discretion is typically associated with lower income and lower socio-economic status, in common with other lifestyle risk factors such as smoking and poor diet. This suggests that part of the apparent evidence for the demand/control model may be confounded with lifestyle risk factors that have nothing to do with work.

Person-Environment (P-E) Fit

The job demand/control model seeks to explain stress from the standpoint of the characteristics of specific jobs, but does not take account of the differences between people. The P-E fit model addresses this by taking account of the skills, motivation, and interests of individuals. It embodies the common-sense notion that employees will be attracted to and effective in jobs that match their own skills and preferences. The P-E fit model is a theory of occupational selection that has been adopted as a foundation for a model of occupational stress (Edwards and Van Harrison, 1993). According to this model, mismatches between the rewards sought from work (P) and the rewards supplied (E), or between the skills and resources demanded (E) and the skill level and abilities of the worker (P), lead to strain and dissatisfaction.

There are different ways of assessing the fit between P and E (Edwards and Van Harrison, 1993; Furnham, Toop, Lewis, & Fisher, 1995) but the basic principle is that P and E should be congruent if strain is to be avoided. Measures of job dissatisfaction, distress, workload dissatisfaction, boredom, and somatic complaints have been used as indications of strain in testing this theory.

The research evidence for the P-E fit model is inconsistent. Some studies have shown that congruence between P and E

is related to job satisfaction and psychological distress as the model would predict (Furnham, 1997; Furnham & Schaeffer, 1984). However, Edwards & Van Harrison (1993) found that the P-E fit model only explained some relationships between P, E and strain. There were many exceptions; for example, in some cases P and E were independently associated with strain. In other cases, adding P and E scores predicted strain more accurately than the difference between them. Other studies have failed to find adequate support for the P-E fit model (Furnham & Brewin, 1990; Furnham et al, 1995).

The Transactional Model

The transactional model of stress (Folkman & Lazarus, 1988; Lazarus & Folkman, 1984) is more flexible than the job demands/control and P-E fit models. It states that, within certain limits, an aspect of the environment only becomes a stressor when a person appraises it as such. If the person is unable to respond adequately to a stressor, a state of strain will result, and under certain circumstances this will lead to ill health. The transactional model goes further than the other three models, by taking the behaviour and inner world of the individual into account.

There are three phases in the transactional process, beginning with a stressor and ending with a stress outcome, or strain (Deary & Frier, 1995). In the first phase, a transaction between the person and the environment is appraised in terms of threats, costs, and benefits. This appraisal generates emotion, and the appraisal and emotions give rise to a mediation phase. In the mediation phase, coping responses are directed towards problem solving, or towards attempts to modify the emotions that the appraisal has generated. There are two types of coping: emotion-focused coping refers to attempts to manage emotions, and problem-solving coping refers to attempts to manage the sources of stress. The latter is most likely to be effective in situations where change is possible (Suls, David, & Harvey, 1996). Coping may or may not be beneficial: its effect is a change in the relationship

between the person and their environment, which is then re-appraised. This second appraisal may result in the person being stressed, which constitutes the end-point of the process.

The transactional model has important implications. Firstly, the model suggests that something is only stressful if the person appraises it as such, and appraisals of the same situation will be different for different people depending on their needs and motivation. Therefore, the measurement of stressors cannot be entirely objective. Secondly, the effects of events that are appraised as threatening or stressful cannot be determined without understanding how people cope. Thirdly, coping may involve actions or thoughts that have the potential to increase or reduce the harmful effects of stressors. Also, since emotion focused coping involves thought, it too cannot be measured by objective means alone. In other words, every element of the transactional model can be studied using questionnaires.

However, common sense and research evidence (Spector & Jex, 1991) suggest that something may be stressful and could lead to ill-health irrespective of an individual's appraisals. Therefore, it is necessary to measure both appraisals (through questionnaires or interviews) and objective factors, such as hours worked, to get a fuller understanding of the causes of work-related distress and ill-health.

Also, sole reliance on subjective questionnaire measures may lead to false conclusions because correlations between questionnaire measures of stressors and strains are inflated by common method variance (for example, a tendency to respond to all questionnaires with a consistent bias).

These problems do not invalidate the use of self-report measures, but it is important to include objective measures to guard against them (Frese, 1985; Frese & Zapf, 1988). For example, Melamed, Ben-Avi, Luz, & Green (1995) have shown that objective working conditions may have direct effects on strain as well as effects mediated by subjective appraisal, underlining the importance of combining self-report and objective measures of stressors.

Summary

These theories of occupational stress give more or less attention to several factors: individual differences, the impact of the environment on health, appraisals, coping, and the balance between skills, motivation and the demands of work. They fail to give much attention to health-related behaviours such as smoking, diet and lifestyle, although these factors may be important in explaining the apparently impressive support for the job demands/ control model. The models are usually tested scientifically by using questionnaires, but insufficient attention has been given to the extent to which the many questionnaires that have been used overlap and duplicate each other.

The models and theories are partial explanations that don't fit all people or circumstances and indeed, it is unlikely that any single theory or model could, because of the complexities involved in understanding the relationship between working conditions and human health.

THE EWQ IN CONTEXT

The EWQ addresses occupational stress from a practical standpoint. Rather than develop measures that support a particular theory of stress, the authors' approach has been to develop high quality, valid and reliable measures. In developing the EWQ, the authors set out to measure a wide range of constructs that are used commonly within individual and organisational stress/engagement audits, but when the questionnaire was factor analysed, the constructs reduced to a small number of highly replicable scales and sub-scales. This in itself was an interesting discovery, suggesting that 'stress' questionnaires often incorporate complex and redundant measures. Consequently, the EWQ is unique among occupational stress questionnaires, because it measures the core dimensions that are essential for occupational use, with very little risk that the three core measures are overlapping or confounded with each other.

Development of the EWQ

The EWQ was developed in a series of large-scale surveys in several different organisations, beginning with a pilot survey. After each survey, the questionnaire data were submitted to item and factor analysis; redundant or poor items were removed and new items written. Surveys were used to test hypotheses about the constructs that underlie the EWQ, and also used to test the reliability and validity of the EWQ scales. Careful checks were made to ensure that the underlying constructs measured by each questionnaire had been accurately replicated between surveys (Lyne de Ver, 1998).

ITEM TRIALLING AND SAMPLES

The decision to develop the EWQ arose from a request to conduct a comprehensive occupational stress audit for a UK NHS hospital, with the intention of detecting groups of employees for whom stress might have been a problem and recommending possible solutions.

The literature review (Lyne de Ver, 1998)

that underpins the development of the EWQ concentrated on problems in the measurement of occupational stress, particularly for measures to do with mental health, job satisfaction, sickness absence, coping, locus of control and self-esteem. The literature was riddled with problems of confounded measurement and a lack of conceptual clarity about what was being measured.

Many questionnaires that had been used to measure occupational stress and related phenomena were reviewed and it became clear that they were overlapping, often confusing and usually of poor psychometric quality. Good quality measures of mental health had been developed for clinical use, but had not been adequately validated in occupational contexts.

One of the most widely used instruments, the Occupational Stress Indicator (OSI; Cooper, Sloan, & Williams, 1988) was comprehensive, but aimed mainly at managers. The authors thought that the psychometrics of the OSI needed updating and subsequently addressed

this (Lyne, Barrett, Williams, & Coaley, 2000). The authors considered that the 05I model could be adapted to develop a new questionnaire that would be of more general use, and quicker to complete.

Therefore, a new questionnaire was written with new scales to represent many of the constructs measured in previous occupational stress research. The whole questionnaire had uniform instructions and response format. This would make it possible to test for the presence of the different constructs empirically using factor analysis, rather than making a priori assumptions. This approach to identifying constructs that underlie a broad family of scales in a confused area of investigation had been advocated by Deary, Clyde, & Frier (1997). The criteria for developing the EWQ were that items should be easy to read, should have face validity with employees, and should be suitable for employees from all occupations. Items were generated for the pilot questionnaire following a literature search, review of other scales and semi-structured interviews with employees. The interviews explored sources of stress in the particular job, workplace stressors that the interviewee felt had an impact on their colleagues, effects of stress on the interviewee, and coping strategies used by the interviewee. A balance of positively and negatively keyed items was included to control for acquiescence responding.

The authors developed almost 150 questionnaire items as the research progressed, and tested them in a series of surveys in five NHS Hospital Trusts, a Health Authority, a School of Nursing and a University in the UK.

THE PILOT QUESTIONNAIRE

Part 1 Sources of Stress comprised 57 items intended to reflect six themes identified by Cooper and Marshall (1976): sources of pressure to do with the job itself (15 items), role (6), relationships (10), career aspirations (6), climate at work (14) and home/work pressures (6).

Part 2 -Living with Stress comprised 74 items. Twenty locus of control at work items were developed to measure state rather than trait locus of control, by selecting items which characterise the individual's sense of control in the workplace (Reese and Cooper, 1992).

Nineteen job satisfaction items and 35

anxiety and depression items were included also.

The methodology for questionnaire construction outlined by Kline (1986), was followed. This involved conducting a pilot survey in 1992, in which the 131 items were tested using item and factor analysis. Comments were sought from respondents on every item. There were 199 respondents giving a 61% response rate. Age data was collected in bands: 3 people < 21 years; 72= 21-36 years; 104= 37-55 years; and 22 > 55 years, with women forming 77% of the sample.

Factor analysis and radial parcel analysis (Barrett and Kline, 1981) were used to derive a model for the structure of the questionnaire and there were some interesting findings. Control at work items turned out to be measures of job satisfaction: this raised a theoretical question about previous work where similar control at work scales had been assumed to be independent of job satisfaction (Karasek and Theorell, 1990). In addition, many sources of pressure items turned out to be measures of job satisfaction, confirming a long-held suspicion that measures of cause and effect have been confounded in some previous research (Schafer and Fals-Stewart, 1991). The questionnaire had a clear and simple structure with independent, but correlated measures of workload (or psychological demand), psychological health and job satisfaction.

The three core dimensions that form the basis of the EWQ are well established in the literature. They represent the three most important things that an organisation needs to know to assess the risk of problems of staff retention (job satisfaction), staff health (psychological health) and risk of litigation due to putting employees under undue pressure (combination of workload and psychological health). Because the measures have been developed in the same research programme, they are not overlapping or confounded with each other. Up to now this has been a major problem in the measurement of occupational stress (Schafer and Fals-Stewart, 1991).

The information from the pilot survey was used to develop a shorter questionnaire with 77 items that was then subject to psychometric tests of reliability and validity in a further survey in the same hospital. In this survey, the questionnaire was sent to all employees in the hospital and 623 responded, giving a 68% response rate. Six people were under 21;



204 = 21-36; 359 = 37-55; and 50 > 55 (age data missing for 4), with women forming 81% of respondents.

The three-factor structure identified in the pilot survey was confirmed.

More was learned during subsequent surveys, and the questionnaire refined into its 59-item format. In these surveys in four different

hospitals, a Health Authority, a School of Nursing, a university, and two large local council organizations in England, over 7,000 people completed questionnaires. The psychometric details that emerged in these surveys regarding the reliability and validity of the measures, is presented in Section 3.

The Psychometric Properties and Validity of the EWQ

Unless otherwise indicated, all analyses were conducted using the global normative dataset of 7071 cases of data acquired from a variety of organizations (hospitals, a university, and two local council organizations).

STRUCTURE

These analyses focus on the scale structure found within the 59-item dataset. Each structural analysis was computed from a Pearson correlation matrix calculated over the 59 items and using only complete-case data ($n = 6,304$ cases). In addition, all items were scored in the same direction reflecting the meaning of the core and facet scales (i.e., item

response scoring was reversed for some items in order to ensure all items were aligned in the keyed direction). For layout purposes, the three core scale item sets are presented in separate blocks, although the factor loading matrix is actually 59 items x 3 factors. Varimax rotation was used as a simple convenience throughout because although the core scales are correlated (see Table 6), no substantive difference was observed between keyed loadings computed from a structural equation correlated-factor model solution and the simple exploratory varimax-rotated solutions.

COMPONENT AND COMMON FACTOR ANALYSIS – CORE SCALES

Table 1: Principal Components Analysis, Varimax Rotation

	PH	JS	WK		PH	JS	WK		PH	JS	WK
PH-1	0.46	0.11	0.15	JS-1	0.05	0.63	0.09	WK-1	-0.09	-0.06	-0.66
PH-2	0.38	0.17	0.17	JS-2	0.11	0.47	0.23	WK-2	-0.03	-0.07	-0.45
PH-3	0.43	0.22	0.12	JS-3	0.11	0.47	0.22	WK-3	-0.11	-0.10	-0.60
PH-4	0.50	0.26	0.16	JS-4	0.05	0.67	0.10	WK-4	-0.12	-0.05	-0.56
PH-5	0.55	0.31	0.32	JS-5	0.10	0.53	0.20	WK-5	-0.08	-0.36	-0.48
PH-6	0.66	0.13	0.06	JS-6	0.12	0.73	0.19	WK-6	-0.03	-0.28	-0.49
PH-7	0.54	0.35	0.14	JS-7	0.12	0.55	-0.09	WK-7	-0.14	-0.06	-0.73
PH-8	0.43	0.15	0.18	JS-8	0.20	0.58	0.07	WK-8	-0.13	-0.22	-0.58
PH-9	0.53	0.22	0.13	JS-9	0.27	0.61	0.11	WK-9	-0.16	-0.19	-0.74
PH-10	0.50	0.15	0.14	JS-10	0.23	0.36	-0.09	WK-10			
PH-11	0.47	0.02	0.20	JS-11	0.17	0.72	-0.07	WK-11			
PH-12	0.52	0.29	0.23	JS-12	0.28	0.46	0.08	WK-12			
PH-13	0.73	0.10	-0.07	JS-13	0.14	0.65	0.13	WK-13			

PH-14	0.66	0.16	0.30	JS-14	0.19	0.68	0.07	WK-14			
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	PH	JS	WK		PH	JS	WK		PH	JS	WK
PH-15	0.52	0.33	0.14	JS-15	0.10	0.66	0.16				
PH-16	0.47	0.15	0.04	JS-16	0.05	0.53	-0.05				
PH-17	0.46	0.02	0.28	JS-17	0.25	0.51	-0.16				
PH-18	0.51	0.05	0.03	JS-18	0.28	0.60	0.11				
PH-19	0.70	0.11	-0.05	JS-19	0.10	0.71	0.15				
PH-20	0.67	0.05	-0.01	JS-20	0.08	0.56	0.17				
PH-21	0.58	0.10	-0.10	JS-21	0.22	0.68	0.02				
PH-22	0.51	0.25	0.13	JS-22	0.32	0.58	-0.08				
PH-23	0.59	0.09	0.21								
PH-24	0.62	0.10	0.17								
PH-25	0.61	0.08	-0.16								
PH-26	0.56	0.07	-0.02								
PH-27	0.49	0.10	0.06								
PH-28	0.46	0.17	-0.16								

Note: PH = Psychological Health, JS = Job Satisfaction, WK = Workload. Loadings > 0.36 are highlighted in red. The actual questionnaire item numbers have been replaced by simple integers.

A common factor model solution using Maximum Likelihood extraction is presented in Table 2.

Table 2: Maximum Likelihood Factor Analysis, Varimax Rotation

	JS	PH	WK		JS	PH	WK		JS	PH	WK
PH-1	0.13	0.42	0.16	JS-1	0.61	0.04	0.09	WK-1	-0.08	-0.07	-0.59
PH-2	0.19	0.33	0.17	JS-2	0.44	0.10	0.21	WK-2	-0.08	-0.03	-0.37
PH-3	0.23	0.39	0.14	JS-3	0.45	0.10	0.19	WK-3	0.07	-0.10	-0.51
PH-4	0.27	0.47	0.17	JS-4	0.64	0.05	0.09	WK-4	0.02	-0.11	-0.49
PH-5	0.33	0.52	0.33	JS-5	0.50	0.10	0.17	WK-5	-0.35	-0.07	-0.44
PH-6	0.15	0.65	0.09	JS-6	0.72	0.10	0.18	WK-6	-0.27	-0.02	-0.46
PH-7	0.35	0.51	0.17	JS-7	0.51	0.12	-0.05	WK-7	-0.07	-0.11	-0.72
PH-8	0.17	0.40	0.18	JS-8	0.56	0.19	0.07	WK-8	-0.22	-0.11	-0.56
PH-9	0.23	0.50	0.15	JS-9	0.60	0.25	0.13	WK-9	-0.19	-0.13	-0.75
PH-10	0.18	0.45	0.15	JS-10	0.34	0.22	-0.05				

	JS	PH	WK		JS	PH	WK		JS	PH	WK
PH-11	0.05	0.43	0.19	JS-11	0.70	0.16	-0.06				
PH-12	0.30	0.49	0.24	JS-12	0.45	0.26	0.09				
PH-13	0.11	0.73	-0.02	JS-13	0.64	0.13	0.13				
PH-14	0.19	0.62	0.32	JS-14	0.66	0.18	0.07				
PH-15	0.34	0.49	0.16	JS-15	0.64	0.08	0.15				
PH-16	0.16	0.45	0.07	JS-16	0.49	0.05	-0.03				
PH-17	0.05	0.42	0.26	JS-17	0.48	0.23	-0.10				
PH-18	0.07	0.47	0.06	JS-18	0.58	0.27	0.14				
PH-19	0.12	0.69	-0.01	JS-19	0.70	0.08	0.14				
PH-20	0.07	0.64	0.03	JS-20	0.54	0.07	0.16				
PH-21	0.11	0.57	-0.06	JS-21	0.66	0.21	0.03				
PH-22	0.27	0.47	0.15	JS-22	0.56	0.31	-0.05				
PH-23	0.12	0.55	0.22								
PH-24	0.13	0.57	0.19								
PH-25	0.09	0.58	-0.10								
PH-26	0.09	0.52	0.02								
PH-27	0.19	0.44	0.09								
PH-28	0.17	0.43	-0.10								

Note: PH = Psychological Health, JS = Job Satisfaction, WK = Workload. Loadings > 0.36 are highlighted in red. The actual questionnaire item numbers have been replaced by simple integers.

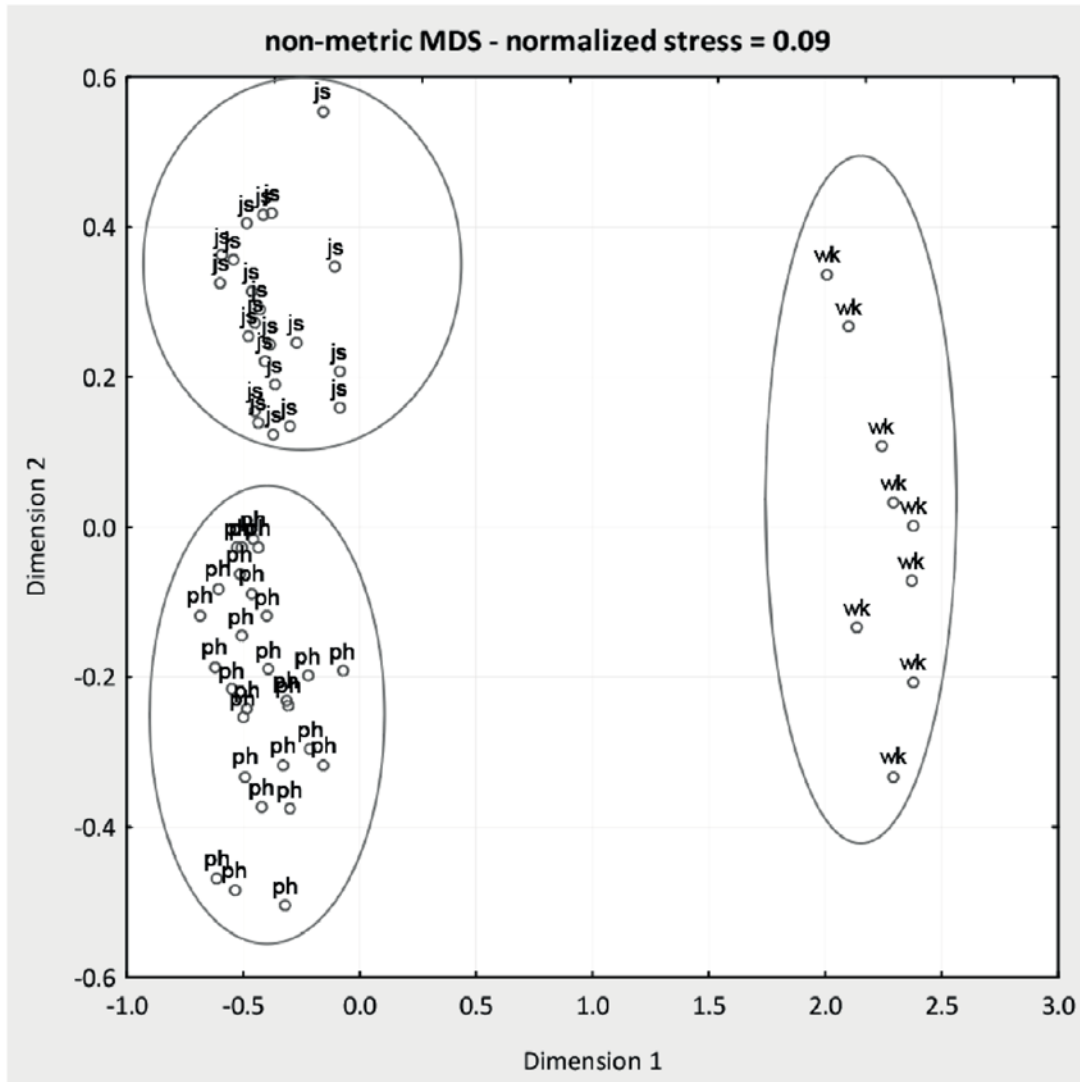
Tables 1 and 2 show a reasonably clean factor structure for each core scale.

Non-metric Multidimensional Scaling Solution – Core Scales

Another way of looking at the structure

inherent within the data is to compute a non-metric multidimensional scaling solution. This allows the data to be displayed graphically within a Cartesian coordinate system, where items which share an attribute in common are located closer to one another in Euclidean space compared to items which assess a dissimilar attribute. Ideally, the three core scales should appear as three homogenous clusters in a two or three-dimensional coordinate system.

Figure 1: Non-metric Multidimensional Scaling Solution (normalized-stress = 0.09)



Note: ph = Psychological Health, js = Job Satisfaction, wk = Workload.

Figure 1 shows a clear discrete homogenous clustering of items definitive of the core attributes.

HIFAC Facet Scale Identification

In order to identify useful constituent components of the core scales, as Homogenous Item Facets, the two largest core scales of Psychological Health and Job Satisfaction were factored separately. Three constituent HIFACS were constructed from each core scale item-set, using maximum

likelihood factor analysis, with varimax rotation, selecting those items which loaded highest on a factor, avoiding substantive cross-loading items. Table 3 shows the relative clarity of HIFAC composition from within the Psychological Health (PH) scale. In order to shield the actual item compositions of the HIFACS (for test-security/IP purposes), simple integers replace the actual item numbers in the questionnaire. Subsequently, the only relevant information in this table are the loading patterns – indicating reasonable clarity of discriminating HIFAC items.

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Table 3: Psychological Health HIFAC identification using Maximum Likelihood factoring

	Resilience	Positive Outlook	Physical Health
PH-1	0.34	0.25	0.18
PH-2	0.26	0.08	0.47
PH-3	0.23	0.10	0.66
PH-4	0.52	0.17	0.27
PH-5	0.66	0.16	0.32
PH-6	0.33	0.63	0.13
PH-7	0.51	0.23	0.32
PH-8	0.33	0.22	0.27
PH-9	0.46	0.33	0.11
PH-10	0.40	0.12	0.43
PH-11	0.44	0.21	0.09
PH-12	0.55	0.20	0.27
PH-13	0.25	0.77	0.14
PH-14	0.66	0.28	0.22
PH-15	0.53	0.26	0.20
PH-16	0.21	0.48	0.07
PH-17	0.48	0.18	0.07
PH-18	0.43	0.25	0.08
PH-19	0.27	0.72	0.09
PH-20	0.18	0.57	0.36
PH-21	0.18	0.60	0.12
PH-22	0.51	0.20	0.25
PH-23	0.44	0.37	0.17
PH-24	0.60	0.18	0.27
PH-25	0.23	0.56	0.10
PH-26	0.09	0.42	0.50
PH-27	0.29	0.15	0.47
PH-28	0.14	0.44	0.13

The reasoning behind HIFAC construction is that when interpreting core scales, it is helpful to establish which areas or facets of Psychological Health are most (or least) causal for a particular global score. While the facets are correlated highly with their core scale, there

is sufficient variation to enable useful more-detailed interpretations for some individuals. Section 3.3.2 shows an example of this 'conditional-score' variation for the Engagement HIFAC sten scores given a fixed Job Satisfaction core sten scale score.

RELIABILITY ANALYSIS

Internal Consistency

Table 4: Internal consistency reliability of EWQ Core and HIFAC scales

Scale	N	Alpha
Psychological Health	6677	.92
HIFAC: Resilience	6910	.88
HIFAC: Positive Outlook	6861	.84
HIFAC: Physical Health	6957	.72
Job Satisfaction	6632	.92
HIFAC: Supervision	6884	.85
HIFAC: Supportive Colleagues	6989	.79
HIFAC: Engagement	6956	.71
Workload	6884	.81

Retest Reliability

Six-month duration test-retest estimates were computed for the three scales of the EWQ. The data for these calculations were drawn from a survey carried out within an English NHS community trust, using a subset of core

EWQ items drawn from the 59-item test. Table 5 presents the results from this analysis, along with ancillary information. These core item scales are very highly correlated with the EWQ core scales (above 0.90), and share alphas of near equivalent magnitude

Table 5: Retest reliabilities for core-item EWQ scales

Scale	N	Alpha
Psychological Health (18 items)	260	.73
Job Satisfaction (22 items)	225	.78
Workload (6 items)	275	.76

CORE SCALE AND HIFAC SCORE INTERRELATIONSHIPS

The Correlations Between Core Scales and Facets

Table 6: Core EWQ and HIFAC scale correlations

Variable	Correlations (Global EWQ Normative Dataset n=7071, 24-Sep-12.sta) Marked correlations are significant at p < .05000 N=7012 (Casewise deletion of missing data)								
	PH	PH HIFAC Resilience	PH HIFAC Positive Outlook	PH HIFAC Physical Health	JS	JS HIFAC Superv.	JS HIFAC Supp Coll.	JS HIFAC Engage	WKLD
Psychological Health	1.00	0.94	0.79	0.75	0.52	0.42	0.45	0.51	-0.35
PH HIFAC Resilience	0.94	1.00	0.62	0.65	0.52	0.44	0.44	0.49	-0.38
PH HIFAC Positive Outlook	0.79	0.62	1.00	0.45	0.37	0.25	0.34	0.40	-0.18
PH HIFAC Physical Health	0.75	0.62	0.45	1.00	0.37	0.31	0.30	0.37	-0.24
Job Satisfaction	0.52	0.52	0.37	0.37	1.00	0.92	0.82	0.79	-0.33
JS HIFAC Supervision	0.42	0.44	0.25	0.31	0.92	1.00	0.65	0.63	-0.31
JS HIFAC Supportive Colleagues	0.45	0.44	0.34	0.30	0.82	0.65	1.00	0.55	-0.29
JS HIFAC Engagement	0.51	0.49	0.40	0.37	0.79	0.63	0.55	1.00	-0.23
Workload	-0.35	-0.38	-0.18	-0.24	-0.33	-0.31	-0.29	-0.23	1.00

The Interpretative Utility of the Facet Scales – Conditional Sten Score Distributions

Given the high correlation between some HIFAC scales and their core scale, it is useful to see the range of sten scores on a HIFAC which might be observed for people scoring exactly the same sten score

on the core scale. The sten scores were generated using the global normative dataset.

For example, for the core scale of Job Satisfaction, and one of its HIFACS – Engagement – where the correlation in the total sample data is 0.79 (from Table 6) using Discrete Frequency formula sten scores ...

Table 7: Conditional sten score distribution for the Job Satisfaction HIFAC Engagement scale, given a fixed sten score of 6 on the Job Satisfaction scale

Category	Frequencies for HIFAC Engagement Stens, given a fixed sten of <6> on Job Satisfaction			
	Count	Cumulative Count	Percent	Cumulative Percent
2	4	4	0.30	0.30
3	25	29	1.91	2.21
4	85	114	6.48	8.69
5	274	388	20.88	29.57

Category	Count	Cumulative Count	Percent	Cumulative Percent
6	450	838	34.30	63.87
7	326	1164	24.85	88.72
8	77	1241	5.87	94.59
9	43	1284	3.28	97.87
10	27	1311	2.06	99.92
Missing	1	1312	0.08	100.00

Table 8: Conditional sten score distribution for the Job Satisfaction HIFAC Engagement scale, given a fixed sten score of 7 on the Job Satisfaction scale

Category	Frequencies for HIFAC Engagement Stens, given a fixed sten of <7> on Job Satisfaction			
	Count	Cumulative Count	Percent	Cumulative Percent
2	1	1	0.10	0.10
3	6	7	0.58	0.67
4	22	29	2.11	2.78
5	62	91	5.94	8.72
6	265	356	25.41	34.13
7	444	800	42.57	76.70
8	112	912	10.74	87.44
9	83	995	7.96	95.40
10	48	1043	4.60	100.00
Missing	0	1043	0.00	100.00

Table 9: Conditional sten score distribution for the Job Satisfaction HIFAC Engagement scale, given a fixed sten score of 8 on the Job Satisfaction scale

Category	Frequencies for HIFAC Engagement Stens, given a fixed sten of <8> on Job Satisfaction			
	Count	Cumulative Count	Percent	Cumulative Percent
4	3	3	0.47	0.47
5	23	26	3.58	4.05
6	81	107	12.62	16.67
7	241	348	37.54	54.21
8	118	466	18.38	72.59
9	107	573	16.67	89.25
10	69	642	10.75	100.00
Missing	0	642	0.00	100.00

Table 10: Conditional sten score distribution for the Job Satisfaction HIFAC Engagement scale, given a fixed sten score of 9 on the Job Satisfaction scale

Category	Frequencies for HIFAC Engagement Stens, given a fixed sten of <9> on Job Satisfaction			
	Count	Cumulative Count	Percent	Cumulative Percent
4	2	2	0.55	0.55
6	21	23	5.75	6.30
7	89	112	24.38	30.68
8	67	179	18.36	49.04
9	99	278	27.12	76.16
10	87	365	23.84	100.00
Missing	0	365	0.00	100.00

Table 11: Conditional sten score distribution for the Job Satisfaction HIFAC Engagement scale, given a fixed sten score of 10 on the Job Satisfaction scale

Category	Frequencies for HIFAC Engagement Stens, given a fixed sten of <10> on Job Satisfaction			
	Count	Cumulative Count	Percent	Cumulative Percent
6	2	2	1.16	1.16
7	8	10	4.62	5.78
8	14	24	8.09	13.87
9	47	71	27.17	41.04
10	102	173	58.96	100.00
Missing	0	173	0.00	100.00

The point being that even with HIFAC scales correlating at 0.79 with the main scale, there will be sufficient variation in HIFAC sten scores for interpretation purposes, given a particular main scale sten score. That is, the sten scores on the main scale and HIFAC scale will disagree for some test-takers, which will provide some basis for extra interpretation narratives and feedback.

CONCURRENT VALIDITY ANALYSES

Study 1: EWQ scales with the GHQ-12 and JSQ

Table 12 provides the results of a concurrent validity study using a sample of employees within two hospital organizations. Two questionnaires were administered

concurrently with EWQ core item subset scales of psychological health, job satisfaction, and workload. These were the General Health Questionnaire (GHQ-12; Goldberg and Williams, 1988) and the Warr, Cook, and Wall, (1979) Job Satisfaction Questionnaire (USQ). All Pearson correlations between these measures are significant, with the strongest correlations confirming that the EWQ job satisfaction scale has high concurrent validity and reasonable discriminant validity, although a lower correlation with the GHQ-12 would have been desirable. The psychological health scale shows good concurrent validity in relation to the GHQ-12 and good discriminant validity in relation to Warr's Job Satisfaction Questionnaire.

Table 12: Concurrent validity of the EWQ Psychological Health, job Satisfaction, and Workload scales with the GHQ-12 and JSQ

Test	EWQ Psychological Health	EWQ Job Satisfaction	EWQ Workload
GHQ-12	.65 (n=582)	.49 (n=540)	-.38 (n=602)
Warr's JSQ	.32 (n=560)	.82 (n=522)	-.19 (n=574)

Note: all correlations are statistically significant at $p < 0.001$.

Study 2: EWQ core item scales with the PANAS and EPQ

Tables 13 and 14 provide the results of a concurrent validity study using another sample of employees drawn from a different organization. Two questionnaires were administered concurrently with the EWQ scales of psychological health and job satisfaction. These were the Positive and Negative Affect Scales (PANAS) of Watson, Clark, and Tellegen (1988), and the Eysenck

Personality Questionnaire (EPQ) of Eysenck and Eysenck (1978). The EWQ psychological health scale has substantial correlations with PANAS Negative Affect and EPQ Neuroticism. The negative associations with Extraversion and Psychoticism mirrors the negative associations between Neuroticism and these two scales.

For this sample the correlations were $r = -0.22$ between Neuroticism and Extraversion and $r = -0.21$ between Neuroticism and Psychoticism.

Table 13: Concurrent validity of the EWQ Psychological Health, job Satisfaction scales with the PANAS scales

Scale	EWQ Job Satisfaction	EWQ Psychological Health
PANAS: Positive Affect	.45 (n=974)	.48 (n=1077)
PANAS: Negative Affect	-.30 (n=972)	-.66 (n=1081)

Table 14: Concurrent validity of the EWQ Psychological Health, job Satisfaction scales with the EPQ

Scale	EWQ Job Satisfaction	EWQ Psychological Health
EPQ: Psychoticism	.05 (n=411)	.13 (n=457)*
EPQ: Extraversion	.14 (n=415)*	.26 (n=449)*
EPQ: Neuroticism	-.21 (n=418)*	-.65 (n=461)*
EPQ: Social Desirability	.00 (n=418)	.02 (n=460)

Affect is a feature of all of the scales. This would be expected for EWQ psychological health, which itself is a direct measure of affect. A multiple regression equation, with psychological health as the dependent variable and positive and negative affect as independent variables, showed that 50% of the variance in the psychological health scale is accounted for by affect ($R=0.713$; $F=556.737$; $df= 2, 1074$; $n=1077$; $p < 0.001$). The correlations between EWQ job

satisfaction and positive and negative affect indicate that responses to this scale, which has already been shown to have concurrent validity using Warr's Job Satisfaction Questionnaire, are also substantially determined by mood disposition, but less so than for the psychological health scale. A multiple regression equation, with job satisfaction as the dependent variable and positive and negative affect as the independent variables, demonstrated that

affect accounts for 22.5% of the variance in the JSQ ($R=0.475$; $F=13.807$; $df= 2, 943$; $p < 0.001$). This result is remarkably close to the results reported by Cropanzano, James, and Konovsky, (1993) who found that affect accounted for 21% of the variance in a global measure of job satisfaction, with first order correlations of -0.24 and 0.45 between job satisfaction, and negative and positive affect respectively. The EWQ scales are not contaminated with social desirability

effects as measured by the EPQ L scale.

Study 3: EWQ core item scales with the DASS

Table 15 gives the results of a concurrent validity study using the 21-item short form of the Depression, Anxiety, and Stress Scales (DASS; Lovibond and Lovibond, 1995).

The sample consisted of a subset ($n=228$) of those respondents surveyed in Study 2.

Table 15: EWQ core item scales with the DASS

Test	EWQ Psychological Health	EWQ Job Satisfaction	EWQ Workload
DASS Depression	-.58	-.45	.32
DASS Anxiety	-.55	-.14	.20
DASS Stress	-.65	-.39	.42

Note: correlations at or above $|0.20|$ are statistically significant $p < 0.01$

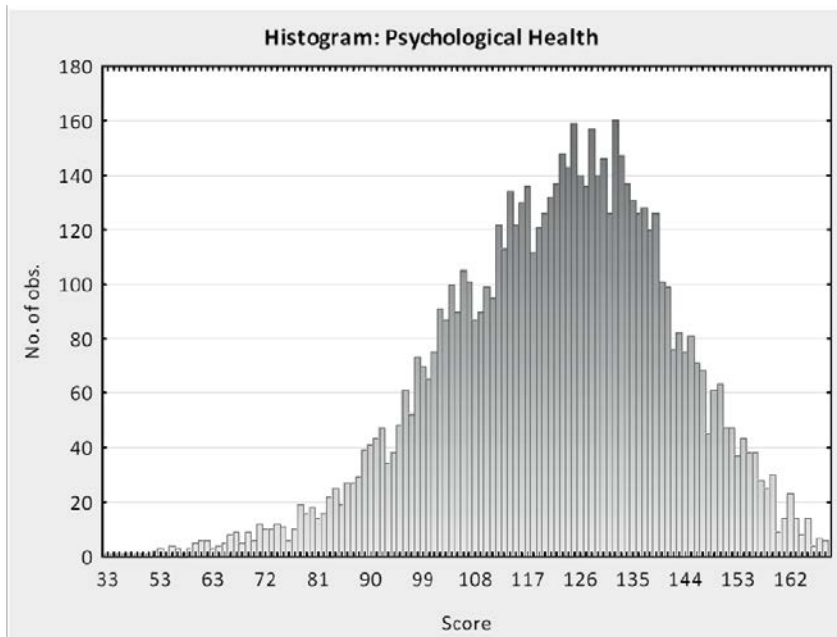
As can be seen, the EWQ core item subset scales have good concurrent validity with the DASS measures, especially with regard to the psychological health scale.

Although all scale and HIFAC scores are expressed in sten form (relative to the current normative database), it is useful to see how the raw scores are distributed in order to evaluate the assessment characteristics of each scale.

RAW SCORE HISTOGRAMS FOR CORE SCALES AND FACETS

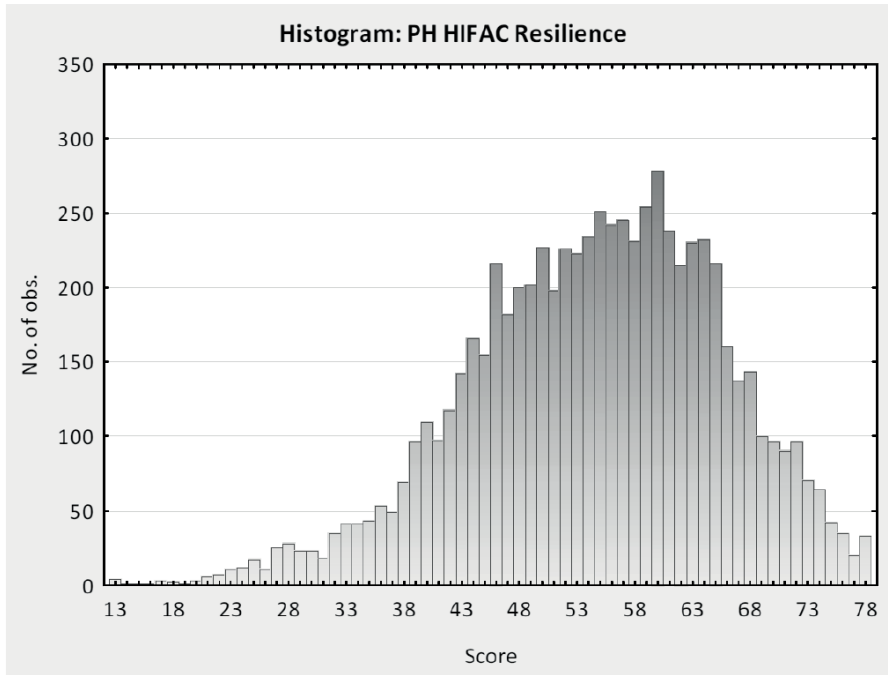
Core Scale: Psychological Health

Figure 2: Histogram of Psychological Health Raw Scores



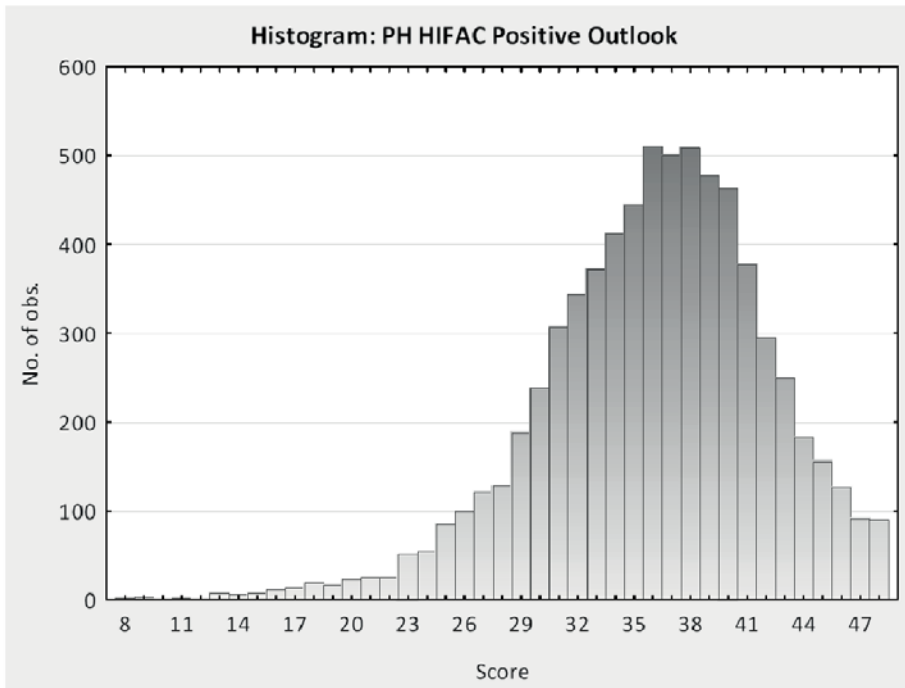
Psychological Health HIFAC: Resilience

Figure 3: Histogram of Psychological Health HIFAC Resilience Raw Scores



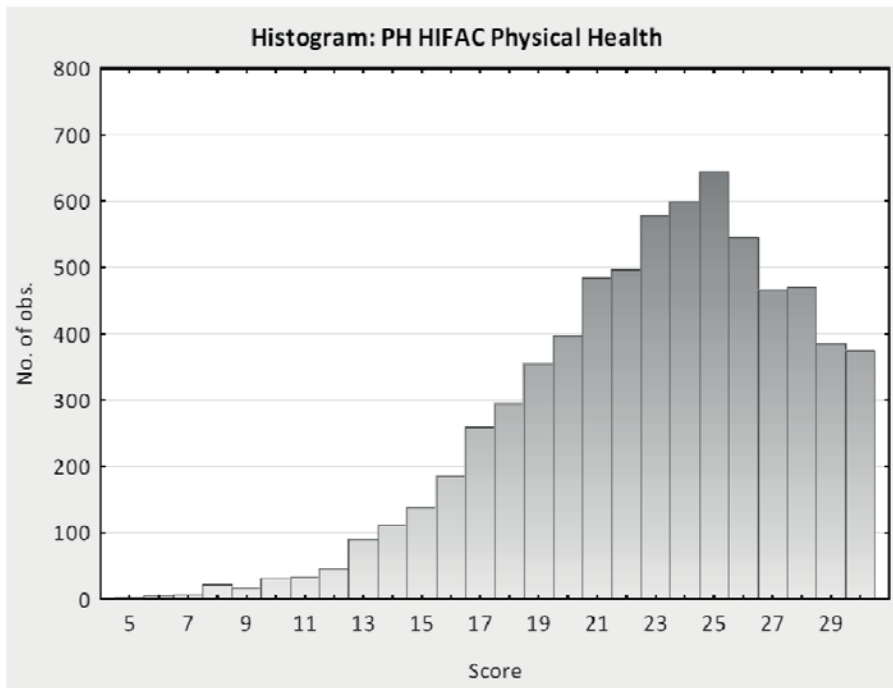
Psychological Health HIFAC: Positive Outlook

Figure 4: Histogram of Psychological Health HIFAC Positive Outlook Raw Scores



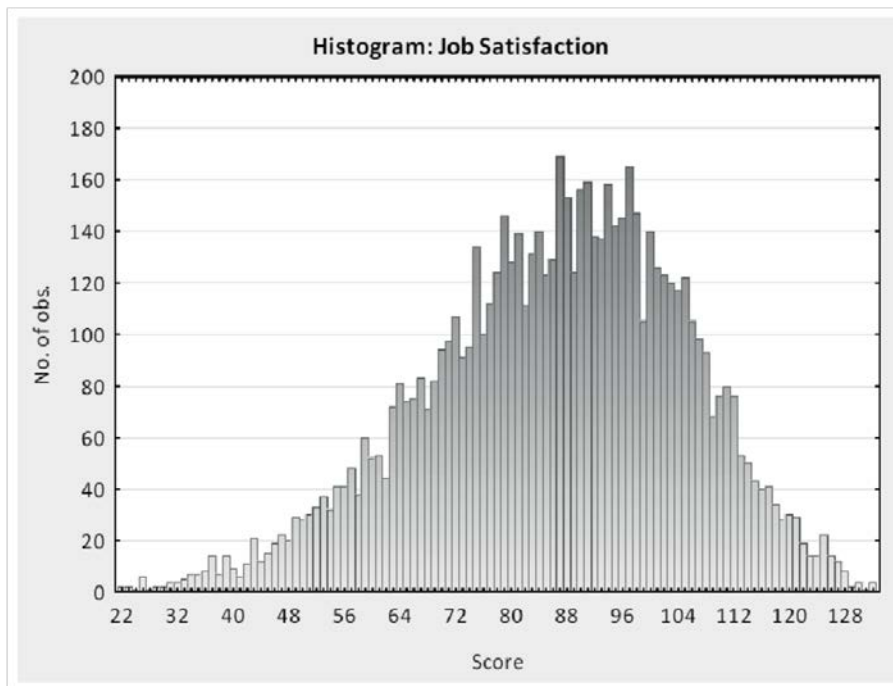
Psychological Health HIFAC: Physical Health

Figure 5: Histogram of Psychological Health HIFAC Physical Health Raw Scores



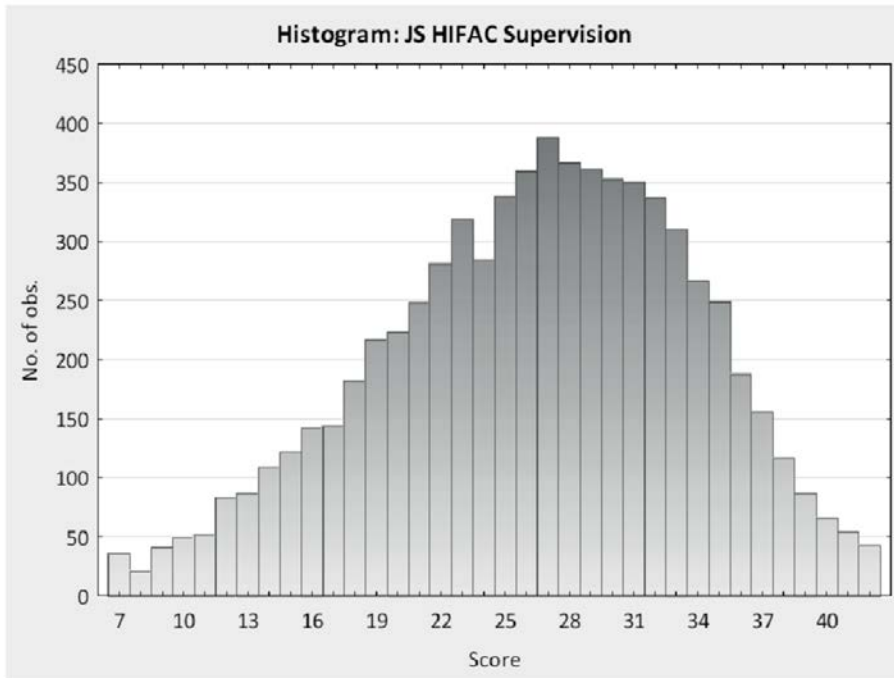
Core Scale: Job Satisfaction

Figure 6: Histogram of Job Satisfaction Raw Scores



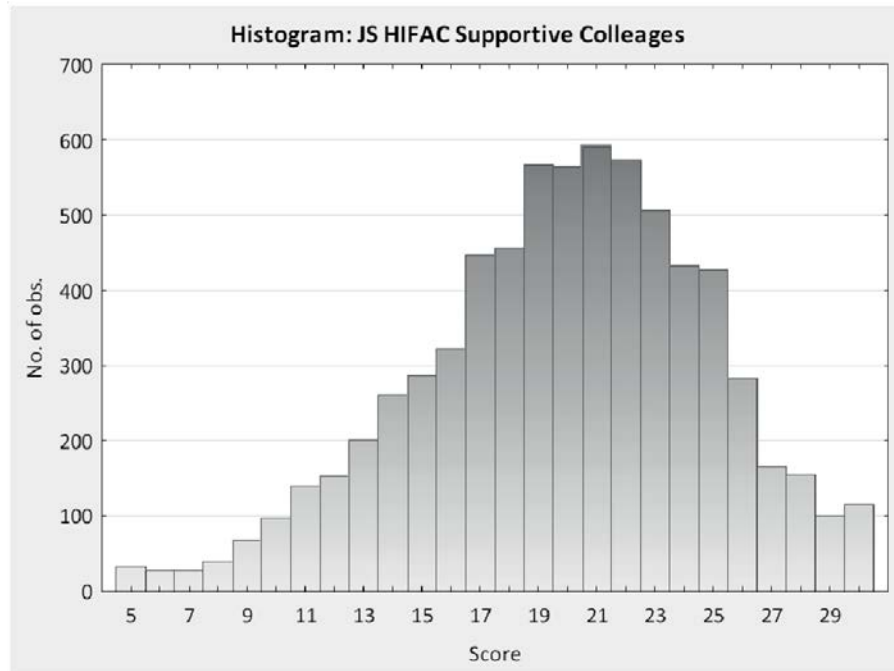
Job Satisfaction HIFAC: Supervision

Figure 7: Histogram of Job Satisfaction HIFAC Supervision Raw Scores



Job Satisfaction HIFAC: Supportive Colleagues

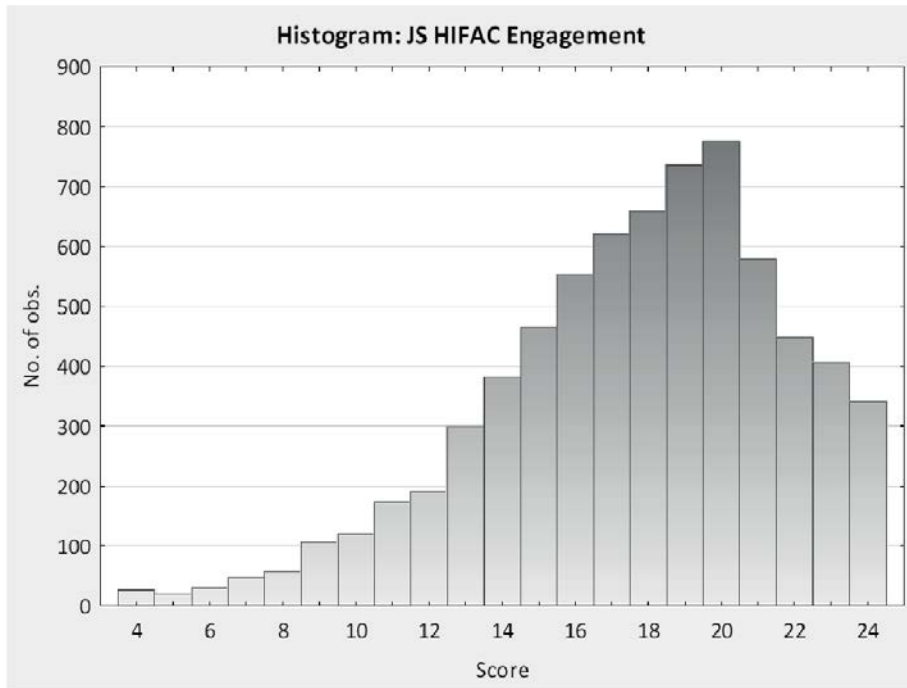
Figure 8: Histogram of Job Satisfaction HIFAC Supportive Colleagues Raw Scores



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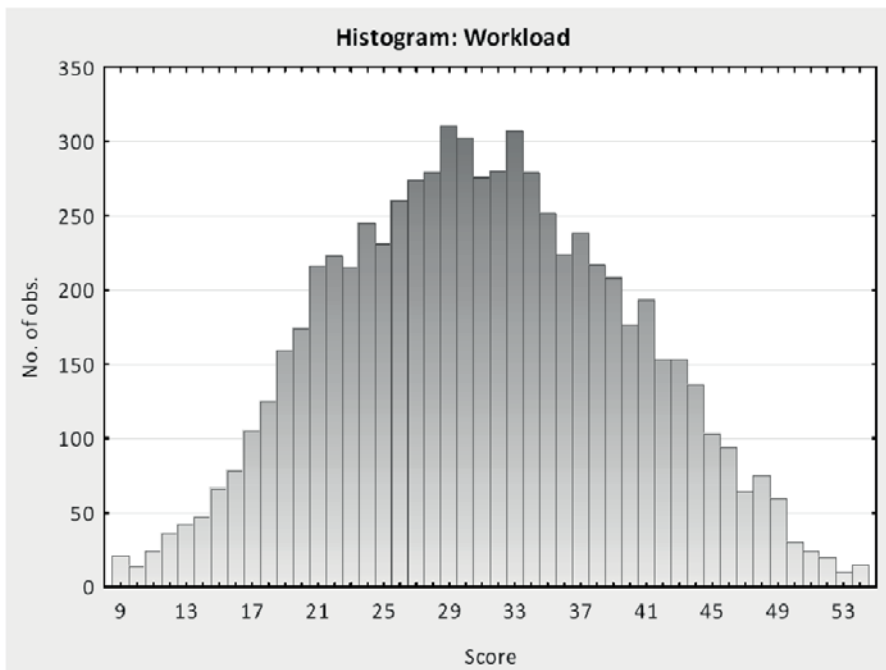
Job Satisfaction HIFAC: Engagement

Figure 9: Histogram of Job Satisfaction HIFAC Engagement Raw Scores



Workload

Figure 10: Histogram of Workload Raw Scores



4. The EWQ Core Scale and HIFAC descriptions

PSYCHOLOGICAL HEALTH

<p>Core Scale: Psychological Health The emotional and physical wellbeing of the individual.</p>	
<p>Low Score</p> <p>The employee reports experiencing a high degree of distress. This may be a temporary or long-term problem. For example, they may have recently suffered a bereavement or divorce. For some people with scores at this level the problem may be temporary and will resolve itself in a few weeks. However, it may also be an indication of burnout and enduring stress.</p>	<p>High Score</p> <p>The employee is relaxed and confident. They tend to have an optimistic and positive outlook on life. Their physical health is also very good, likely to be reflected in lower-than-average absenteeism rates.</p>
<p>Facet: Resilience The emotional and physical wellbeing of the individual.</p>	
<p>Low Score</p> <p>The employee has great difficulty coping with the day to day demands of the job. They lack confidence in their abilities and skills, and experience feelings of foreboding about the outcome of future events. They find it difficult to 'bounce-back' from adverse events, tending to worry and fret about such events which occurred in the past.</p>	<p>High Score</p> <p>The employee shows considerable capacity for coping with the varied demands and pressures experienced in fulfilling their day-to-day job role. They seem able to absorb setbacks and negative outcomes, express their concerns openly and confidently, and are able to relax as and when they choose.</p>
<p>Facet: Positive Outlook Shows energy, enthusiasm, and optimism.</p>	
<p>Low Score</p> <p>The employee generally feels pessimistic about life, experiencing bouts of depression and a lack of energy, and tending to have a negative outlook on people and events. They are not happy in their work or in their personal life.</p>	<p>High Score</p> <p>The employee possesses an optimistic outlook on life. They are energetic and show a positive 'can do' attitude, even when experiencing adverse events. Overall, they are viewed as happy, motivated people by co-workers.</p>
<p>Facet: Physical Health Experiences good general health and vitality</p>	
<p>Low Score</p> <p>The employee tends to suffer from many physical symptoms of stress and ill-health, such as headaches, shortness of breath, and aches and pains. These physical ailments may lead to time lost at work and a gradual deterioration in the work performance of the employee.</p>	<p>High Score</p> <p>The employee experiences good and stable general health. They rarely suffer any physical symptoms of stress or ill-health, even when occasionally having to work under pressure for considerable periods of time. They seem to evade many of the day-to-day health problems that affect others.</p>

JOB SATISFACTION

Core Scale: **Job Satisfaction**

Satisfaction and engagement with the job and the organisation.

Low Score

Low scorers are very unhappy with their job. This may be because they are not happy with the job or organization, with how they are being supervised/managed, and are dissatisfied with the degree of support they receive from their colleagues. Which of these applies can be more precisely assessed from the facet scales.

High Score

High scorers enjoy their job. They are likely to take initiatives, and tend to get on well with their manager and colleagues. They believe that the employer is fair to them and good to work for. They are fully engaged with their organization and job-role.

Facet: **Supervision**

Confidence in and satisfaction with the management and supervision of their work.

Low Score

The employee feels that they are not being managed/supervised in a way they feel is suited to them. They feel they are not sufficiently consulted about matters which involve their work, and that the supervisory environment is confrontational rather than supportive. In addition, when they do try and make positive suggestions about work-related matters, they feel they are not taken seriously.

High Score

The employee is very satisfied with the supervision/management of them at work. They report a good working environment where their managers consult with them on decisions to be made relevant to their job-role, and listen to their suggestions about other work-related matters. Their supervisor also lets them know when they are doing a good job.

Facet: **Supportive Colleagues**

Openness and collaborative team interaction among colleagues

Low Score

The employee reports working in an environment where colleagues and team members are confrontational and difficult to work with. There is a feeling that everybody is just 'doing their own thing' where any attempt at helpful comment is immediately interpreted as a personal criticism of them.

High Score

The employee gets on very well with their co-workers and colleagues. Interactions between them are supportive, open, and rewarding, with very few serious personal conflicts (if any). The overall impression is that everyone is working toward a shared goal.

Facet: **Engagement**

Motivated and enjoying their work within in the organization.

Low Score

The employee is reporting a low motivation to work for the organization. They are now just working for the money they are paid to do a job rather than any additional motivation to support the organization and their colleagues. Unless their motivation is rekindled, it is likely they will leave the organization when an opportunity arises.

High Score

The employee likes their job and feels it challenges their abilities. They remain motivated and focused, and are clearly obtaining some personal satisfaction and pride in working for the organization.

WORKLOAD

Core Scale: **Workload**

The employee's perception of the pressure they work under and the amount of work they do

Low Score

Low scores indicate that the employee does not feel under pressure and feels they can do their job thoroughly and properly. It is possible that some low scorers are under-utilised: most people dislike having too little to do as much as they dislike being overworked.

High Score

High scores indicate that the employee feels rushed and unable to do their job properly. They report being overworked with insufficient time available to them to fulfil their job functions.



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