Assessing Stress at Work across Occupations and Cultures
Using the Occupational Stress Inventory Revised

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Workplace stress is common across occupations and across nations. However, there has been limited research examining the similarities and differences across cultures, and none that seem to have used a direct comparison across one professional area using the same extensive and validated questionnaire. One such questionnaire is the Occupational Stress Inventory-Revised (OSI-R: Osipow 1998) which assesses three main dimensions related to stress: “occupational roles” (stressors), “personal strain” (experienced stress), and “personal resources” (coping resources). The current study examined a cross-national application of the OSI-R among Australian and Turkish teachers to identify whether patterns of latent structure of the OSI-R were similar (and therefore whether the questionnaire would be useful in wider research and professional application). Structural equation modeling and fit indices results generally confirmed the three-dimensional model posited by Osipow and also suggested that the occupational role stress dimension could be subdivided: the similar latent factor results obtained across cultures for the teacher samples suggesting the stability of the OSI-R in this cross-cultural workplace setting. The general implications for research and practice are discussed.

Field of Research: Management

1. Introduction

Many countries report studies of workplace stress among workers, professionals of all kinds, administrators and managers, and many others, including students and teachers. Some recent studies include those on general workplace stress by Daniels (2006) and Johnson et al. (2005); on interventions to reduce stress outcomes at work by La Montagne et al. (2007); on stress in the health and service industries by Barton (2009), De Jonge et al. (2008) and Dollard and de Jonge (2003); and in the education industry, by Sabanci (2011) on the relationship between teacher stress and a healthy school organisation, Hicks, Fujiwara and Bahr (2006) on stress among Australian teachers and a little earlier (in summaries on teacher stress across different countries or regions), in papers by Jacobsson, Pousette and Thylefors (2001, Sweden), Kinman (2001) and Kyriacou (2001) on UK teacher stress, and Mears and Cain (2003) and Rudow (1999) on European teacher stress. Importantly, however, there is also interest in assessment issues- in identifying accurately how occupational groups and countries may be similar to and different from each other in their experiencing of stress. But many of the cited studies use different questionnaires to assess stress in the workplace and this causes problems for comparative stress research.

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Thus, a major limitation of past studies on stress at work lay in the non-comparability of the stress measures used, and the inability to ascertain clearly whether stress levels found are related to the profession or nation, or to the profession-specific or cultural-specific nature of the assessment devices used. An aim of the current study was to examine a model of stress that could enable accurate cross-nation and cross-group comparisons, using similar constructs.

There is continuing interest in stress in the workforce, and case studies of different groups of employees where the same inventory is used can inform comparisons directly. For example, there have been many studies of office workers, the police, nurses, teachers and other professional and semi-professional and trade groups (cf., Osipow 1998) but few use the same constructs or questionnaires. We were interested in whether the factor structure and integrity of the Occupational Stress Inventory-Revised- the OSI-R were at a high level and thus would help provide the ‘missing link’ for detailed research on occupational stress and its related factors. The significance would be considerable if similarities across different professional and business groupings and also nations were found in the psychometric structure of the OSI-R. This is because a common measuring instrument would then be available enabling directly comparable cross-cultural research in the professions and business groups, using the same basic questionnaire. Differences and similarities identified could then be related to the variables assessed within the questionnaire, rather than results being questioned when different ‘profession-specific’ or ‘nation-specific’ questionnaires are used.

As indicated in Hicks (2011), there are few standardised models of stress measurement, and even then only limited information on model constructs that ‘cover the field’ and use effective measurement (cf., Dollard & De Jonge 2003). However, the OSI-R (Osipow 1998) is based on a model of stress that covers the major influences associated with stress and has the potential to be a questionnaire that provides the resource needed for comparative research and applications. The current study is different from previous studies in that it uses the one ‘general’ questionnaire, the OSI-R, in a study in Turkey among teachers, and compares findings on the psychometric properties obtained in the Turkish sample with those reported in the OSI-R Manual (Osipow, 1998; Hicks, Bahr & Fujiwara 2010) and found in an earlier Australian study (Hicks, Fujiwara & Bahr 2006).

In the sections which follow an outline is given of the theoretical model that underlies the structure of the Occupational Stress Inventory- Revised; the research questions and hypotheses are presented (concerning the expected replication of the OSI-R structure among Turkish teachers); the method followed is indicated (in the administration of the OSI-R in Turkey, and comparison with an Australian study); the results are presented (including results of the confirmatory factor analysis and comparisons of the Turkish, Australian and manual data); and the discussion outlines the consistencies in the findings and the limitations of the study, with a concluding statement on the importance in theory and practice of the findings.

2. Underlying Theory and the Research Hypotheses

2.1 A Theoretical Model Underpinning the OSI-R

The OSI-R model of stress involves three inter-related overall dimensions related to stress: occupational role stressors, personal strain, and personal coping resources, each assessed through dimensions or questionnaires and their sub-scales. The underlying
hypotheses (theoretical bases) are that stressors originating in the workplace environment influence how individuals perceive their work roles; when the work stressors interact with stress-related work roles then strain results; and finally that the availability and level of coping resources possessed by the individuals in turn influences the presence and level of strain experienced.

To assess each of these areas or domains (roles, strain, and coping resources possessed), three questionnaires as part of the full OSI-R were developed.

The Occupational Roles Questionnaire (ORQ) includes six sub-scales: role overload, role insufficiency, role ambiguity, role boundary, role responsibility, and physical environment. The Personal Strain Questionnaire (PSQ) includes four sub-scales: vocational strain, psychological strain, interpersonal strain, and physical strain. The Personal (Coping) Resources Questionnaire (PRQ) includes four sub-scales: recreation, self-care, social support, and rational/cognitive coping—each aspects of coping.

The OSI-R overall model argues that work environment stressors and work roles produce personal strain, with that strain influenced by the variety, strength, and level of coping resources available to the individual (Osipow 1998).

2.2 The Research Hypotheses: Using the Turkish Teachers as a Case Study

The Occupational Stress Inventory-Revised has been a useful instrument in organizational assessment for several decades (including in its earlier version). The Manual reports several relevant norms and standards for different occupational groups (Osipow 1998), and there have been numerous studies reported using the questionnaire in occupational and health settings. The questionnaire may well be useful in a much broader context of cross-occupational and cross-national research, if it can be found to have good psychometrics and factor structure. Hence the thrust of the current study using teachers as a case study.

Would these three major dimensions of the OSI-R (occupational role stressors, experienced personal strain, and personal coping resources) be replicated in the Turkish sample of teachers (would the overall questionnaire model 'hold-up')? Specifically, would the Turkish teachers show similar response patterns to those of the Australian sample reported earlier (Hicks, Fujiwara & Bahr 2006), and would the pattern found in the OSI-R Manual data also be replicated? This current study examined the performance of the OSI-R in Turkey, using confirmatory factor analyses of the data collected from Turkish teachers. The solution obtained from the Turkish sample was then compared to the original Australian data using matched fit indices to enable direct comparisons.

3. Method

Approvals for the research and cross-national comparisons using the OSI-R were obtained from the relevant universities (Akdeniz, and Bond), education departments, and from PAR- Psychological Assessment Resources (for the Turkish translation and pilot studies of the OSI-R). Standard translation and repeated back translation procedures were followed stringently and final approvals obtained before we commenced data gathering in Turkey.
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The Turkish participants were 390 teachers with an average of 7.0 years or more experience in teaching; all except five possessed a minimum university level four-year diploma or degree in teaching with masters and doctoral degrees also held; all were employed in the government secondary school system in urban and rural schools. The 141 Australian teachers all possessed a minimum university level four year training and were teaching in the government secondary school system also in a mix of urban and rural schools.

A variety of occupational groups is also listed in the Manual (Osipow 1998), along with the Table of Inter-Correlations of the fourteen facets of the questionnaire that make up the three domains (occupational roles, personal strain, and personal coping resources).

4. Results - With Comment

4.1 General Finding

The study aimed at replicating previous studies, but in a different cross-cultural context, that is, in Turkey. Confirmatory factor analyses using LISREL 8.0 were conducted to investigate the fit of the OSI in Turkish teachers (See Figure 1). The solution obtained is indeed similar to previously obtained results both for the dataset from the original normative manual data and with the Australian teacher data previously reported. These findings of similarity in the psychometric and factorial structure of the OSI-R across nations are elaborated in the Discussion. The specific fit findings follow for the Turkish sample.

4.2 Comparative and Fit Statistics

The 3-factor solution, while moderately confirmed as shown in Figure 1 for the Turkish teacher sample, does not however, indicate a fully satisfactory fit (refer to Table 1). The solution and corresponding fit statistics are nevertheless consistent with previously published analyses of both the manual data (Hicks, Bahr & Fujiwara 2010) and of the Australian sample (Hicks, Fujiwara & Bahr 2006).
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Figure 1: Three factor CFA solution for the OSI-R with a sample of Turkish Teachers (n = 390)*

Notes to Figure 1:
*Similar analyses of the Australian data can be found in Hicks et al., 2006, and of the original manual data in Hicks et al., 2010.

ORQ = Occupational Role Questionnaire with RO = role overload; RI = role insufficiency; RA = role ambiguity; RB = role boundary; R = responsibility; PE = physical environment
PSQ = Personal Strain Questionnaire with VS = vocational strain; PSY = psychological strain; IS = interpersonal strain; PHS = physical strain
PRQ = Personal Resources Questionnaire with RE = recreation; SC = self-care; SS = social support; RC = rational/co cognitive coping

The available comparative statistics follow the usual inclusion of several common fit indices and are shown in Table 1. Adequate model fit would be demonstrated by (1) non significant model chi-square statistics, (2) general fit indices scores exceeding .90 (NFI, NNFI, NCI, GFI, AGFI); and (3) low unexplained residual variance (RMSEA) for the solution. Bentler (1980) recommends values of RMSEA of less than .08 (8%).

Table 1: Comparison of fit statistics for the SEM from two samples: The Australian & Turkish Teacher Samples

<table>
<thead>
<tr>
<th>Fit Statistic</th>
<th>Australian(n=147)</th>
<th>Turkish(n=390)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model $\chi^2$</td>
<td>221.35***</td>
<td>325.42***</td>
</tr>
<tr>
<td>NFI</td>
<td>0.77</td>
<td>0.84</td>
</tr>
<tr>
<td>NNFI</td>
<td>0.79</td>
<td>0.82</td>
</tr>
<tr>
<td>CFI</td>
<td>0.83</td>
<td>0.86</td>
</tr>
<tr>
<td>GFI</td>
<td>0.82</td>
<td>0.89</td>
</tr>
<tr>
<td>AGFI</td>
<td>0.74</td>
<td>0.83</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.08</td>
<td>0.10</td>
</tr>
</tbody>
</table>

The model fit chi-squares for both the Australian and the Turkish samples are significant, each indicating some disagreement between the sample data and the three-factor original model.

A difference of chi-square analysis indicates that the Turkish model fits slightly less well than does the original Australian teacher sample ($\chi^2(1) = 104.07$, p<.001; using a matching
set of fit metrics to allow direct comparison between the two models). However, the apparent misfit is most likely an artifact of sample size. Chi-square fit sensitivity is known to increase with sample size, which is why the alternative fit indices are often preferred. Both solutions rapidly converged; the Australian solution converged in 7 iterations and the Turkish in 15 iterations.

In terms of the fit indices themselves, the Turkish data has comparable fit to the Australian data. There is some general improvement in fit scores in the Turkish sample as compared to the Australian sample. In particular, the 10% residual variance suggests that the model itself covers the main elements of importance in the stress area: involving the 14 subscales identified, along with the three questionnaires involved.

4.3 Results - Congeneric Analyses

To investigate fit similarity and discrepancy in more detail, congeneric analyses of the Australian and Turkish studies were conducted for each factor in isolation (results shown in Table 2).

As should be noted because of the importance for research and practice, two of the three main dimensions as assessed by specific questionnaires (Personal Strain PSQ, and Personal Resources PRQ) were reflected relatively accurately and directly in both the Turkish and the Australian models. In the Australian sample the PRQ fit as indicated by the model goodness of fit is better than the PSQ fit, and this relationship is reversed in the Turkish sample. However, despite this difference, the fit indices indicate adequate fit for both subscales in both samples.

More significantly, as previously speculated, the analysis revealed that the source of model misfit appeared to be within the remaining dimension (ORQ- Occupational Roles Questionnaire).

### Table 2: Comparison of single factor modeling (congeneric) fit statistics for the individual factors in the Australian teacher sample, & the Turkish teacher sample

<table>
<thead>
<tr>
<th>Fit Statistic</th>
<th>Australian(n=141)</th>
<th>Turkish(n=390)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PSQ</td>
<td>PRQ</td>
</tr>
<tr>
<td>Model χ²**</td>
<td>21.72*</td>
<td>3.61</td>
</tr>
<tr>
<td>NFI</td>
<td>.94</td>
<td>.96</td>
</tr>
<tr>
<td>NNFI</td>
<td>.83</td>
<td>.94</td>
</tr>
<tr>
<td>CFI</td>
<td>.94</td>
<td>.98</td>
</tr>
<tr>
<td>GFI</td>
<td>.93</td>
<td>.99</td>
</tr>
<tr>
<td>AGFI</td>
<td>.64</td>
<td>.94</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.05</td>
<td>.03</td>
</tr>
</tbody>
</table>

5. Discussion

The results showed findings similar to the psychometric and factorial structure of the OSI-R presented in earlier separate cultural studies. The fit of the Turkish data to the model as shown in Figure 1 and the data analyses show comparable findings to the fit observed in the prior studies (Hicks, Fujiwara & Bahr 2006; Hicks, Bahr & Fujiwara 2010) including with the data shown in the Professional Manual of the OSI-R (Osipow 1998). The three-factor
structure of the OSI-R has been replicated with Figure 1 showing the expected major relationships whereby occupational role stress is positively related to personal strain and negatively to personal resources; and with personal strain and personal resources also being negatively related- that is, the stronger the personal resources, the less the personal strain experienced. This suggests that the instrument is relatively stable cross-culturally in as much as the overall pattern of instrument strengths and weaknesses is consistent across two quite different cultural settings, and is consistent with the original three-dimensional conception in the stress model.

That is, the Occupational Stress Inventory- Revised appears to help meet the need for a measurement instrument that can be used for comparative studies across national borders (certainly at least across the US-Australian-Turkish borders). Because of the relative stability of the scale analyses across these separate samples it appears the OSI-R would be useful in broader national comparative contexts. The model itself is useful as it covers occupational stress in three major facets- occupational roles that are carried with associated stress; the personal resources that individuals possess that help in handling the resulting stress; and the personal strain experienced: all important and common attributes in studies of stress in occupations. These findings are in line with previous arguments that the data supports practical /professional and research uses of the OSI-R on the basis of its utility and broad fit.

However, as with the previous studies, the model fit is best for the Personal Strain and Personal Resources questionnaires and less strong for the Occupational Roles Questionnaire. There are some limitations evident from the structural equation modelling and the fit analyses conducted affecting whether a three-factor structure is optimal. There appears to be room for refinement; for example while the three-factor solution has been moderately supported by the results presented here, clarification is needed of one of the factors - that is, of the Occupational Roles Questionnaire and its six sub-scales: to maximize domain fit and to explore dimensionality. It may be that the ORQ is itself better construed as a higher order factor with at least two sub-domains- as argued elsewhere (Hicks, Fujiwara & Bahr, 2006). Further studies are needed. The implications for research study and professional use are that the total score on the six-scale ORQ (or the five-scale sum as suggested by Osipow 1998, omitting the environment scale) should NOT be used where more detailed understanding of the effects of role stress are required. Instead either the six scales should be used separately, or, based on research reported here and earlier (Hicks, Fujiwara & Bahr 2006), emphasis might be given to three sub-factors (one involving a combination of role overload and role responsibility; a second a combination of role ambiguity, role boundary, and role insufficiency; and a third the somewhat separate ‘environment’ sub-factor).

Limitations exist. Despite the suggestions made and despite the similarities and minor differences found in the study compared with the Manual and previous research, it has not been possible to examine the effect of political and environmental contextual differences. Turkish and the Australian are different and may be responsible for some of the ambiguous results found in responses on some of the scales: such as in the PSQ and PRQ differences referred to). Other limitations include the sampling sizes of the studies (390 teachers, Turkey; 141 teachers, Australia) – plus some minor demographic
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differences in years of education and training, in teachers’ ages and in the classroom contexts. However, despite the limitations, the results were relatively stable across the two samples and in addition were consistent with analyses of over 900 respondents in the US professional sample reported in the Manual and the Hicks, Bahr and Fujiwara (2010) study.

Ongoing exploratory psychometric and factor analytic studies are being conducted using the OSI-R in several Australian employee groups (e.g., transport workers, aviation ground staff, health and education administrators). The studies include research comparing the OSI-R domains with personality variables, mental health and well-being, emotional intelligence and coping styles of professionals, employees, and students in different occupationally related degree programs. One research implication from the current study relates to these continuing studies: we will be emphasising splitting the Occupational Roles Questionnaire into two or more factors, along with the use of the Personal Strain and the Personal Resources scales. We are also currently looking at further cross-national studies, and welcome collaborative enquiries.

5.1 Conclusion

The work that has been conducted provides support for the professional and research use of the OSI-R across different cultures (though more research is needed) and across occupational, business and professional groups. The findings provide a basis to assist human resource management professionals in the comparative assessment of stress levels across different national regions as well as within professional and other employee groups.

Enquiries are welcomed to rhicks@bond.edu.au

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Hicks, Sabanci & Bahr


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