Critical stressors influencing construction estimators in Hong Kong

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Stressors of Construction Cost Estimation in Hong Kong

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STRESSORS OF CONSTRUCTION COST ESTIMATION IN HONG KONG

ABSTRACT

Prediction of probable final construction cost is the predominant task of cost estimators. While majority of construction projects are procured under a fixed price nature, any errors in cost prediction could undermine the project success and ultimately reduce the profit margin. Cost estimation not only relies on a precise analysis of available data but also involves the use of subjective judgement especially in the absence of perfect data. Producing accurate cost estimation within an unrealistically short tendering period has exerted a great deal of stress on estimators. In fact, it is well known that cost estimation is a very stressful business. This paper identifies the main causes of the stress endured by cost estimators by a survey of construction cost estimators in Hong Kong. Using correlation analysis, regression analysis and structural equation modelling, the relationships amongst the stressors (stress factors) and stress are examined and a causal structural model is developed. The results indicate work overload, role conflict, job ambiguity, and working environment to be the critical stressors involved, with work underload and distrust being the stressors being indirectly influencing factors.

Keywords: cost estimators, stresss, stressor, personal, task, physical

INTRODUCTION

It is well known that cost estimators are often pressed to produce accurate cost estimates within a rigid, yet hasty, timeframe. This is often made even more difficult by a lack of cooperation between the various project participants, such as planners, project managers, sub-contractors, suppliers, etc., as cost estimation relies heavily on data associated with the production schedule, methods, materials, quantities, and component costs. In such circumstances, it is not surprising to find that cost estimators are often under a considerable amount of stress. While, of course, low levels of stress can enhance performance, high levels

often compromise the personal intellect and emotion of decision makers (Jex, 1998). In highly stressful situations, decisions invariably become more rigid, simplistic and superficial (Cherrington, 1994). As a result, it is not uncommon for errors to occur. In cost estimating, these can be very costly, with the most common consequences to a contracting organisation being loss of work opportunities (in case of over-estimation) or a shortfall in profits (in case of under-estimation).

On the other hand, insufficient stress can induce boredom and a lack of concentration and motivation (Cooper and Marshall, 1981; Gmelch and Chan, 1994). In order to attain optimal performance, a balanced and healthy level of stress (i.e. eustress) is needed to promote enthusiasm and motivation (Freedman, 1988). The level of stress depends on its causes, as stress relates a person's adaptive response to a stimulus that places excessive psychological or physical demands on that person (Moorhead and Griffin, 1995). In the working environment, these causes or stressors are likely to be of a long-term nature: inducing physical and spiritual fatigue; affecting one's health; undermining team morale; affecting the stressees' perception of their ability to fulfil a task/assignment; and eventually breaking down their working abilities (Mind Tools Ltd., 1996).

The significance of the effects of occupational stress in general has prompted several studies to date aimed at identifying the causes of stress in various disciplines, including nurses (Dailey *et al*, 1986), managers (Davidson and Cooper, 1986) and teachers (Byosiere, 1988). These indicate that stress can be related to (i) physical condition (Braham, 1994); (ii) organisational culture (Moorhead and Griffin, 1995; Cooper, 2001); (iii) interpersonal conflict (Toates, 1995; Cooper, 2001); (iv) personal characteristics (Caplan and Jones, 1975; Alluisi, 1982; Cooper and Roden, 1985; Hurell, 1985; Dailey *et al*, 1986; Caudron, 1998; Bliese, 2001); and (v) job nature (Caplan and Jones, 1975; Matteson and Ivancevich, 1987). Other studies have focused on the effects of stress on the performance of various professions - such as physicians (Richardson and Burke, 1991), managers (Jex, 1998), construction site managers (Sutherland and Davidson, 1989; Djebarri, 1996), nurses (Jeanie, 2001), teachers (Sadowski, 1986; Chaplain, 1995) and police (Storch and Panzarella, 1996).

However, no study has yet been conducted on the stress of cost estimators. This paper aims to identify the prominent factors causing unmanageable stress to cost estimators, and to examine the relationships between the stressors and stress during the estimation process. The results

should enable the estimators to identify if stress exists during their works thereby help address or at least eliminate some unmanageable stress at work.

STRESSORS TO ESTIMATORS

In the course of construction cost estimation, estimators are required to make a series of informed decisions as to the direct and indirect costs, overhead, and profit (based on the identified risks). However, as time for the estimating process is usually very limited and in the absence of adequate information, some cost estimating decisions would have to call upon the judgment and experience of individual estimators. Besides, estimators have to collect useful information from various departments within the company (e.g., the plant department, planning department, etc.), other organizations in the construction supply chain (e.g., subcontractors, suppliers, etc.), and/or external bodies (e.g., the statutory bodies, construction indexes, etc.). The nature of the cost estimation suggests that four types of stressors are likely to exist:

1. *Personal stressors:* Individuals have different levels of resistance to stressors depending on their personal characteristics and cultural background (Lee and Ashforth, 1990). Those who are extremely competitive, committed to work and strong in time urgency, for example, are more likely to be subject to emotional distress and suffer from stress symptoms (Chesney and Rosenman, 1980; Ganster, 1986; Lee and Ashforth, 1990). This can escalate when individuals have to devote their time, energy and commitment also to family, friends, and community (Quick and Quick, 1989).

2. *Interpersonal stressors:* Estimators interact, in a formal and informal capacity, with many different entities within and outside their companies. This can give rise to stress and tensions, as team members, knowingly or unknowingly, frequently exert pressures on one another as a result of divergences in values, mistrust or an unfair microenvironment within the team (Quick and Quick, 1989). Stress can also occur as a result of role conflicts, particularly those arising out of the different expectations of superiors (Gross *et al*, 1985; Moorhead and Griffin, 1995), and the various behavioural expectations of their positions (Van Sell *et al*, 1981).

3. *Task stressors:* Construction projects are dynamic, and cost estimators are often confronted with complications caused by changes in client's requirements, designs, laws or regulations. The problem is aggravated by job/task ambiguity, in the form of unclear scoping and task objectives, lines of responsibility, etc. Excessive workload, e.g., due to intensive work undertaken over a limited timeframe (quantitative overload) or managerial ineffectiveness is another source of task stress. If there is need for frequent travel to sites, fatigue and reduced efficiency may occur as a result of increased stress levels (Alluisi, 1982). Task stress can also result in depression, low self-esteem, dissatisfaction, futility and the intention to leave (Buller and Schuler, 2000).

4. *Physical stressors:* Physical stressors relate to the job setting, or temperature and design of office. Research findings indicate strong relationships amongst the environment, level of stress, and physical/psychological health (Gmelch, 1982; Furnham, 1997; Mind Tools Ltd., 1996). Stress can occur by working in extreme temperatures, overcrowded environments, or poorly designed offices with too much or too little social interaction (Beehr 2000; Cooper and Payne 1978).

In this paper, the results are provided of a survey of construction cost estimators in Hong Kong, aimed at examining the potency of these types of stressors and their relationship with the levels of stress occurring during the estimation process.

RESEARCH METHOD

The survey was conducted in Hong Kong with a targeted sample including quantity surveyors and estimators who (1) were professionally qualified in the field; and (2) had direct experience of cost estimation. The samples were randomly selected from the membership records of professional institutions. A questionnaire consisting of thirty-two potential stressors was designed based on previous research, e.g., CIOB (1984), Locke and Latham (1990) [for personal and interpersonal stressors], Quick and Quick (1989), Gmelch (1982), Furnham (1997) [for task stressors], Gmelch (1982), and Furnham (1997) [for physical stressors]. In this, the factors pertaining to personal, interpersonal, task and environmental stressor types were presented for evaluation to determine the predominant stress factors and their intrinsic relationships,

As a measure of the level of stress, the deviation between a person's expected and actual ability to handle stressors were used (Gmelch, 1982), as stress becomes apparent when the actual abilities are lower than expected (French and Caplan, 1972; McGrath, 1976; Schuler, 1980; Kahn *et al*, 1964). The respondents were therefore asked to rate the actual ('a') and expected ('b') ability to handle the thirty-two stressors (Table 1) based on a seven-point Likert scale ranging from 1 (no impact) to 7 (a great deal of impact). The overall level of stress was taken to be represented by the sum of the differences between 'a' and 'b' ratings.

< Table 1 >

A total of 180 questionnaires were administered by post/fax after a brief telephone conversation to confirm the relevancy of the potential respondents' experience. 87 completed questionnaires were received, representing a response rate of 36%. Most of the respondents work for private consultants (64.4%), while the others are employed by main contractors (23%) or public clients (11.5%). Over half of the respondents (55.2%) have more than five years of relevant experience.

PRINCIPLE STRESSORS

To identify the main categories of stressors, the 'expected' responses to the thirty-two items were subjected to a Factor Analysis with varimax rotation (eigenvalue=1 cut-off). Owing to the limited sample size ($n<100$), only those items with factor loading greater than 0.5 were accepted as the principle stressors (Rahim *et al* 2000). These, together with the coefficient alpha reliabilities, are summarised in Table 2. As can be seen, the majority of the items, including 'distrust' (F1), 'conflict' (F2), 'work overload' (F3), 'dynamic tasks' (F6), 'private life' (F5), 'working environment' (F7), 'job specificity' (F8), and 'work underload' (F9), load onto appropriate factors. The original 'interaction' and 'personal working behavioural' scales, however, had been transformed into two new factors, namely 'teamwork' (F4) and 'interaction' (F10). The reliabilities for only the first nine factors (F1-F9) are within acceptable ranges for newly created stressors ($\alpha>0.60$), making the 'interaction' factor (F10) redundant.

< Table 2 >

The remaining nine factors were then classified into three major groups: (1) task-related, (2) (inter)personal-related and (3) physical-related (Table 3). 'Distrust', 'work overload', 'competitive teamwork' and 'private life' factors are classified into the (inter)personal-related group; while 'work overload', 'dynamic tasks', 'task ambiguity' and 'work underload' are treated as part of the task-related group. Role conflict is classified between the task-related and (inter)personal-related groups as it involves incompatibility amongst the team members. 'Environment' is the only factor in the physical-related group.

< Table 3 >

INTERSTRESSOR RELATIONSHIPS

< Table 4 >

Interstressor relationships were examined by correlation, multiple regression and structural equation model analyses. Table 4 gives the intercorrelations of the criticality indices of stress and the nine stressor groups. This indicates a significant (i.e. $p<0.01$) positive correlation between 'distrust' (F1) and 'role conflict' (0.464) and 'work overload' (0.305). 'Work overload' (F3) is also significantly positively correlated with 'private life' (0.400). Those stressors with significant negative correlations are between 'work underload' (F9) and 'stress' (-0.341), 'distrust' (-0.309), and 'conflict' (-0.378). Seven out of the nine stressors are significantly correlated with the stress variable, including 'work overload' (0.495), 'distrust' (0.498), 'role conflict' (0.447), 'working environment' (0.374), 'job ambiguity' (0.384), 'work underload' (-0.341), and 'private life' (0.321). 'Competitive teamwork' (F4) and 'dynamic task' (F6) are not directly correlated with 'stress', but they are interrelated (0.416). The inter-correlations amongst stress and stressors are illustrated in Figure 1.

< Figure 1 >

Ordinary least squares forward stepwise multiple regression analysis (MRA) was used to predict the stress caused by stressors during the goal setting process (cf: Pallant, 2001; Morgan *et al*, 2001). Table 5 summarises the results, showing that 'Work overload' (F3) was entered into the equation at first, followed by 'conflict' (F2), 'job specificity' (F8), and 'environment' (F7).

< Table 5 >

To overcome the inability of MRA to examine latent variables (Lehman, 1991; Diamantopoulos and Siguaw, 2000), structural equation modelling applied to develop an integrated structural model to cross-check the inter-relationships amongst the stressors (Long and Kahn 1992; McManus *et al* 2002). This is a multivariate technique for testing structural theory, incorporating both observed/measured (indicators) and unobserved (latent) variables (Byrne, 1998; Schumacker and Lomax, 1996). A full structural equation model typically comprises two elements: (i) the measurement model – for describing how each latent variable is measured or operationalised by corresponding manifest indicators; and (ii) the structural model – for describing the relationships between the latent variables themselves and indicating the amount of unexplained variance. For measuring and assessing an acceptable model, goodness-of-fit (or badness-of fit) criteria were formulated by LISREL (Joreskog and Sorbom, 2001; Raykov and Marcoulides, 2000; Diamantopoulos and Siguaw, 2000) during the structural equation modelling, including chi-square (x^2), root-mean-square residual (RMSR), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI) and comparative fit index (CFI).

Based on the correlation coefficients, three structural models were established: *Model I* (a *full model* with two-direction causal relationships amongst stress and the nine stressor groups); *Model II* (a *modified model* with one-way relationship amongst stress and the nine stressor groups); and *Model III* (an *optimised model* with one-way and two-way relationships amongst the stress and nine stressor groups).

< Table 6 >

The goodness-of-fit indexes for *Model I* indicate a poor fit with the data (Table 6). *Model I* needed to be modified, e.g., by deleting parts of items (i.e. indicators) and converting parts of the two-way paths to one-way paths (see Appendices I and II for *Models I* and *II* respectively). Although the χ^2 and RMSR are improved for *Model II*, *Model III* is better, with a χ^2, RMSR, GFI and AFGI of 108.30, 0.057, 0.87 and 0.79 respectively (Table 6).

Figure 2 shows the stressor and stress interrelationships for structural equation *Model III*. These are rather similar to those represented by the correlation coefficients (Figure 1). Again,

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'Distrust' (F1), 'role conflict' (F2), 'work overload' (F3), 'private life' (F5), 'environment' (F7), 'job ambiguity' (F8), and 'work underload' (F9) are the major stressors, while 'competitive teamwork' (F4) and 'dynamic task' (F6) are less significant.

< Figure 2 >

DISCUSSION

The results of the analyses identify 'role conflict' (F2), 'work overload' (F3), 'job ambiguity' (F8), and 'working environment' (F7) as the critical stressors most affecting estimators (Table 5), while 'competitive teamwork' and 'interaction with clients' are of lesser significance. This suggests that estimator stress is more likely to be induced by the tasks involved than company peers or clients. Combining the correlation coefficients (Figure 1) and structural equation model (Figure 2), the causal relationships amongst the stressors and stress can be posited (Figure 3).

< Figure 3 >

This shows 'work underload' (F9) not to be an independent factor in the regression model, but interrelated with 'role conflict' (F2) and influences 'distrust' (F1). 'Distrust' (F1) does not induce stress directly, but indirectly through various other stressors including 'work overload' (F3) and 'role conflict' (F2). Therefore, F1, F2, F3, F7, F8 and F9 all affect, either directly or indirectly, the level of estimator stress.

Figure 3 also shows that 'private life' (F5) in terms of 'social contact' (item 3) and 'family life' (item 4) is influenced by 'distrust' (F1) and 'work overload' (F3), while affecting stress levels. This suggests that both F1 and F3 influence the level of stress through the private life of estimators, e.g., poor social contact and lack support of family life. On the other hand, 'work overload' (F3) also affects 'activities of task' (F6) and 'performance of teamwork' (F4).

The above findings carry some important practice implications on the management of estimation process. First, the consultant/construction company has to provide a comfortable *environment* to the estimators, e.g., sufficient space, quiet office, etc. The records of all

previous projects should be tidily filed to leave the space for a new project. Second, the *roles of estimators* for each project should be clearly assigned. Furthermore, requesting estimators to participate in a several projects simultaneously could be problematic, especially when they are asked to estimate a new works within a short period. The company has to review or relocate the jobs frequently in order to balance the *workload* among estimators. Where possible, a systematic data repository should be set up to encourage information sharing among estimators. Through which, estimators could clarify or make assumptions for the new projects based on historic ones. Third, *team building* through workshops (inside the office) and activities (out of office) could enhance trust amongst the staff, reduce workload (by shortening the information searching period), avoid role conflict, and specify the job. Finally, it would be desirable for consultant/contracting firms to employ a *psychological councilor* to help alleviate the stress of individual estimators (private life), as stress may cause one to burnout or rust out (Schuler and Buller 2000; Lingard, 2003). In fact, some international construction companies have been employing psychological consultants to assist their employees in reducing stress so as to ensure the quality performance of construction projects is improved.

Some comments on the research method are appropriate, as the study described here has clear limitations. For instance, the study used self-report measures, which are of uncertain reliability, and there is a potential risk of common method variance. Also, since this was a generalisation survey, the results can only reveal the relationship between stressors and stress in the general estimation situation. Further research is needed to investigate the manageability of stress, particularly for estimators with different working experiences in different working environments (e.g., design/manufacturing firms) and with different levels of stress tolerance. Lastly, this study did not examine the effect of stress on the accuracy and timeliness of the estimation process. Further research investigating the relationship between stress and performance is desirable in order to determine how stress management could be best applied to improve the performance of estimators. To do this, some qualitative analysis (e.g., via case studies) would be useful to crosscheck results under a controllable environment.

CONCLUSIONS

In this paper, different stressors - including personal, interpersonal, task, and physical stressors - have been identified in connection with the cost estimating process in Hong Kong.

Personal and interpersonal stressors arise from a poor allocation of time between work, social activities and family life, and feelings of distrust or disbelief of colleagues and the organisation. *Task stressors* include vague task objectives, excessive or insufficient workload, difficult tasks beyond an individual's experience or perceived abilities, time pressures, lack of relevant information and unclear responsibilities. Stress may also be caused by the organisation or clients, such as pressures from senior personnel within the organisation, demands from clients, and even disruptions to work plans. *Physical stressors* relate to the appropriateness of the estimator's working environment (e.g., health and work conditions).

Basically, all stressors, except for work underload have a positive relationship with estimator stress. The amount of work overload, specificity of tasks, identification of estimating role, and the physical working environment are significant independent stressors, with the degree of lack of micro-environment trustiness having a significant indirect effect (through the four stressors of workload, specificity, role conflict and environment). Moreover, the amount of workload and feelings of distrust against the organisation also affect the private life of estimators, which ultimately indirectly escalates the level of stress felt in the workplace.

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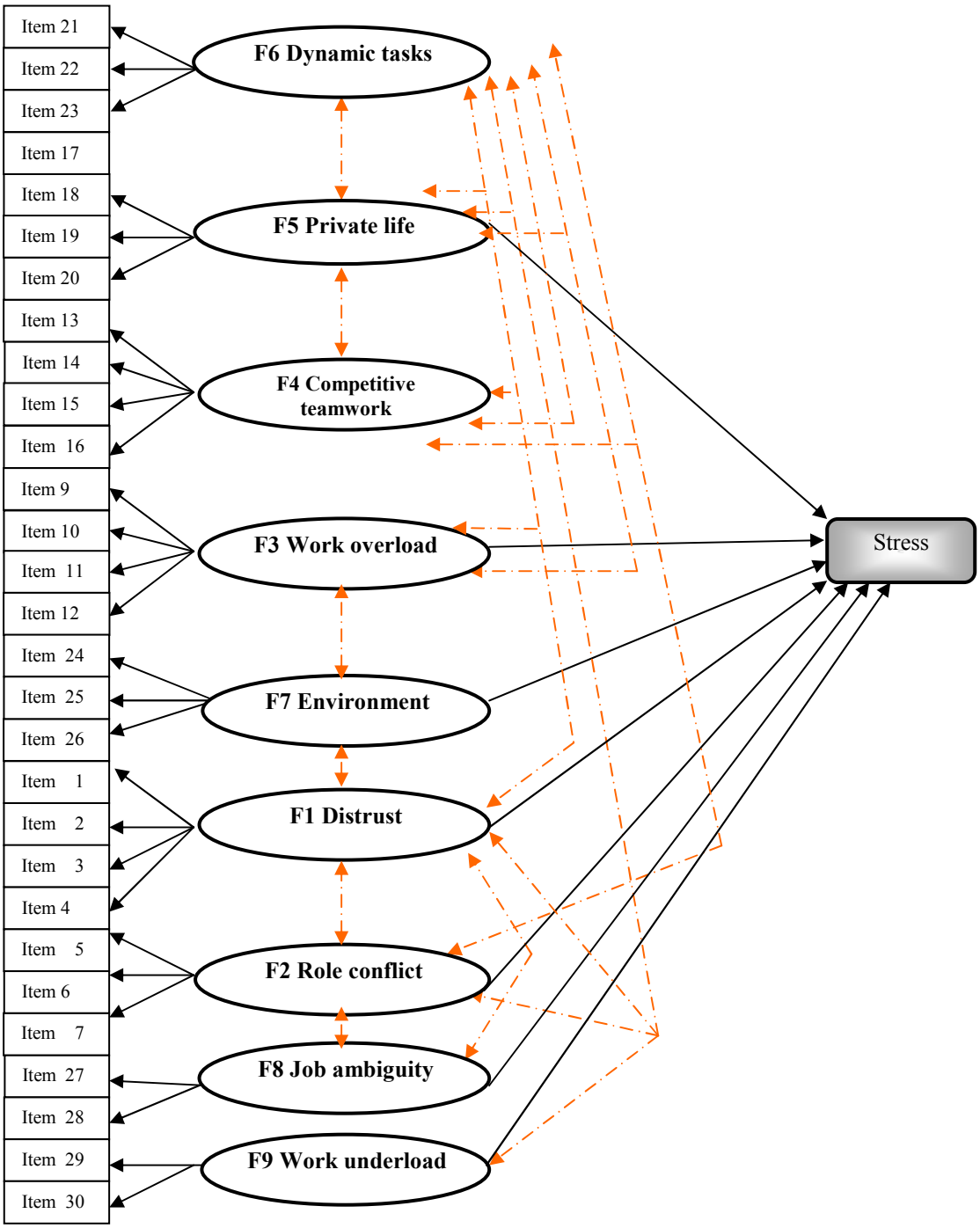
Appendix I Structural Equation Model I (Full Model)



Note: v1 – v30 are the items used to measure the latent factors (see Table 2);
→ one-way relationship between indicators and stressors; and stressors and stress; and
↔ two-way relationship amongst stressors.

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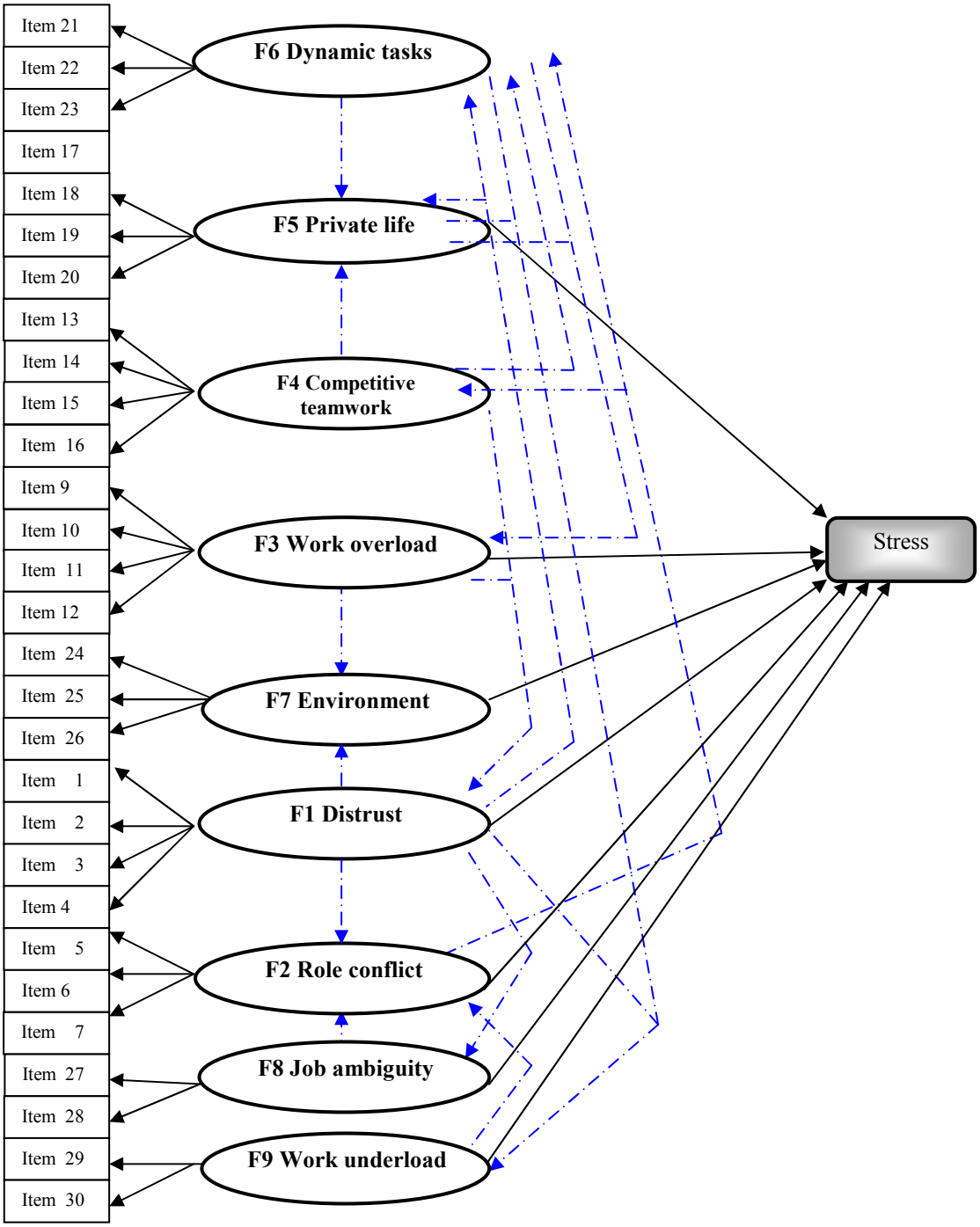
Appendix II Structural Equation Model II (Modified Model)



Note: v1 – v30 are the items used to measure the latent factors (see Table 2);
→ one-way relationship between indicators and stressors; and stressors and stress;
-·-▸ one-way relationship amongst stressors; and

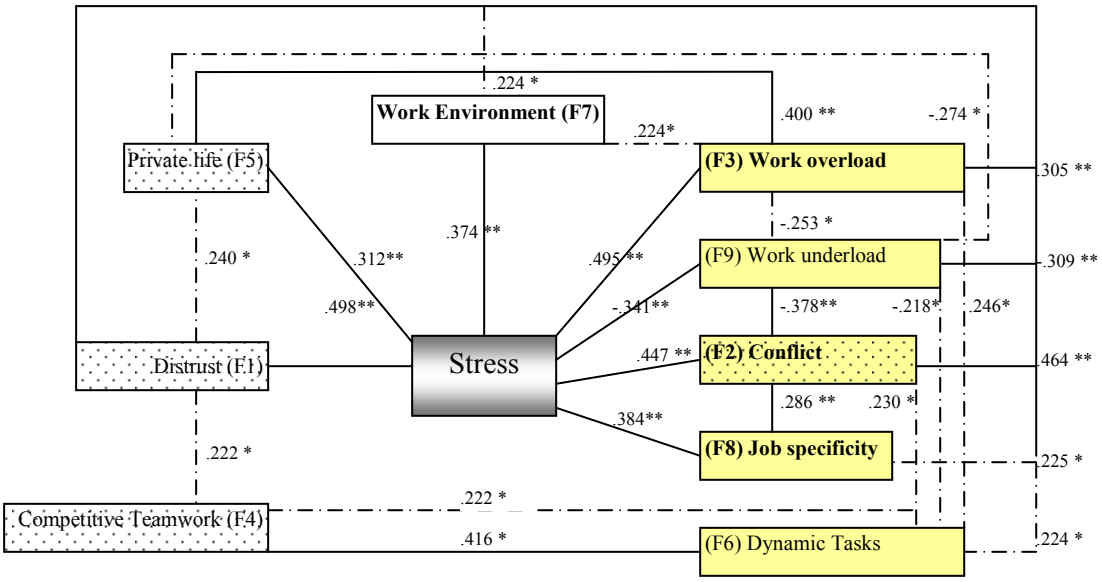


Figure 1 Hypothesised Model based on Results of Correlation Analysis

Note: F2, F3, F7 and F8 consist of an optimised regression model (see Table 4);

———significant relationship ($p < 0.01$**) ; – – – – significant relationship ($p < 0.05$*) ;

Environment-related variables ;

Personal or Interpersonal-related variables; and

Task-related variables.

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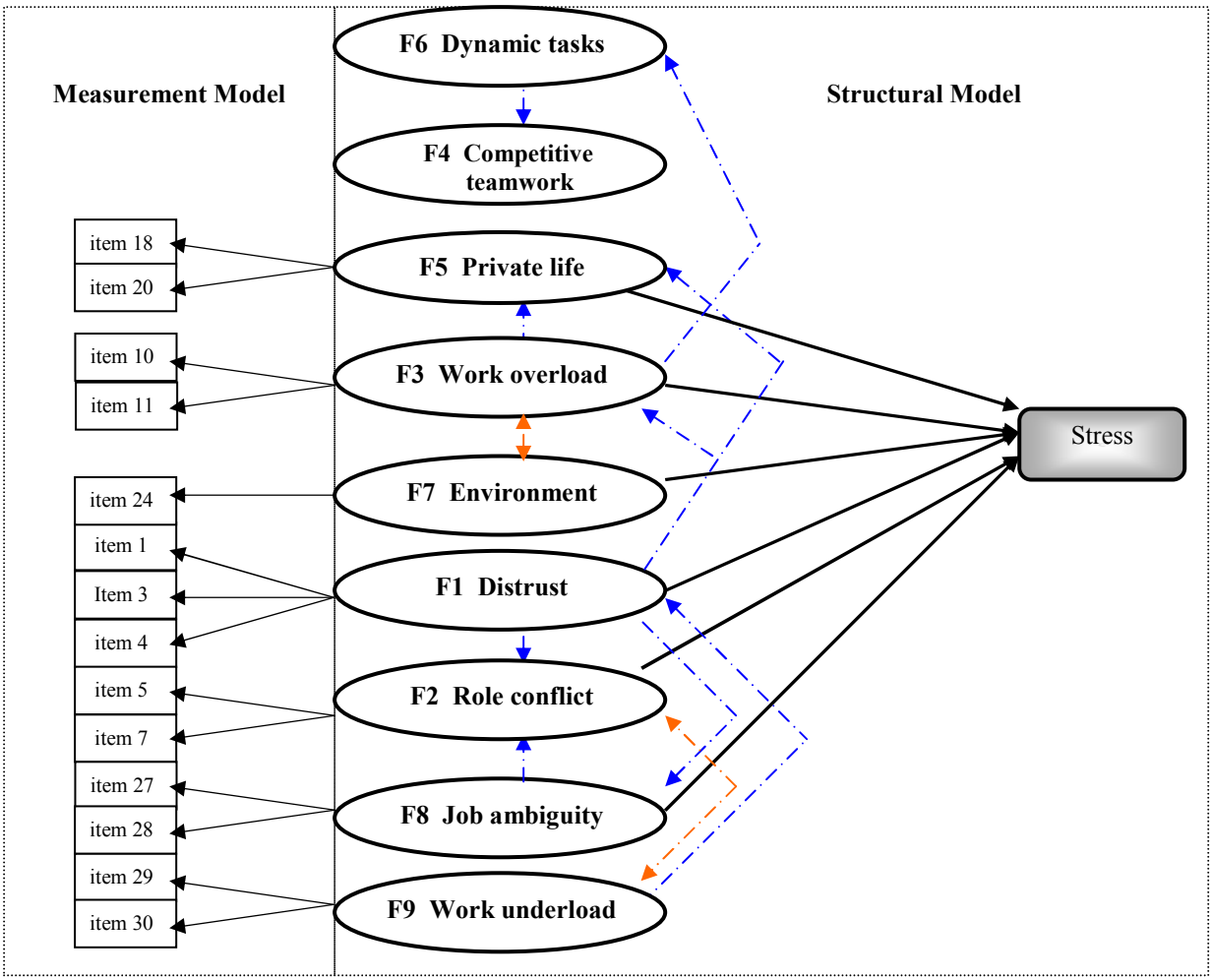

Figure 2 Structural Equation Model III

Note: The 'items' are used to measure the latent factors (see Table 2);

- one-way relationship between items (indicators) and factors (stressors);
- one-way relationship between factors (stressors) and stress;
- one-way relationship amongst factors (stressors); and
- two-way relationship amongst factors (stressors).

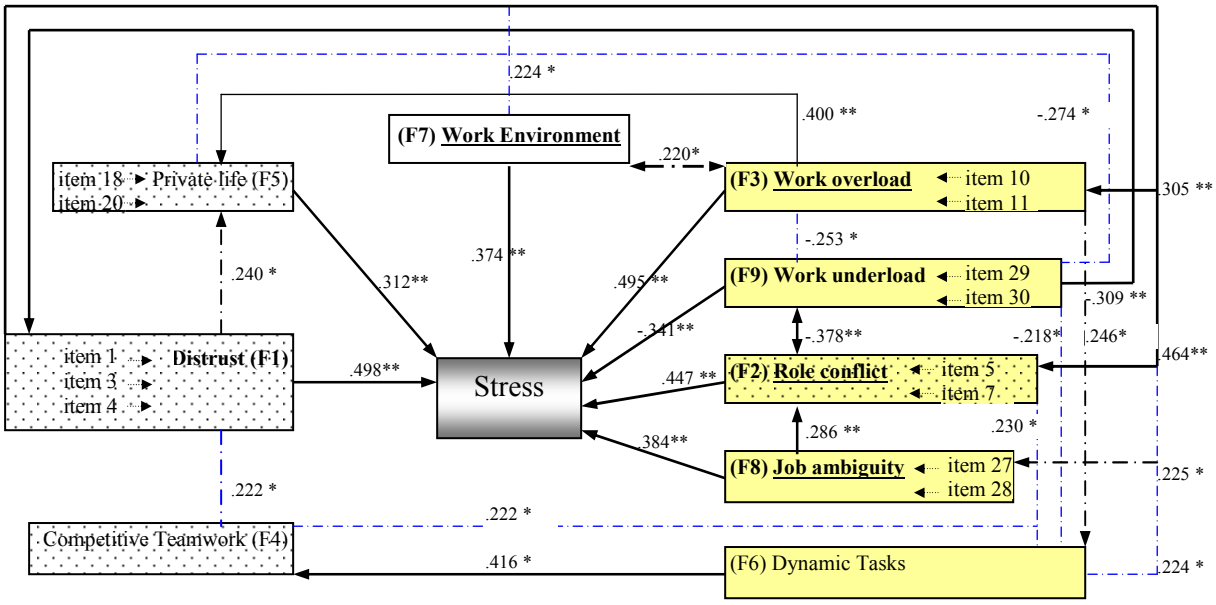

Figure 3 Causal Model of Stressors–Stress

Note: F2, F3, F7 and F8 consist of an optimised regression model (see Table 4);
The items are used to measure the latent factors (see Figure 2) ;
measurement of latent factors ;
causal significant relationship ($p < 0.01$**) ;
two-way causal significant relationship ($p < 0.01$**) ;
significant relationship ($p < 0.05$*) only;
causal significant relationship ($p < 0.05$*) ;
two-way causal significant relationship ($p < 0.05$*)
Environment-related variables ;
Personal or Interpersonal-related variables ; and
Task-related variables.

Table 1 Statement for the Measurement of Stress Level

Statement	EXPECTED ABILITY		ACTUAL ABILITY	
1. The number of deadlines	a) I have to meet	___	b) I am capable of meeting	___
2. The degree to which	a) my skills are used	___	b) my skills could be used	___
3. The number of tasks	a) I have to do	___	b) I am capable to do	___
4. The level of difficulty	a) of my work	___	b) I am capable of doing	___
5. The quality of work	a) I have to do	___	b) I am capable of doing	___
6. The scope and responsibility	a) of my job	___	b) I am capable of handling	___
7. The amount of work in an ordinary day	a) I have to do	___	b) I am capable of doing	___
8. The degree of complexity	a) of my assignment	___	b) I am capable of handling	___
9. The number of projects	a) I have to do	___	b) I am capable of doing	___
10. The number of people	a) I have to work with to get my job done	___	b) I would like to work with to get my job done	___

Table 2 Scale Items, Factor Loadings and Coefficient Alpha Reliabilities for the Stressors

Factors (i.e. Stressors)	**Items**	**Factor loading**	**Alpha**
F1 Distrust /Disbelief	1. There often seems to be a lack of trust between myself and my subordinates.	.773	.800
	2. I seldom delegate tasks because of incomplete the tasks as well as I can.	.757	
	3. I often feel unfair for the organisation treatment.	.647	
	4. My beliefs often conflict with those of the organisation.	.635	
F2 Conflict	5. I often have difficulty deciding between high productivity and high quality.	.773	.745
	6. Things I do are often accepted by one person and not another.	.773	
	7. I am often caught between conflicting demands from my supervisor and staff.	.660	
	~~8. My boss often deals with me in an autocratic and overdemanding manner.~~	~~.475~~	
F3 Work overload	9. There is constant pressure to work every minute, with little opportunity to relax.	.787	.775
	10. I have a lot of responsibility in my job.	.748	
	11. I find it difficult to keep up with the development or new technology of my field.	.658	
	12. I often meet with team members and do not have enough time to myself.	.526	
F4 Competitive teamwork	13. I often believe I am successful because I can get things done faster than others.	.756	.657
	14. I have great opportunity for upward career movement.	.581	
	15. I often have to make decisions affecting the lives of employee.	.575	
	16. My colleagues often compete with another than cooperate with a feeling of team spirit.	.558	
F5 Private life	17. My family/friends would like me to spend more time with them.	.792	.719
	18. My devotion to work is usually in conflict with my devotion to family.	.758	
	19. I often feel that nothing matters in life besides my job.	.603	
	20. I do not have social contact with people at work.	.539	
F6 Dynamic tasks	21. New laws and regulations frequently require me to change the way I do things.	.708	.643
	22. I often find it hard to focus on any one activity for a long period of time (>10 mins).	.704	
	23. My job frequently takes me out of office, visiting work sites.	.680	
F7 Environment	24. My office is too crowded.	.774	.658
	25. I have many interruptions and disturbances in my job.	.773	
	26. My job is physically demanding.	.633	
F8 Job specificity	27. I am not sure I have divided my time properly among task.	.850	.701
	28. My job responsibilities are generally vague, unclear and inconsistent.	.806	
F9 Work underload	29. I feel my skills and abilities are not being used well.	-.807	.721
	30. I frequently find my work boring and repetitive.	-.743	
F10Interaction with client	31. I often have to interact with clients.	.857	.0.38
	32. I am frequently in a hurry.	.516	

Note: All items were measured on a 7-point scale ranging from disagree strongly to agree strongly.
'~~xxx~~' - Items with the factor loadings lesser than 0.50 are deleted in the following data analysis.
Cumulative variance = 69.8%; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.630.

Table 3 Classification of Stress Factors (Stressors)

	Factors (Stressors)	Task	(Inter)personal	Physical
F1	Distrust		✓	
F2	Role Conflict	✓	✓	
F3	Work overload	✓		
F4	Competitive Teamwork		✓	
F5	Private Life		✓	
F6	Dynamic Tasks	✓		
F7	Environment			✓
F8	Task ambiguity	✓		
F9	Work underload	✓		

Table 4 Means, Standard Deviations and Correlations amongst Stress and Stressors

Factor	M	SD	Alpha	Stress	1	2	3	4	5	6	7	8	9
STRESS	7.02	5.86	0.70										
F1 Distrust	14.11	3.97	0.80	.498**									
F2 Role conflict	10.85	3.00	0.74	.447**	.464**								
F3 Work overload	16.52	2.84	0.78	.495**	.305**	.168							
F4 Competitive teamwork	10.16	2.68	0.66	.199	.222*	.222*	.183						
F5 Private life	10.87	3.01	0.72	.312**	.240*	.174	.400**	.273*					
F6 Dynamic tasks	9.48	3.01	0.64	.065	.224*	.230*	.246*	.416**	.223*				
F7 Environment	12.37	1.87	0.66	.374**	.224*	.175	.224*	.135	.159	.025			
F8 Job ambiguity	7.10	2.20	0.70	.384**	.225**	.286*	.037	.104	.059	.185	.034		
F9 Work underload	7.97	2.16	0.70	-.341**	-.309**	-.378**	-.140	-.135	-.274*	-.218*	-.162	-.156	
~~F10 Interaction~~	~~4.43~~	~~1.43~~	~~0.38~~	~~.141*~~	~~.068~~	~~-.003~~	~~.079~~	~~-187~~	~~.055~~	~~.035~~	~~.132~~	~~-.001~~	~~-.020~~

Note: Total sample size: 87; 'M' – mean ; 'SD' Standard Deviation ;
F1 = v1+v2+v3+v4 ; F2 = v5+v6+v7 ; F3 = v9+v10+v11+v12 ; F4 = v13+v14+v15+v16 ; F5 = v17+v18+v19+v20 ;
F6 = v21+v22+v23 ; F7 = v24+v25+v26 ; F8 = v27+v28 ; F9 = v29+v30 ; v10 = v31+v32 ('Table 2' refers);
Correlations are significant at p<0.05* or p<0.01** ; and
~~'F10'~~ is deleted in the following study due to the low Alpha scale (0.38).

Table 5 Regression Model for the Prediction of Stress

MODEL		Unstandardised Coefficients		*t*	Sig.	R	R^2
		B	Std. Error				
1	(Constant)	-11.936	3.123	-3.822	.000	.550	.309
	F3	1.148	.186	6.158	.000		
2	(Constant)	-17.034	3.140	-5.425	.000	.649	.421
	F3	1.019	.175	5.840	.000		
	F2	.666	.165	4.038	.000		
3	(Constant)	-20.084	3.120	-6.437	.000	.697	.486
	F3	.984	.166	5.939	.000		
	F2	.539	.161	3.346	.001		
	F8	.704	.217	3.249	.002		
4	(Constant)	-27.276	3.691	-7.391	.000	.738	.545
	F3	.886	.160	5.542	.000		
	F2	.463	.154	3.000	.004		
	F8	.693	.205	3.373	.001		
	F7	.787	.242	3.252	.002		

Table 6 Fit Indices of the Structural Models I, II and III

Model	df	x^2	df /x^2	RMSR	GFI	AGFI	CFI	Remarks
I	303	1693.97	0.18	0.210	0.45	0.26	0.05	see Appendix I
II	323	1597.10	0.20	0.190	0.48	0.34	0.13	see Appendix II
III	72	108.30	0.66	0.057	0.87	0.79	0.91	see Figure 2

*df = degree of freedom; x^2 = chi-square; RMSEA = Root mean square residual; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; CFI = Comparative Fit Index; p<0.01; **p<0.001*

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