Typological Mood-State Factors Measured in the Eight State Questionnaire

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Abstract

Previous studies of the higher-order state-change factors in the Eight State Questionnaire (8SQ) have suggested that at least three typological mood-state dimensions are measured in the instrument. Nevertheless, the appropriate dR-factor analytic methodology has not always been employed, and even when it has (e.g. Boyle, 198Sa), the sample size has been sufficient to allow only preliminary conclusions. The present study explores more thoroughly this issue of typological mood-state factors in the 8SQ using a large sample of 470 subjects. A dR-factoring of the intercorrelations for the subscale difference scores (across two separate measurement occasions) clearly suggests the presence of four different emotional/mood-type factors. These findings are compared with higher-order factors obtained previously for the Differential Emotions Scale (DES), an instrument purported to measure fundamental human emotions.
Introduction

Numerous multivariate self-report inventories have been devised to measure fundamental emotional/mood states. Boyle (1985b) reviewed the psychometric adequacy of a number of such instruments and concluded that most have serious limitations in their present versions. The two most promising of these mood-state measures, however, on the basis of Boyle's review, are the Eight State Questionnaire (8SQ-Curran and Cattell, 1976) and the Differential Emotions Scale (DES-Izard, Dougherty, Bloxom and Kotsch, 1974). The 8SQ is based on extensive factor analytic work and purports to measure Anxiety, Stress, Depression, Regression, Fatigue, Guilt, Extraversion and Arousal. Recently, the question of the nature of the relationships between emotional states has received some prominence in the literature (e.g. Schwartz and Weinberger, 1980; Sirota and Schwartz, 1982). In this context, the investigation of typological (higher-order) mood-state factors in the 8SQ seems warranted. Indeed, in some instances it might be more convenient to score the 8SQ for secondary factors, thereby adding to the usefulness of the instrument.

Previous studies of the higher-order factor structure of the 8SQ (e.g. Stewart and Stewart, 1976; Cattell and Kline, 1977; Boyle, 1983, 1985a) have not adequately resolved this issue. The dR-factoring procedure across two separate measurement occasions (a methodology which is appropriate to the elucidation of change dimensions and which has been supported by Nesselroade and Cable, 1974; Cattell, 1979, 1982; Lam, 1981) was employed in Boyle's (1985a) study on a marginal sample of 258 young adults. Boyle employed an iterative principal factoring procedure with oblique rotation and obtained a three-factor higher-order
solution for the 8SQ. According to Boyle (1985a, p. 372), "the first dR-factor involved a combination of Anxiety, Stress, Depression, Regression and Guilt ... reminiscent of Eysenck's (e.g. 1983) Neurotiscism dimension, but at the state level. The second 8SQ factor clearly represented Eysenck's Extraversion factor within the state realm, while the third dR-factor contrasted Fatigue with Arousal, indicative of a physiological dimension pertaining to CNS activation levels (cf. Meites, Lovallo and Pishkin, 1980)."

The present study attempts to more comprehensively examine typological mood-state factors in the 8SQ on a considerably larger sample than previously employed by Boyle (1985a) and to compare these findings with those reported by Boyle (1986) for the DES-III (a 30-item version of Izard's scale) -- a 49-item version, the DES-IV, has more recently been constructed comprising 12 separate subscales.

The DES-III purports to measure 10 fundamental emotions discernible in the facial expression -- namely, Joy, Surprise, Sadness, Anger, Disgust, Contempt, Fear, Shame/Shyness and Guilt (cf. Izard and Buechler, 1979, 1980; Schwartz, Ahem and Brown, 1979a; Schwartz, Weinberger and Singer, 1979b; Schwartz, Fair, Salt, Mandel and Klerman, 1976; Schwartz, Brown and Ahem, 1980). Boyle (1986) conducted a single-occasion R-factoring of the item intercorrelations for the DES-III on a sample of 204 University of Delaware undergraduates, using an iterative principal factoring procedure with rotation to oblique simple structure. This was followed by a second-order analysis which produced a four-factor solution. The first higher-order DES-III factor accounted for 48.2% of the variance and contrasted Fear with Shame/Shyness, Disgust and Guilt. The second factor accounted for 32.1% of the variance and contrasted Surprise with Joy and Interest.
The third factor accounted for 12.1% of the variance and appeared to represent a combination of Contempt and Anger, while the fourth factor accounted for 7.6% of the variance and represented Depressed Mood (i.e. the subjective-experience component of the depression syndrome). The validity of the DES instrument has been supported in several studies (e.g. Emde, 1980; Fuenzalida, Emde, Pannabecker and Stenberg, 1981; Kotsch, Gerbing and Schwartz, 1982; Izard and Blumberg, 1985, 1987; Izard, Blumberg and Oyster, 1985; Boyle, 1984), thereby making it a useful instrument to compare with the 8SQ. The present paper attempts to definitively examine the typological mood-state factors in the 8SQ and to relate these to the extant knowledge above, concerning the typological mood-factors in the DES-III.

Method

Subjects

The total sample comprised 470 male and female college students attending either the Institute of Catholic Education, Melbourne, or the Melbourne College of Advanced Education. Both colleges were situated in predominantly middle-class socioeconomic areas. The age range of the sample varied between 18 and 50 years with the mean age being about 21 years.

Table 1
Means and standard deviations for 8SQ subscale change scores (N=470)

<table>
<thead>
<tr>
<th>Subscale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>5.87</td>
<td>5.14</td>
</tr>
<tr>
<td>Stress</td>
<td>3.85</td>
<td>3.15</td>
</tr>
<tr>
<td>Depression</td>
<td>5.36</td>
<td>4.46</td>
</tr>
<tr>
<td>Regression</td>
<td>4.02</td>
<td>3.54</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5.88</td>
<td>5.16</td>
</tr>
<tr>
<td>Guilt</td>
<td>4.57</td>
<td>4.31</td>
</tr>
<tr>
<td>Extraversion</td>
<td>-4.44</td>
<td>4.12</td>
</tr>
<tr>
<td>Arousal</td>
<td>-4.57</td>
<td>4.11</td>
</tr>
</tbody>
</table>
**Procedure and results**

The 470 students responded to the 8SQ items on two separate occasions at least 1 week apart. Although there was a wide range of scores, visual inspection of the data suggested that floor and ceiling effects were not particularly a problem. Both means and standard deviations for the 8SQ subscale change scores are presented in Table 1.

The intercorrelations of the 8SQ subscale change scores are presented in Table 2. As is evident, the state-change dimensions measured in the 8SQ are moderately intercorrelated (a usual finding with mood-state inventories—see Boyle, 1985b). Cattell (1979) has commented on the high intercorrelations between the subscales of the 8SQ and has pointed out that a number of moods may vary together in response to certain situational stimuli, as indeed the experience of 'mixed emotions' would predict, quite apart from the more common experience that emotions such as Anxiety and Stress, for example, tend to fluctuate in similar directions under various conditions.

As in Boyle's (1985a) study, an iterative principal factoring procedure was employed (requiring 208 iterations, at which point the communality for the Extraversion subscale reached one). Application of the Scree Test indicated that four factors should be extracted (as Cattell and Vogelmann, 1977, along with Hakstian, Rogers and Cattell, 1982, have shown, the Kaiser-Guttman eigenvalue greater than unity underestimates the appropriate factor number when there are fewer than about 20 variables in the analysis—cf. Child, 1970, pp. 43-44). Accordingly, four higher-order 8SQ factors were extracted and rotated to oblique simple structure via the direct Oblimin method in the SPSS statistical package (cf. Nie, Hull, Jenkins, Steinbrenner and Bent, 1975). Orthogonal rotation was not employed in view of the reservations expressed by Loo (1979) as well as by Gorsuch (1983) and Cattell (1978). Clearly, if a solution is truly orthogonal, the
oblique rotation will stop at the special orthogonal position, as Cattell has pointed out. The factor pattern solution is presented in Table 3.

The results above support those already reported by Boyle (1985a) with the exception that Depression has now shifted out of Factor I and formed the fourth factor by itself (see Gorsuch, 1983, regarding the importance of a single high loading with small factor matrices). The other results are similar to Boyle's earlier findings with one factor representing Eysenck's Extraversion dimension at the state level, while the other factor contrasted Fatigue with Arousal, and is clearly a physiological activation dimension. Importantly, the state Neuroticism dimension of Factor I is now clearly seen to involve Anxiety, Stress, Regression and Guilt, while Depression appears to be a separate entity, as was found in the higher-order R-factoring of the DES-III. This finding provides further evidence that Depressed mood is a complex emotion involving more fundamental emotions such as Sadness, Anger, Fear and Anxiety (cf. Izard et al., 1985; Cattell, 1979, pp. 76-79; Price, Cattell and Patrick, 1981).

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Stress</th>
<th>Depression</th>
<th>Regression</th>
<th>Fatigue</th>
<th>Guilt</th>
<th>Extraversion/Arousal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Str</td>
<td>0.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dep</td>
<td>0.68</td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reg</td>
<td>0.56</td>
<td>0.41</td>
<td>0.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td>0.34</td>
<td>0.38</td>
<td>0.56</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gui</td>
<td>0.60</td>
<td>0.37</td>
<td>0.57</td>
<td>0.43</td>
<td>0.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ext</td>
<td>-0.47</td>
<td>-0.27</td>
<td>-0.58</td>
<td>-0.44</td>
<td>-0.50</td>
<td>-0.41</td>
<td></td>
</tr>
<tr>
<td>Aro</td>
<td>-0.41</td>
<td>-0.37</td>
<td>-0.57</td>
<td>-0.40</td>
<td>-0.62</td>
<td>-0.37</td>
<td>-0.57</td>
</tr>
</tbody>
</table>
Table 3
Oblique factor pattern matrix for 8SQ

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Factor1</th>
<th>Factor2</th>
<th>Factor3</th>
<th>Factor4</th>
<th>h²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>0.77</td>
<td>0.22</td>
<td>-0.09</td>
<td>-0.21</td>
<td>0.82</td>
</tr>
<tr>
<td>Stress</td>
<td>0.65</td>
<td>-0.14</td>
<td>0.06</td>
<td>0.06</td>
<td>0.43</td>
</tr>
<tr>
<td>Depression</td>
<td>0.04</td>
<td>-0.18</td>
<td>-0.02</td>
<td>-0.81</td>
<td>0.87</td>
</tr>
<tr>
<td>Regression</td>
<td>0.50</td>
<td>-0.10</td>
<td>-0.14</td>
<td>-0.05</td>
<td>0.44</td>
</tr>
<tr>
<td>Fatigue</td>
<td>0.08</td>
<td>-0.76</td>
<td>-0.06</td>
<td>-0.12</td>
<td>0.77</td>
</tr>
<tr>
<td>Guilt</td>
<td>0.39</td>
<td>0.08</td>
<td>-0.10</td>
<td>-0.31</td>
<td>0.46</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.01</td>
<td>0.04</td>
<td>0.99</td>
<td>-0.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Arousal</td>
<td>-0.11</td>
<td>0.45</td>
<td>0.23</td>
<td>0.15</td>
<td>0.55</td>
</tr>
</tbody>
</table>

| %Variance  | 75.1    | 13.0    | 8.5     | 3.5     |

Notes. Significant loadings underlined. Factor loadings rounded to two decimal places. The association of Depression State with Neuroticism State appears to be through the common loading of Guilt. Factor 1 correlates -0.40 with Factor 2, -0.48 with Factor 3, and -0.72 with Factor 4. Factor 2 correlates 0.42 with Factor 3, and 0.33 with Factor 4, while Factor 3 correlates 0.60 with Factor 4. Variation of the δ shift parameter in the SPSS package for greater or less obliquity resulted in a poorer approximation to simple structure and reduced ±.10 hyperplane counts as compared with the present solution.

In conclusion, the present study suggests strongly that there are at least four major typological mood-state factors: Neuroticism, Extraversion, Arousal/Fatigue, and Depression. Only the Arousal/Fatigue state dimension was not also represented in the higher-order findings for the DES-III. In the latter analysis, a typological mood-state dimension pertaining to Anger/Contempt emerged, which has no representation in the 8SQ instrument. Nevertheless, research into typological mood-state factors seems well worth the effort, if in the process, a smaller number of dimensions can be discerned as representing most of the mood-state variance. Such research should enable the development of more condensed and efficient multivariate mood-state instruments, which can more readily be used in many applied situations.
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