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Psychometric Study of Bar-On Emotional Quotient Inventory: Youth Version in Malaysian Sample

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ABSTRACT

The concept of emotional intelligence (EQ) is an important topic among today's modern society. People are now gaining realisation that these skills can help them in better managing both their professional and personal lives. However, scales available to measure EQ are limited especially among the Malaysian population. Therefore, this study sought to investigate the psychometric proprieties of the Bar-On Emotional Youth Version Quotient Inventory (EQi:YV) in Malaysian samples. A total of 728 students aged between 14 to 20 years old from four secondary schools in Kota Kinabalu, Sabah participated in this study. The EQ-i:YV contains 35 self-report items designed to assess: Intrapersonal, Interpersonal, Adaptability, and Stress Management. The Structural Equation Modelling was used to assess the suitability of the model. The reliability and validity of the model were also measured. Confirmatory factor analysis was employed to test its compatibility. Multiple goodness-of-fit indicators initially revealed that the measurement model failed to reach some of the recommended standards for model fitness. After necessary adjustments were made, the modified model, which retained 30 items, produced a better level of fitness and met recommended standards. The analysis found that EQi: YV had a satisfactory level of reliability despite some convergent and discriminant validity issues. Overall, the EQi:YV is suitable for use in the Malaysian context. Recommendations for future research are also discussed.

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INTRODUCTION

From the perspective of positive youth development, emotional intelligence among the youth is an important aspect of constructing their future careers. In today's globalised and competitive world, our youth needs to be equipped with the ability to recognise, understand, and react appropriately to their own emotions and feelings as well as those of others, so that they will be able to form a productive future workforce and improve the lives of coming generations. The concept of emotional intelligence is currently important as people are now realising that these skills can help them manage both their professional and personal lives.

Researchers have differing points of view when interpreting the term emotional intelligence. In defining the term emotional intelligence, contemporary theorists like Salovey and Mayer (1990) considered emotional intelligence as part of social intelligence, and therefore suggested that both of these concepts were interrelated and could be representing the same construct. Salovey and Mayer (1990) also suggested that it involved five domains of abilities that could be categorized as (1) managing emotions (2) self-awareness, (3) motivating oneself (4) handling relationships, and (5) empathy. Thus, the conceptualized of emotional intelligence was influenced by the early definitions of social intelligence. Looking at the five domains mentioned above, we can see that they have a wide range of useful implications for adolescents and young adults who are at their career building stages in life. In essence, it can be said that a certain level of self-awareness will help a person to control, adapt and manage their mood, responses and emotions through self-management. These skills will further help them in navigating their emotions and guide them to take the appropriate actions. EQ is also a powerful skill that maximises a person's abilities to recognise and discern the feelings of others, gain trust, and make a connection. EQ can further help young people to build quality relationships with others, work as an effective team member, relate to other people in a social situation, and resolve conflicts that may arise through negotiations in everyday lives. The youth age category in Malaysia is the highest group. This means that this group is the backbone of the nation's social welfare. With the available data of Emotional Intelligence for this group, relevant parties can consider an initiative or program relevant to develop strengthen social well-being in Malaysia. Thus, the easy-to-use instrument Emotional Quotient inventory: YV from Reuven BarOn special develop for youth purposed.

Therefore, the psychometric study of this instrument is very important to show that it has good value and is suitable for youth.

Literature Review

Past studies have shown that efforts have been made to combine both the social and emotional components of the construct. Gardner (1983), in explaining multiple intelligences, conceptualized that personal intelligence was based on intrapersonal intelligence, which constituted emotional and

interpersonal intelligence which, according to him, referred to the social component of the construct. Furthermore, Bar-On (1988) suggested that emotional-social intelligence was composed of various interpersonal and intrapersonal skills and competencies that worked together to elicit effective human behaviour in different contexts. Later, Saarni (1990) explained eight interrelated social and emotional skills that could be referred as emotional competence. Therefore, based on the above mentioned past studies, to be more precise, this construct should be referred as "emotional-social intelligence" instead of "emotional intelligence" or "social intelligence" only. Today, many studies of emotional intelligence in Malaysia use different instruments such as Goleman, Mayer's and Petrides. However, EQ: i YV is built for the youth category. Bar-On has developed a number of emotional intelligence instruments according to specific age categories, for example, school students, university students and workers. Psychometric studies of emotional intelligence have been conducted by Wan Sulaiman and Noor (2015) but the instrument used was the Wong and Law Emotional Intelligence Scale (WLEIS). Psychometric Studies on EQ:I still rare especially in Malaysia.

Bar-On Model of Emotional Social Intelligence. The current research paper focuses on the Bar-On (1988) model of emotional-social intelligence (ESI) by exploring the psychometric properties of the Bar-On Emotional Quotient Inventory (EQ-i:YV). The Emotional Quotient Inventory (the EQ-i) played a vital role in the development of Bar-On (1988) model of ESI. Rigorous research that led to the development of the measure of ESI and Bar-On model were carried out over a period of 17 years in six major stages; these stages were: (1) identifying and grouping together various socio-emotional competencies thoughts that impact psychological well-being based on the clinical experiences of the researchers as well as reviewing the work of earlier researchers; (2) differentiating the separate key clusters of skills and competencies; (3) developing 1,000 items based on the clinical experiences of the researchers as well as by reviewing the literature; (4) developing 15 primary scales and 133 items of the instrument based on a combination of statistical analyses achieved by conducting factor analysis and item analysis and based on theoretical knowledge; (5) developing the norms for the scale based on the data collected from 3,831 adults; and (6) carrying on normalization and validation of the instrument in many different languages across cultures (Bar-On, 2006).

To date, translations of the EQ-i are available in almost 30 languages (Bar-On, 1997) and data using this inventory from various countries around the world have been collected. The EQ-i was first translated from English to Spanish, and the Spanish version was used for large data collection in Argentina. Later on, data collection was also performed in several other countries. The inventory was

later used to collect data involving 3,000 research participants from many countries including Argentina, Germany, India, Israel, Nigeria, and South Africa. EQ:i YV has two types of questionnaires: EQ:i YV and also EQ: i:YV (short form). In this study the questionnaire used was EQ: I YV. The difference between these two questionnaires is the sub-component of General Mood not included in the short form. The short form has 35 Items compared to another one which has 60 items. However, this study only analysed four components of Emotional Intelligence, and according to Bar-On (1997), each component can stand alone.

Apart from providing cross-cultural data, this cross-cultural data collection using the EQ-i helped during scale validation and development by assisting in the process of item selection and alteration, and establishing the final nature of the response format. These cross-cultural research provide evidence that the EQ-i:YV can also be used with Malaysian samples provided that such samples are compatible with the reliability and validity measure of the inventory. Therefore, the main aim of the present study is to determine the psychometric proprieties specifically to assess the suitability of the model, reliability and validity of The Emotional Quotient Inventory: Youth Version (EQ-i:YV) using Malaysian samples to overcome the limitation of available instruments.

METHODS

Participants and Procedure

A total of 728 secondary school students (380 males and 348 females) aged between 14 years old to 20 years old were recruited from four secondary schools in Kota Kinabalu, Sabah to participate in this study. In terms of ethnicity, 31.9% were Bajau, 15.2% were Malay, 8.8% were Melayu Brunei, 2.1% were Kadazandusun, 0.5% were Chinese, 0.3% were Indians and the remaining majority (41.2%) were from the other indigenous groups in Sabah. In terms of religion, a majority of the participants were Muslim (94%), 5.8% were Christians and 0.3% were Buddhists. After a permit has been obtained from the Ministry of Education as well as the State, the study was conducted according to the selected school. The questionnaire was distributed personally by the researchers in the classroom. The participants could ask the researcher directly if any item was not understood.

Measure

The Emotional Quotient Inventory: Youth Version (EQ-i:YV) contains 60 items designed by Bar-On and Parker (2000) to measure four dimensions of Bar-On's Emotional Intelligence model: the intrapersonal scale (6 items), the interpersonal scale (12 items), the stress management scale (12 items), and the adaptability scale (10 items). The sum of these four scales would be used to measure the total Emotional Intelligence scale. In addition to these four scales, the EQ-i:YV also contains a general mood scale (14 items), this scale was used to measure the general level of emotional positivity or negativity, together with a

positive impression validity scale (6 items), which measured the excessively positive or socially desirable. The response format for the items was five-point Likert scales which ranged from 1 = very seldom true of me to 5 = very often true of me. High scores obtained by the respondents on the scale indicate their levels of social competency and self-perceived emotions are higher. The EQ-i short version consisted of twelve reverse-coded items (namely items 6, 15, 26, 28, 35, 37, 45, 46, 49, 53, 54, and 58). In this study, the analysis was only conducted on the four broad dimensions of the EQ-i:YV.

The original version of EQ-i:YV was translated into Malay by using the back-to-back translation method. In the translation process, two independent translators (the lecturer in Psychology program in Faculty of Psychology and Education, Universiti Malaysia Sabah) carried out the translation from the original version to Malay version then another translator (another Psychology lecturer in Faculty of Psychology and Education) also back-translated it to the English version. In the final process, all the researchers in this project involved in harmonizing the final instrument.

Data Analysis

The data were analysed by using IBM SPSS AMOS 23 Program (Arbuckle, 2014). Considering the already existing assumptions of the four-factor of the Emotional Quotient Inventory Youth version (EQ-i:YV) (Bar-On & Parker, 2000), the Confirmatory Factor Analysis was performed to test the suitability of the inventory to apply in Malayasia context and to verify the model fit. The predictive validity of the proposed four-factor (40 item-structure) of the EQ-i:YV was evaluated by comparing the multiple goodnesses of fit indices of the model to the recommended criteria, such as The Chi-square/df ratio should be less than 5.0 (CMIN/DF < 5.0), the goodness-of-fit index should be larger than 0.90 (GFI > 0.90). The GFI is scaled between 0 and 1, higher values indicating better model fit. Jöreskog and Sörbom (1986) do not state a cut-off value for the GFI although it is common for values greater than 0.9 to be considered acceptable. Adjusted GFI (AGFI > 0.80), and the Comparative Fit Index (CFI) (Bentler, 1990), in which the value obtained should be larger than 0.90 (CFI > 0.90). The Root Mean Square Error of Approximation value should be less than 0.05 (RMSEA < 0.05) (Browne & Cudeck, 1993). These criteria are considered as acceptable indices of fit and were used to determine the adequacy of the model of measure. Besides, the criteria used to retain the items was indicated by an item factor loading ≥ 0.5 (Hair et al., 2009). In the present study, composite reliability, discriminant validity, and convergent validity of the scale were also investigated.

RESULTS

Confirmatory Factor Analysis

In the present study, the Confirmatory Factor Analysis (CFA) was conducted using IBM SPSS Amos to perform structural equation modelling (SEM) of the data obtained from the 728 secondary school students.

In conducting the multivariate statistical techniques Kline (2005) suggested the ratio of cases that the free parameters should be 10:1 in order to conduct a confirmatory factor analysis. While, Tabachnick and Fidell (2001) recommended that the sample size should be a minimum of 200 to perform multivariate statistical techniques on the data. In the present study, there were 60 constructs and 728 cases involved, which suggested the ratio of 12:1. Referring to the two recommendations, the size of the sample in the present study is sufficient and should not be an issue.

The CFA results revealed that some of the comparative fit indexes of the four-factor structure of the EQ-i:YV failed to meet the recommended standards for model fit. The fit indices indicated CMIN/DF of 3.40 which is below the threshold of 5, GFI of 0.88 which does not reach the recommended value greater than 0.90, AGFI of 0.84 which is also tolerable but not great, CFI of 0.72 which does not reach the recommended standard, and an RMSEA estimate of 0.05 which is acceptable (refer to Table 1). The parameter estimates range from 0.01 to 0.65 for items on the intrapersonal factor, while for the interpersonal factor the parameter estimates range from 0.35 – 0.52, for adaptability factor (range from 0.41 – 0.58), and stress management factor (range from 0.03 – 0.61). Parameter estimates among factors from the CFA are as presented in Table 2. The results indicated that the four-factor model of the EQ-i:YV had some model fit issues. Therefore, a reasonable adjustment of data was required. Table 1 shows a Measurement Model of the EQ-i:YV.

To discover the model fit issues, the covariance problem between errors on the same factor and the items' loading value had been checked in order to improve the model fit. First, we removed two items (B28 and B53) in the intrapersonal factor, four items (B3, B11, B26, and B39) in the stress management factor, and four items (B41, B20, B51, and B14) in the interpersonal factor, which loaded insufficiently on the corresponding latent factors and some of the items were removed due to high covariance problem (the criteria used to remove the 10 items was based on the parameter estimates and high covariance among the items).

Table 1

Model fit statistics from confirmatory factor analysis for the Emotional Quotient Inventory youth version (EQ-i:YV)

Fit Indices	Recommended Fit	Measurement Model	Modified Measurement Model
CMIN/DF	< 5.0	2.88	2.76
GFI	> 0.90	0.86	0.92
AGFI	> 0.80	0.84	0.9
CFI	> 0.90	0.7	0.83
RMSEA	< 0.05	0.05	0.04

The modified model of EQ-i:YV retained 30 out of a total of 40 items of the four-factor structure of the EQ-i:YV model, with recommended quality standards and better goodness of fit with data (refer to Table 2). As shown in Table 1 (modified measurement model), the estimates for the modified measurement models showed a better fit for the data with a CMIN/DF of 2.76, GFI of 0.92, AGFI of 0.90, CFI of 0.83, and a RMSEA estimate of 0.04. The parameter estimate for the modified model of EQ-i:YV ranged from 0.50 to 0.65 for items on the intrapersonal factor; 0.38 – 0.49 for interpersonal factor; 0.41 – 0.60 for adaptability factor; and 0.41 – 0.53 for stress management factor. Table 2 lists the original 40 items and the 30 retained items of the EQ-i:YV and items parameter estimates.

Table 2

Parameter estimates from the confirmatory factor analysis of the Emotional Quotient Inventory Youth Version (EQ-I:YV)

Measurement Model		Modified Measurement Model	
Item - Scale	Parameter	Item	Parameter
Intrapersonal Scale		Intrapersonal Scale	
B53	0.068		
B43	0.601	B43	0.602
B31	0.649	B31	0.65
B28	0.032		
B17	0.653	B17	0.653
B7	0.528	B7	0.528
Interpersonal Scale		Interpersonal Scale	
B59	0.478	B59	0.529
B55	0.528	B55	0.546
B51	0.325	B45	0.427
B45	0.431		
B41	0.286		
B36	0.383	B36	0.399
B24	0.469	B24	0.46
B20	0.3		
B14	0.351		
B10	0.448	B10	0.518
B5	0.483	B5	0.429
B2	0.527	B2	0.548

Table 2 *(Continued)*

Measurement Model		Modified Measurement Model	
Item - Scale	Parameter	Item	Parameter
Stress Management		Stress Management	
B58	0.602	B58	0.605
B54	0.452	B54	0.457
B49	0.303	B49	0.306
B46	0.454	B46	0.457
B39	-0.004		
B35	0.663	B35	0.653
B26	0.288	B21	0.334
B21	0.323	B15	0.373
B15	0.376	B15	0.378
B11	-0.18		
B6	0.446	B6	0.45
B3	-0.163		
Adaptability		Adaptability	
B57	0.508	B57	0.494
B48	0.499	B48	0.493
B44	0.529	B44	0.53
B38	0.559	B38	0.562
B34	0.595	B34	0.601
B30	0.454	B30	0.456
B25	0.431	B25	0.428
B22	0.455	B22	0.465
B16	0.449	B16	0.447
B12	0.487	B12	0.494

Composite Reliability

Composite reliability index (CR) and average variance extracted (AVE) were used to determine the reliability of the modified measurement model of the EQi: YV). Hair et al. (2010) recommended that the composite reliability should be above the 0.70 threshold and the AVE should be above the 0.50 threshold. In the current study, a satisfactory level of reliability was determined, as the composite reliability (CR) of each scale of EQ-i:YV was found to exceed the threshold value of 0.70, except for the stress management scale. Composite reliability values for all the four factors range between 0.68 and 0.79. However,

analysis of average variance extracted (AVE) showed that out of all the four factors, only the intrapersonal scale (AVE = 0.61) reached the recommended average variance extracted (AVE) of more than 0.50 threshold (Hair et al., 2006). Table 3 shows the CR and AVE of the EQi: YV.

Table 3

Composite Reliability and Average Variance Extracted of the Emotional Quotient Inventory youth version (EQ-i:YV)

Scale	Composite Reliability (CR)	Average Variance Extracted (AVE)
Intrapersonal	0.702	0.373
Interpersonal	0.709	0.235
Stress Management	0.679	0.22
Adaptability	0.767	0.25

Construct Validity

When conducting a Confirmatory Factor Analysis, it is absolutely necessary to establish reliability, as well as construct validity. In the current study, construct validity is in convergent form, and the discriminant validity was assessed for a good-fitting measurement model of EQ-i:YV.

Convergent Validity

The evidence of convergent validity was assessed using three criteria. The composite reliability should be greater than 0.7 (CR > 0.70), the composite reliability value should be greater than the average variance extracted (AVE) value (CR > AVE) and lastly, the average variance extracted (AVE) value should be above the 0.50 threshold (AVE > 0.50) (Hair et al., 2006). Referring to Table 3, the results showed that all factors of the Emotional Quotient Inventory Youth Version (EQ-i:YV) were greater than the recommended levels of CR > 0.70 and CR > AVE. However, for the last criterion, only the intrapersonal scale showed its AVE value to be above 0.50 threshold (AVE > 0.50). The overall results were due to the other three scales (interpersonal, stress management, and adaptability), consisting of items with low factor loading (lower than 0.50). The results also indicated that the scales of EQ-i:YV had some convergent validity issues.

Discriminant Validity

Evidence of discriminant validity was determined if the average variance extracted (AVE) is greater than the squared correlation between each pair of constructs (Hair et al., 2010). The results of discriminant validity analysis showed (Table 4) that the square root of the AVE for the interpersonal (0.485) and adaptability scale (0.500) was less than one the absolute values of the correlations with another factor. The results also indicated that

the AVE for the interpersonal scale (0.373) and the adaptability scale (0.250) was less than the MSV for interpersonal scale (0.312) and adaptability scale (0.312). This suggests that the data have some discriminant validity issues.

Table 4

Analysis of convergent and discriminant validity of the Emotional Quotient Inventory youth version (EQ-i:YV)

Scale	CR	AVE	MSV	MaxR(H)	stressman	intra	interp	Adap
Stress Management **(stressman)**	0.679	0.22	0.012	0.714	**0.469**			
Intrapersonal **(intra)**	0.702	0.373	0.112	0.831	0.11	**0.61**		
Interpersonal **(interp)**	0.709	0.235	0.312	0.881	0.104	0.13	**0.485**	
Adaptability **(Adap)**	0.767	0.25	0.312	0.916	-0.102	0.334	0.559	**0.5**

DISCUSSIONS

Structural equation modelling by applying CFA was conducted to define the goodness of fit of the four-factor model for EQ-i:YV. The results of the CFA do not meet the suggested criteria for GFI (Jöreskog & Sörbom, 1986) and CFI criteria (Bentler, 1990). However, the result is still tolerable. The covariance problem between errors on the same factor and the items loading value had been checked to further improve the model fit. Two items were removed (B28 and B53) in the intrapersonal factor, four items (B3, B11, B26, and B39) were removed in the stress management factor and four items (B41, B20, B51, and B14) were removed in the interpersonal factor, which loaded insufficiently on the corresponding latent factors. After removing these particular items, the researchers conducted subsequent covariance analysis on the items with high covariance problem. The modified model of EQ-i:YV retained 30 out of a total of 40 items of the four-factor structure of the EQ-i:YV model, which met quality standards and better goodness of fit with data. Removing the suggested items resulted in a clearer and more coherent factorial structure. The eliminated items have an almost similar meaning and respondents may have questioned why redundant items are in the questionnaire or they may have difficulty distinguishing the meaning of each item, therefore, it brought confusion to answer which meant that the respondent was experiencing difficulty understanding subtle differences between some of the items. For example, items deleted in the intrapersonal factor was "It is hard to talk about my deep feelings" and "I have trouble telling others about my feelings". As for the eliminated items in the stress management

factor, can indicate that the respondents have a lack of self-awareness. Another possible reason for the lower loading values is the wording or cultural reasons since the respondents consist of various sub-ethnics in Sabah which may have influenced the interpretation of the items. Further investigations on the clarity or understand ability of the items can be done in the future to provide insight of the suitability of these items. Another study by Kun et al. (2012) also had questioned the validity of some items in EQ-i: YV-S. Therefore, some items may need to be relooked to ensure the validity and replicability of the measure.

However, this outcome is still in line with Bar-On analysis using CFA. The psychometric analyses of EQ-I Four-factor model (comprising 40 emotional intelligence items) were empirically supported. Parker et al. (2005) also examined the four-factor structure which included interpersonal, intrapersonal, adaptability, and stress management of the EQ-i:YV by applying CFA. His findings supported the generalisation of the measure with adolescents as the four-factor structure explored by him was found to have adequate fit to the data as fit indices and parameter estimates were satisfactory. Since students from secondary schools were involved in this study, there was no issue in terms of the sampling size.

Its convergent validity showed that all of the factors of the EQ-i:YV were greater than the recommended level of CR > 0.70 and CR > AVE. However, the criteria for the AVE value were above 0.50 thresholds (AVE > 0.50) in intrapersonal scale. The results were due to the other three scales (interpersonal, stress management, and adaptability) consisting of items with low factor loading (lower than 0.50). The results also indicated that there were some convergent validity issues with the scales of EQ-i:YV. According to Parker et al. (2005), researchers in various fields are attracted to the concept of emotional intelligence. Researchers have thus applied this concept based on their own cultural background. Culture can influence the way people experience and express their emotions, thus cautions must be taken when using the emotional intelligence construct in other different cultures, because there might be some convergent validity issues due to the varying cultures.

To test the construct validity of concepts in any theory, researchers need to measure convergent and discriminant validity to ensure that the instrument is validated. Evidence of discriminant validity for the EQ-I; YV was measured by comparing the average of the AVEs for the constructs against the shared variance (squared correlation) between each pair of constructs (Bove et al., 2009; Walsh et al., 2009). Therefore, to determine satisfactory discriminant validity, the AVE should be greater than the squared correlation. According to Fornell and Larcker (1981), discriminant validity can be obtained by determining that the square of the correlation between the latent variables should be lesser than the AVE of the correlated latent variables. The results of discriminant validity analysis

showed the square root of the AVE for the interpersonal scale (0.485) and the adaptability scale (0.500) was found to be less than one, which can indicate the absolute value of the correlations with another factor. The results also indicated that the AVE for the interpersonal scale (0.373) and the adaptability scale (0.250) was less than the MSV for interpersonal scale (0.312) and the adaptability scale (0.312). Even though the AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell & Larcker, 1981). Future studies should consider including the Positive Impression scale (available on the original version) as part of the psychometric analysis to ensure whether the respondents are attempting to create an overly positive self-impression.

CONCLUSION

Based on psychometric analyses using CFA, the results revealed that some of the comparative fit indices of the four-factor structure of the EQ-i:YV did not meet the recommended standards for model fitness. However, the results were still tolerable because Fornell and Larcker (1981) mentioned that if AVE was less than 0.5, but composite reliability was higher than 0.6, the convergent validity of the construct was still adequate. Subsequently, 10 items were removed to improve the model fit based on recommended quality standards and better goodness of fit with data. Following this, the EQ-I:YV designed by Bar-On was found to have good psychometric characteristics and suitable for use in the context of Malaysian culture, especially among secondary school students. Hence, EQ-I:YV has provided an important contribution to the emotional-social intelligence in the context of Malaysian youth. Future studies should be carried out in a proportionate age group cohort to explore differences in the emotional-social intelligence between teenagers and early adolescence. Future research can consider that the, sample be extended to youths in rural areas as well to determine any differences due to environmental settings. To further explore the role of ethnicity and different socioeconomic levels, studies should also be carried out in other states in Malaysia. Since this study only involved secondary school students in Kota Kinabalu, the findings cannot be generalised to include the characteristics of other samples.

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