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Confirmatory factor analysis of the Occupational Stress Inventory-Revised among Australian teachers

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Abstract

Assessing teacher stress has been a difficult and complex process, especially when comparisons across different professions have been considered. The Occupational Stress Inventory- Revised (OSI-R) offers a means of making such comparisons. The OSI-R model is theory-based and assesses the effects on the individual of three areas: occupational roles, psychological strain and coping resources. This current study reports the findings of confirmatory factor analyses of the three-factor stress model of the OSI-R, using a sample of 141 Australian teachers. It also reports the findings for a four-factor solution – with results demonstrating the four-factor model better fits the responses in the teacher sample but with more error than desirable. Further research is ongoing.

*Confirmatory factor analysis of the Occupational Stress Inventory-Revised
among Australian teachers*

Teacher stress seems to be a universal phenomenon in Western countries, a phenomenon that has been recognised for over more than 25 years and across many studies (e.g., Borg & Riding, 1991; Brown, et al., 2002; Farber, 1991; Jacobsson et al., 2001; Kyriacou, 1998, 2002; Kyriacou & Sutcliffe, 1979; Laughlin, 1984; Mearns & Cain, 2003; Naylor, 2001; Rudow, 1999). Australia is no exception (e.g., Fujiwara & Hicks, 2005; Manthei & Gilmore, 1996; Pithers & Fogarty, 1995; Pithers & Soden, 1998). However, no standard models exist on how to measure teacher stress. Those models or questionnaires that do exist have often not been well-validated, nor are they able to be used comparatively with other professions.

The current study reports on a model of stress that has the potential to provide a standardised questionnaire- the Occupational Stress Inventory-Revised (OSI-R), that can be used across professional groups (enabling comparisons) and which appears to incorporate or integrate previous teacher-stress models. The aim of the study was to provide initial validation among secondary school teachers of the model, using confirmatory factor analysis.

The Occupational Stress Inventory- Revised (Osipow, 1998) is a psychometrically validated stress questionnaire built on a broad theoretical base and with normative data (enabling comparisons with other professional groups). The OSI-R assesses three inter-related overall dimensions each important in the experiencing of occupational adjustment-- occupational role stress, psychological strain and coping resources. These dimensions and the sub-scales in each are shown in Figure 1.

Scale	What Each Scale Measures
Occupational Roles Questionnaire (ORQ)	
Role Overload	Job demands, resources, and ability to complete tasks ***
Role Insufficiency	Fit between skills and job, needs for recognition, boredom
Role Ambiguity	Awareness of one's work expectations
Role Boundary	Level of conflict in loyalties and priorities in workplace
Role Responsibility	Feeling of responsibility of welfare and performance of others
Physical Environment	Exposure to stressful work environment (e.g., heat, noise)
Personal Strain Questionnaire (PSQ)	
Vocational Strain	Attitudes towards work, problems in work quantity/quality
Psychological Strain	Whether employees are experiencing psychological problems
Interpersonal Strain	Degree of disruptions in interpersonal relationships
Physical Strain	Symptoms of physical illness and worries about their health
Personal Resources Questionnaire (PRQ)	
Recreation	Level of recreational and leisure activities engaged
Self-Care	Participation in stress-reducing habits (e.g., adequate sleep)
Social Support	Feeling of having support and help from others
Rational/Cognitive Coping	Knowledge and use of cognitive techniques to deal with stress

FIGURE 1: *Scale Descriptions of the OSI-R*

The OSI-R theoretical model of stress (the OSI model) hypothesises that stressors originating in the work environment influence how individuals perceive their work roles; that when work stressors interact with stress-inducing work roles, personal or psychological strain results; and finally that the variety, strength and level of coping resources an individual possesses influences both the presence and level of strain.

This model appears to integrate in one questionnaire the variety of earlier approaches that were not complete in any one set of studies but emphasised (a) the *sources of stress* or the impact of the environment on stress (e.g., Borg & Riding, 1991; Brown et al., 2002; Cooper, 1998; Kyriacou & Sutcliffe, 1978; Mearns & Cain, 2003) and (b) in only a few studies, the interaction between environmental sources and the cognitive appraisal process or, more succinctly, the *causes of stress* (why the individuals responded with stressed reactions (c.f., Moracco & McFadden, 1982). Reactions to stressful situations have been extensively studied (supporting the comment earlier that teacher stress is a universal phenomenon and problem) (e.g., Dunham, 1980, 1984; Kinman, 2001; Naylor, 2001).

However, while citing the likely advantages of a questionnaire that will integrate earlier theories or models of teacher stress and that will enable comparisons across a variety of professions, it is necessary to examine the model itself and confirm whether or not the model “holds up” under analysis or can be improved. This rationale was behind the current confirmatory study of the three-factor model underlying the OSI-R, and the subsequent proposed four-factor model.

METHOD

The survey sample response consisted of 141 secondary public school teachers from rural and suburban areas of south-east Queensland (a response rate of 57 percent, compared with the 240 questionnaires sent to teachers who had expressed interest). Teachers received a stamped, addressed envelope containing the OSI-R and a “demographic” questionnaire which also included questions similar to those used consistently in earlier studies examining teacher stress. This latter questionnaire is not examined in the current report but yielded results similar to previous studies (Fujiwara & Hicks, 2005).

An exploratory factor analysis was conducted and indicated the likelihood that a four-factor rather than a three-factor model might more clearly define the underlying structure of the OSI-R. It was decided to examine which of two models, a three-factor model or the four-factor model, best explained the underlying concepts or latent structure of the questionnaire.

As shown in Figure 1, there are fourteen scales. These scales are summed to obtain overall results in each of the three main dimensions of the OSI-R. This “three-factor” model was examined first, using the 141 sets of full responses from the teachers. Next, based on the earlier exploratory factor analysis, a four-factor model was examined. The results are presented next. It should be noted that all of the 14 scales have demonstrated high levels of reliability (alpha coefficients between 0.70 and 0.89, as reported in the Professional Manual for the OSI-R; Osipow, 1998, p.26).

RESULTS

Confirmatory Factor Analyses of the three and four factor models were conducted using LISREL 8.0. Neither the three or four factor solutions exhibited adequate fit. However, a difference chi-square indicated significantly better fit for the four factor solution than the three factor solution ($\chi^2(1) = 83.37, p < .001$).

The model chi-square for the three factor solution (Figure 2) revealed significant variation between the data and model ($\chi^2(76) = 257.60, p < .001$) indicating poor overall fit. Poor fit was also indicated by the fit functions (NFI = .64, NNFI = .72, Tucker-Lewis = .59, NCI = .70). The RMSEA also indicated substantial unexplained variance in the three factor solution (RMSEA = .132).

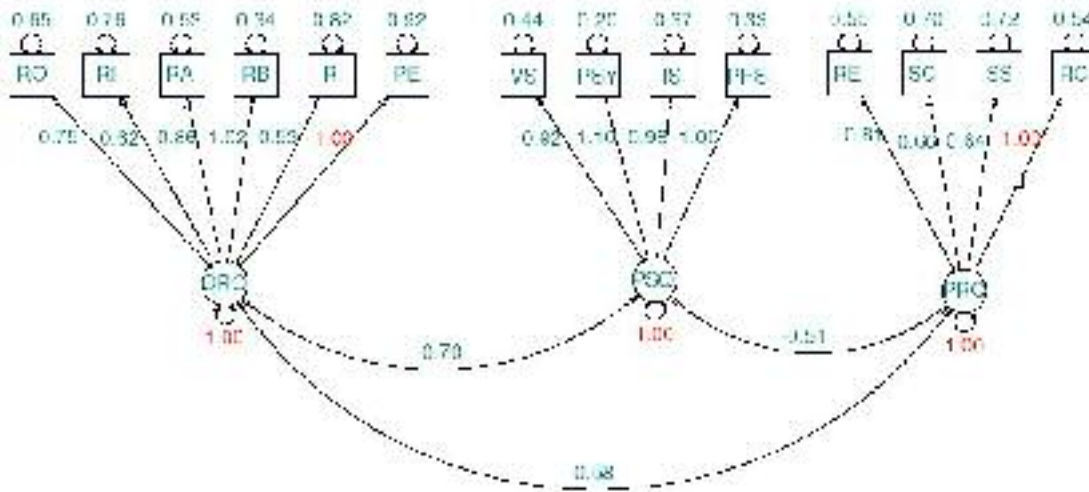


Figure 2- The Three Factor solution

The four factor solution (Figure 3 below) also shows inadequate fit although it appears somewhat better in terms of both the model chi-square ($\chi^2(76) = 257.60, p < .001$) and the fit functions (NFI = .76, NNFI = .82, Tucker-Lewis = .67, NCI = .81) than the three factor solution reported above. The RMSEA also indicated higher than desirable levels of unexplained variance in the four factor solution (RMSEA = .132).

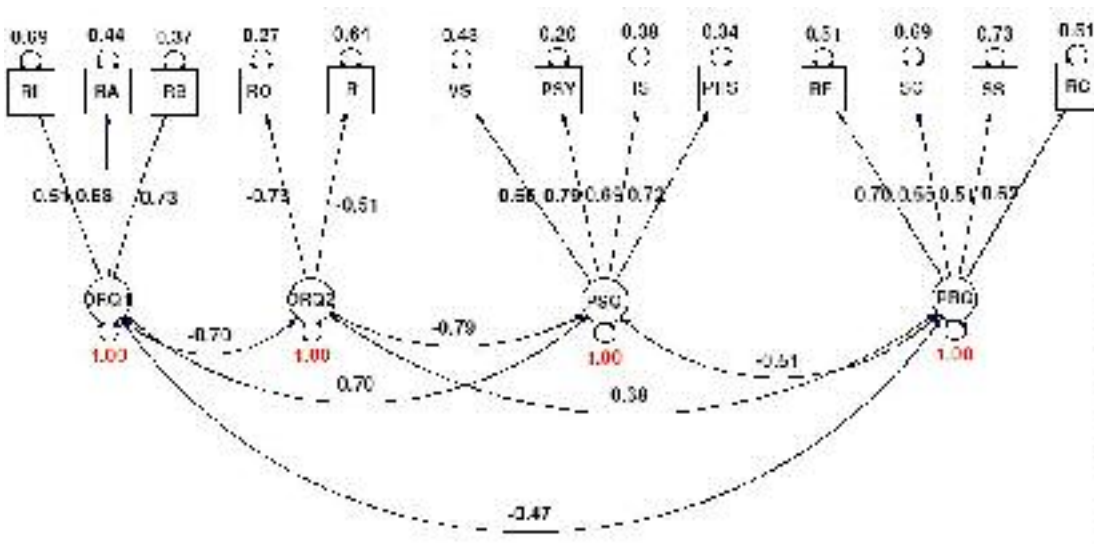


Figure 3: The Four Factor solution

DISCUSSION

The total n available in the current study is marginal for CFA analyses (that is to say that the ratio of variable to cases of 14 to 141 or 1:10, is somewhat unfavourable and as such the analysis may be unstable- although more likely it simply lacks sufficient power). This may contribute to the overall lack of fit in both instances and further studies are under way to increase the sample size of secondary teachers. (In addition wider professional groups are completing the OSI-R; further CFAs for mixed and comparative samples may be reported in due course).

The main implication of the finding that a four-factor model is more likely to reflect the latent structure of the OSI-R than the three-factor model (subject to further research) is that the OSI-R might better be described in these terms.

It should be noted that the results CONFIRM that two of the three major current factors are stable and valuable factors of use directly in describing teacher stress and research arising from teacher stress (that is, the *Personal Strain* scale of four sub-scales, and the *Personal Resources* scale of four sub-scales). However, the current third composite factor, the Occupational Roles scale may be better described as two separate scales. The two factor-scales may be tentatively described as “Role Clarity” (comprising Role Insufficiency, Role Ambiguity and Role Boundary), and “Role Workload” (comprising Role Overload and Role Responsibility), though further research is needed into the concomitants of these two factors before final commitments to relevant titles/factor names can be made. One sub-scale has been left “hanging” – (the Physical Environment scale, as a contributing factor to teacher stress). Its importance as an independent scale will need to be assessed elsewhere, also from further research. It is likely that delineation of such factors will, however, contribute to clearer understanding of the teacher stress environment and enable better measurement of this complex area in due course.

In the meantime professional clinicians and researchers should concentrate their attention on using the 14 scales independently, and, where a composite or overall score is required, should give most attention to the two confirmed composite dimensions of Personal

Strain, and Personal Resources. The individual scales will give clearest indication of the levels of occupational role stress faced by secondary teachers. In the meantime it is hoped that further ongoing research using larger numbers and different occupational groupings will in due course clarify the latent structure of the OSI-R.

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