MEASURING EMOTIONAL INTELLIGENCE IN A MALAYSIAN SAMPLE: AN EXPLORATORY FACTOR ANALYSIS

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ABSTRACT

Schutte et al. (1998) developed a 33-item emotional intelligence scale which they claimed to be unidimensional. Petrides and Furnham (2006) conducted factor analysis on the same scale and found 4 factors underlying the scale. Studies on emotional intelligence had been conducted in Malaysia with scales that were adopted, adapted, and developed. The dimensionality of the scales needed to be clearly demonstrated to better put the findings within the local context. This study examined the factor structure of the bilingual version of the scale (Malay translation by Abd Hamid and Kimin, 2004) using principal axis factoring with a varimax orthogonal rotation, in a Malaysian sample. The scale was administered to 187 Malaysian employees in a government agency and a college community. The analysis revealed four factors underlying the scale that matched Petrides and Furnham's findings. Reliability was found to be good for three factors and unacceptable for one. The issues in the factor structure were discussed.

Keywords: *emotional intelligence, factor structure, Malaysia*

INTRODUCTION

Evidence suggests that emotional intelligence (EI) has value at the workplace. Salesmen at Met Life insurance company in the United States who scored high on optimism achieved 37% higher sales than their colleagues who were pessimistic within their first 2 years of employment. "Learned optimism" is a construct of emotional intelligence (Cherniss, 2000, quoting Seligman, 1986). EI was found to have significant, positive relationship to organizational commitment among teachers in the United States (Anari, 2012) and employees of SME in Iran (Khalili, 2011). There is no universally agreed definition of EI. A definition of EI, proposed by Boyatzis, Goleman, and Rhee (2000, p.4), is as follows: "emotional intelligence is observed when a person demonstrates the competencies that constitute self-awareness, self-management, social awareness, and social skills at appropriate times and ways in sufficient frequency to be effective in the situation."

With the interest on emotional intelligence, a number of scales had been developed. The scales can be classified into ability-based or self-report measures. Summaries provided by Pérez, Petrides, and Furnham (2005) show the scales have between one and seven factors, but most of the scales having unclear factor structure. For example, the EQi (Bar-On, Brown, Kirkcaldy, & Thomé, 2000) has 133 items and 15 subscales, but the evidence for the factor structure is not clear. Additionally, the Emotional Intelligence Self-Regulation Scale EISRS was reported as having a possible single factor. However, Martinez-Pons (2000) reported a two-factor structure for the EISRS. Table 1 provides additional scales not covered by Pérez, Petrides, and Furnham (2005). Of particular interest, the GEII, which measures EI in the workplace context has a short version (14) items. However, according to (Lomas, Stough, Hansen, & Downey, 2012), the internal consistency for the subscales are lower than for the full version. Overall, the number of items and factors of EI in the scales may be a barrier for research efforts where a brief scale with a global score of EI is needed.

Table 1. Emotional intelligence scales and their factors

Scale	Factors
1 Wong, C. S., Law, K. S., & Wong, P. M. (2004).	40 items Factor structure not reported
2 USMQE-i (*USM Emotional Quotient inventory*) (Yusoff, Rahim, & Esa., 2010).	39 items + 7 Faking items 1. Emotional Control 2. Emotional Maturity 3. Emotional Conscientiousness 4. Emotional Awareness 5. Emotional Commitment 6. Emotional Fortitude 7. Emotional Expression
3 GEII (*Genos Emotional Intelligence Inventory*) (Lomas, Stough, Hansen, & Downey, 2012).	70 items. A concise version (31 items) and short version (14 items) are also available 1. Emotional Self-Awareness 2. Emotional Expression 3. Emotional Awareness of Others 4. Emotional Reasoning 5. Emotional Self-Management 6. Emotional Management of Others 7. Emotional Self-Control

Schutte et al. (1998) had developed a 33-item scale (Assessing Emotions Scale - AES) and was included in the summary provided by Pérez, Petrides, and Furnham (2005) but given the name Schutte's Emotional Intelligence Scale (SEIS). The authors claimed that "The 33 items loading on factor one represented all portions of the conceptual model of Salovey and Mayer (1990)" (p.171). This scale would be tempting for I/O psychologists who need economical and reliable scale. However, the study came under heavy critique from Petrides and Furnham (2006) especially on the method of factor analysis which they implied as rudimentary at best. The critics argued that if the scale had been developed based on a conceptual model then factor analysis would have shown the factor structures underlying the model. The critics conducted a confirmatory factor analysis using LISREL and found the lack of fit for the single factor model. Exploratory factor analysis by the critics revealed 4 factors underlying the scale. Prentice and King (2013) also derived a four factor solution using data from 261 casino workers. Their study used CFA based on Pearson Covariance Matrix and Maximum Likelihood Estimation.

The Assessing Emotions Scale had been used in Malaysian and showed good reliability. Liau et al. (2003) used the English version of the scale on 203 secondary school students. The Cronbach alpha in that study was 0.76. Exactly the same alpha value was obtained by Md Nawi and Redzuan (2011) in their study with 276 adult volunteers and non-volunteers. The Malay translation of the scale was tested among 161 university students and the reliability was 0.85 (Abd Hamid & Kimin, 2004). Another study found the alpha to be 0.88 when tested with 100 participants whose age ranged from 15 to 59 years (Andi, 2004). Both the English and Bahasa Melayu versions of the scale demonstrated good reliability. However, the factor structure of the scale was not examined as extensively. In one study with 127 university staff, Ngah, Jusoff and Rahman (2009) used Principle Axis Factoring with oblique rotations. The researchers removed seven items from the English version of the scale and found three factors namely utilization of emotion, regulation of emotions, and expressions of emotions.

It can be seen from the literature review that the AES may have one factor and has acceptable reliability for use among Malaysians. However, the factor structure for Malaysian samples is not established. Therefore, the objective of this study is to examine the factor structure of the EI scale developed by Schutte et al. (1998) by way of exploratory factor analysis. However, in this study, a bilingual (including Malay) version of the scale will be examined.

METHOD

Participants

In total, 187 employees participated in the study (45 males, 128 females and 1 not disclosed). The mean age of the sample was 33.22 years (*SD* = 7.10, min = 24, max = 56).

Materials

The questionnaire was developed by Schutte et al. (1998) and translated into Malay by Abd Hamid and Kimin (2004). It contains 33 items, three of which are reverse-coded (items 5, 28, 33). Respondents rate their agreements to such items as "I like to share my emotions with others" and "I am aware of the non-verbal messages that I send to others" on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). The total score is the sum of all items, which can range from 5 to 165, with higher score indicating a higher emotional intelligence. The items are shown in Appendix A.

Procedure

Participants from a government defence agency and a community college completed the questionnaire when they were attending training programs. SPSS version 17 was used as the statistical analysis tool.

RESULTS

Data Screening

From 187 cases, 12 cases were eliminated using listwise deletion and 2 cases were eliminated as outliers, with 173 valid cases remained. The ratio of 5.24 cases per variable did not satisfy the minimum amount of data for factor analysis. However, given the results below, the EFA was possible to be carried out with the present sample.

Factor Analysis

To begin with, the normality of the data was checked. Kolmogorov-Smirnov with Lilliefors significance correction test statistic of .072 (*df* = 173, *p* = .027) indicates that the data is not normally distributed. The kurtosis of .04 (*SE* = .37) indicates that the distribution is flatter than normal. This serves as a caution to the study.

Next, the factorability of the EI items was examined. Several well-accepted criteria for the factorability of a correlation were used. Firstly, an inspection of the inter-item correlation matrix revealed that all items but 1 (item 28, reverse-coded) correlated at least .3 with at least one other item, suggesting reasonable factorability. Secondly, Kaiser-Meyer-Olkin test of sampling adequacy value of .83, more than the recommended value of .60, indicated that factor analysis may be useful to be carried out on this data. Thirdly, Bartlett's test of sphericity was significant (χ^2 = 2073.61, *df* = 528, *p* < .01), indicating that the correlation matrix was not an identity matrix and that the items were related and therefore suitable to detect structure. Fourthly, except item 5 (reverse-coded), all of the diagonals of the anti-image correlation matrix were above .50. Finally, the communalities for all but 2 items (5 and 28, both reverse-coded) were all above .3, confirming that each item shared some common variance with other items. Given the overall indications, factor analysis was deemed to be able to be carried out but with caution.

Principal axis factoring was used as the preferred method for extraction to mitigate the risks of the potentially poor multivariate normality of the data. Kaiser criterion was applied to extract the structures (items with eigenvalues greater than 1). However, the criterion may not always obtain the best outcomes for some data sets (Costello & Osborne, 2005). The extraction produced a nine-factor model that explained 47% of the total variance. The first factor explained 23.7% of the variance while factors 2, 3 and 4 (eigenvalues from 1.5 to 2.5) explained 6.0%, 4.41% and 3.09%, respectively. Factors 5 to 9 (eigenvalues of just over 1) explained 1.55% to 2.65% of the variance each. Meanwhile, an inspection of the scree plot (see Figure 1) revealed a four-factor model. The four-factor model was preferred because the number was more manageable. Furthermore, the scree plot is better than Kaiser's criterion at determining structures (Costello & Osborne, 2005). Table 2 shows the factor loadings of Varimax-rotated factors.

Next, 4 factors were fixed to be extracted and a model which explained 35.85% of the vari-

ance was produced. Both Varimax (orthogonal) and direct oblimin (oblique) rotations were subjected on the model to produce a solution. The solution from Varimax rotation was preferred because it was clear and relatively easier to interpret the meaning of the factors. The resulting solution from the oblimin rotation, although almost similar to the Varimax-rotated solution, had factor correlations below |.30| for 3 out of 5 relations, contained factors with items that were all negatively loaded, and contained items with positive and negative loadings on multiple factors.

Table 2. Factor loadings of varimax-rotated factors from the emotional intelligence scale[a]

Item number	Factor 1	Factor 2	Factor 3	Factor 4
q8	**.702**	.054	.040	.014
q9	**.602**	.208	.266	-.073
q10	**.586**	.018	.006	.230
q31	**.581**	.161	.358	.092
q14	**.578**	.241	.126	-.024
q6	**.559**	.189	.072	-.065
q24	**.529**	.138	.229	-.053
q2	**.505**	.021	.000	.135
q3	**.498**	.145	.064	.166
q23	**.478**	.007	**.389**	.067
q16	**.463**	-.004	.104	.146
q7	**.405**	.228	.037	.045
q30	**.336**	.284	.194	.142
q26	**.319**	**.317**	.221	.153
q18	.116	**.774**	.066	.052
q25	.049	**.660**	.231	.069
q32	.184	**.545**	.295	.024
q29	-.035	**.545**	.219	**.360**
q19	.204	**.421**	**.415**	-.119
q15	.284	**.380**	.174	**.302**
q4	.132	**.348**	.041	.204
q1	.282	**.311**	-.013	.061
q21	.072	.060	**.708**	.129
q22	**.405**	.178	**.585**	.105
q20	**.369**	.316	**.553**	-.104
q17	**.379**	.140	**.509**	.078
q27	.180	**.310**	**.370**	.118
q28r	-.039	.059	.198	-.055
q11	.216	.283	-.057	**.535**
q33r	.086	-.118	-.156	**-.432**
q13	.239	.242	-.005	**.406**
q12	**.339**	.121	.247	**.385**
q5r	-.017	.045	.095	**-.317**

[a]Factor loadings greater than |0.30| are shown in boldface.

The items along with their numbers are presented in Appendix A.

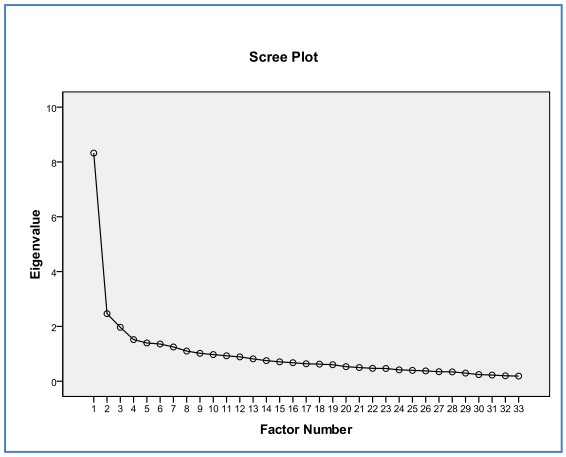

Figure 1. Scree plot of 33 items in the Emotional Intelligence scale.

Costello and Osborne (2005) suggested that researchers decide whether to eliminate an item that loads at .32 or higher on two or more factors. In this study, items with a primary factor loading of less than .30 or cross-loaded with .30 or above were eliminated. In a factor that contained items with positive and negative factor loading, items with negative loadings were eliminated to ensure a simple factor structure. As a result, 24 items were retained and 9 items that met the criteria were removed (12, 15, 19, 23, 26, 27, 5r, 28r, and 33r).

In the second iteration, principal axis factoring analysis was conducted on the 24 items, using both Varimax and oblimin rotations, extracting 4 factors that explained 39.65% of the total variance. Oblimin rotation failed to produce any pattern within 25 iteration limit. On the other hand, Varimax rotation produced 4 factors with almost equal amount of items in each. However, items that primarily loaded to the factors were not as semantically clear as the factors that emerged before the item reduction was carried out. The loss of clarity in the meaning of the factors after item reduction did not justify the increase of 3.8% in variance explained. Therefore, the four factors with all the 33 items from the first iteration were decided to be retained and further tested for internal consistency. The four factors were labelled 'Mood Regulation', 'Emotion Appraisal', 'Emotion Utilization', and 'Social Skills', similar to those previously used by Petrides et al. (2000).

Subsequently, internal consistency of the four sub-scales was tested. However, only 3 scales obtained good Cronbach's alphas: .89 for Mood Regulation (14 items), .77 for Emotion Appraisal (8 items), .78 for Emotion Utilization (5 items). Social Skills (6 items) obtained an unacceptable alpha of .21. Further elimination of items did not yield much higher Cronbach's alphas.

Means of the factors were obtained based on the scores of the items primarily loaded on the factors. Higher scores indicated higher emotional intelligence; namely, higher ability in regulating mood, appraising emotion, utilizing emotion and better social skills. Employees were best at mood regulation (M=4.11, SD=.38), followed by emotion utilization (M=3.94, SD=.52) and emotion appraisal (M=3.77, SD=.47). The skewness and kurtosis for the scales and inspection of the histograms suggested that the distributions of the data could be considered as approximately normal. Although an orthogonal (Varimax) rotation was used, the factors were found to be correlated, ranging from weak to strong. Table 3 shows the descriptive statistics and correlations for the factors.

Table 3. Descriptive statistics and correlations for Mood Regulation, Emotion Appraisal, Emotion Utilization and Social Skills

Factor	*M*	*SD*	Skewness	Kurtosis	Cronbach's alpha	1	2	3
Mood Regulation	4.11	.38	.02	.01	.89			
Emotion Appraisal	3.77	.47	-.21	.93	.77	.48		
Emotion Utilization	3.94	.52	-.17	.30	.78	.57	.48	
Social Skills	3.31	.46	.102	.22	.21	.29	.34	.26

All correlations are significant at $p < .01$

Taken as a whole, the analyses indicated that four factors were underlying the emotional intelligence scale. Using the factors and retaining all 33 items, 3 factors demonstrated good internal consistency while 1 scale had an unacceptable internal consistency. The composite scores of the three factors had evidence of approximately normal distribution; therefore, the data was deemed suitable for further parametric statistical analyses.

DISCUSSION

Based on the data screening and factorability of the data, it was found that factor analysis was suitable to be carried out on the bilingual EI scale. A four-factor structure emerged from the 33 bilingual items based on principal axis factoring exploratory factor analysis using oblique rotation strategy (direct oblimin) as tested in a Malaysian sample. The four factors matched the factors proposed by Petrides and Furnham (2000) which were mood regulation, emotion appraisal, emotion utilization, and social skills with acceptable Cronbach's alphas, except for social skills.

In selecting the items to be retained in each factor, Costello and Osborne (2005) proposed that the factor with item loadings above .30, with no or few cross-loadings, and comprised of three or more items should be considered as best fit for the data. The first factor, mood regulation, comprised of 14 items (2, 3, 6, 7, 8, 9, 10, 14, 16, 23, 24, 26, 30, and 31) that described awareness of own emotions (e.g. "I am aware of my emotions as I experience them") and optimism (e.g. "I expect good things to happen"). This factor was also labelled as optimism by Petrides and Furnham (2000). Twelve items loaded above .40 while Items 26 and 31 cross-loaded on factor 3 but it was decided to retain them on this factor as their primary loading values were above .40 and just over .30 on factor 3.

The second factor, emotion appraisal contained eight items (1, 4, 15, 18, 19, 25, 29, and 32) pertaining to detecting and interpreting emotions (e.g. "By looking at their facial expressions, I recognize the emotions people are experiencing", "I can tell how people are feeling by listening to the tone"). Items 15 and 29 cross-loaded on factor 4 and item 19 on factor 3; but the items were decided to be retained based on the same justification. Furthermore, the items were also face valid.

The third factor, emotion utilization, comprised of five items (17, 20, 21, 22, 27) which have affinity to control and put the emotion to good use (e.g. "I have control over my emotions", "When I am in a positive mood solving problems is easy for me"). Four of the items cross-loaded on other factors; 3 items cross-loaded on another factor and 1 item cross-loaded on 2 other factors. The items were retained as they were face valid and loaded highly on this factor.

Social skills as the last factor consisted of 6 items (5 reverse-coded, 11, 12, 13, 28 reverse-coded, 33 reverse-coded). The items pertained to actions of a person in relation to others (e.g. "I like to share my emotions with others", "I arrange events others enjoy"). Item 12 cross-loaded on factor 1. Item 28 (reverse-coded) had a loading of below .30. However, the item was included in this factor together with the other reverse-coded items. As cautioned during data screening, item 5 "I find it hard to understand the non-verbal messages of other people" showed low anti-image correlation and low communality. Together with Item 33, item 5 may represent the inability to appraise emotions of others in social setting. Item 28 "When I am faced with a challenge, I give up because I believe I will fail" also showed low communality. Item 12 is similar to Item 28 in the sense that both items are about sustaining positive emotions (or motivation). Thus, the low reliability of the factor could be explained by the possible existence of three sub-dimensions. Furthermore, based on the authors' own experience in inspecting reliability and validity of scales, reverse-coded items tend to cause issues in internal consistency. Therefore, grouping them together could lead to the factor to be dropped during analysis. It would be useful to examine this result using a cultural lens. However, the items that make up the factor are not congruous enough, as evident by the low communality indices, to be analysed using an emic perspective.

The factors were found to be correlated although varimax rotation was used. Varimax rotation is favoured when there is a basis to

believe that the factors should not be related to one another. In theory, it would be ideal that factors are only minimally related; however, in reality, a person will not be able to regulate his/her mood without the ability to appraise the emotion. Therefore, some correlation among the factors should be expected (Petrides & Furnham (2000).

IO psychologists intending to measure EI using this scale should take note of the low reliability of the social skill factor or consider excluding this factor. Evidence of the multidimensionality, as found by Ngah *et al.* (2009) using the English only version, strengthen the argument that the AES is not unidimensional as claimed by the scale developers. Future research should consider developing a shorter version of emotional intelligence scale. As an example, the short version of *Genos Emotional Intelligence Inventory* has 14 items, but is limited in terms of its internal consistency. The possibility of adapting the GEII for Malaysians should be considered. Lastly, scale developers should consider avoiding reverse-coded items in Malaysia. Instead, a slightly longer scale with Faking or Lie subscale can be used, as in the USMEQ-i (Yusoff, Rahim, & Esa., 2010).

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APPENDIX

Items in emotional intelligence scale (Schutte et al., 1998)

q1 – I know when to speak about my personal problems to others
q2 – When I am faced with obstacles, I remember times I faced similar obstacles and overcame them
q3 – I expect that I will do well on most things I try
q4 – Other people find it easy to confide in me
q5r – I find it hard to understand the non-verbal messages of other people
q6 – Some major events in my life have led me to re-evaluate what is important and not important
q7 – When my mood changes, I see new possibilities
q8 – Emotions are one of the things that make my life worth living
q9 – I am aware of my emotions as I experience them
q10 – I expect good things to happen
q11 – I like to share my emotions with others
q12 – When I experience a positive emotion, I know how to make it last
q13 – I arrange events others enjoy
q14 – I seek out activities that make me happy
q15 – I am aware of the non-verbal messages that I send to others
q16 – I present myself in a way that makes a good impression on others
q17 – When I am in a positive mood solving problems is easy for me
q18 – By looking at their facial expressions, I recognize the emotions people are experiencing
q19 – I know why my emotions change
q20 – When I am in a positive mood, I am able to come up with new ideas
q21 – I have control over my emotions
q22 – I easily recognize my emotions as I experience them
q23 – I motivate myself by imagining a good outcome to tasks I take on
q24 – I compliment others when they have done something well
q25 – I am aware of the non-verbal messages other people send
q26 – When another person tells me about an important event in his or her life I almost feel as though I have experienced this event myself
q27 – When I feel a change in emotions, I tend to come up with new ideas
q28r – When I am faced with a challenge, I give up because I believe I will fail
q29 – I know what other people are feeling just by looking at them
q30 – I help other people feel better when they are down
q31 – I use good moods to help myself keep trying in the face of obstacles
q32 – I can tell how people are feeling by listening to the tone of their voice
q33r – It is difficult for me to understand why people feel the way they do