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Validation of emotional intelligence scale in Chinese university students

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Abstract

This research revised Wong and Law's (2002) Emotional Intelligence Scale (WLEIS), and specifically examined the feasibility of its use with Chinese university students. The participants were 1458 university students in two cities in China (Beijing and Shandong province) and results showed that the Chinese version of the WLEIS retained a four-factor structure. The scale had acceptable reliability, concurrent validity, convergent and discriminant validity. The psychometric features of the Chinese scale supported its feasibility as a research instrument to measure EI appropriately in Chinese university students. The results also showed that Chinese male students had higher EI scores than female students, reflecting a deviation from previous research.

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1. Introduction

Thorndike proposed that humans possess several types of intelligence, one form being called social intelligence, or the ability to understand and manage men and women, boys and girls, and to act wisely in human relations (Thorndike, 1920). Following Thorndike, Gardner (1993)

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included interpersonal and intrapersonal intelligence as one of the seven intelligence domains in his theory of multiple intelligence.

Salovey and Mayer (1990) were the earliest researchers to propose the term “emotional intelligence” to represent the ability to deal with the emotions. They defined emotional intelligence as “the subset of social intelligence that involves the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions” (p. 189).

Each theoretical paradigm conceptualizes emotional intelligence from one of the three perspectives: ability, mixed model, or trait. Ability models regard emotional intelligence as a pure form of mental ability and thus as a pure intelligence. In contrast, the mixed models of emotional intelligence combine mental ability with personality characteristics such as optimism and well-being (Mayer, 1999). Currently, the only ability model of emotional intelligence is that proposed by Salovey and Mayer (1990). Mixed models of emotional intelligence conceptualize EI as a combination of cognitive, motivational, and affective constructs. By combining intellectual and non-ability traits, mixed models do not claim EI to be a type of intelligence (e.g., spatial ability) (Goleman, 2005). Parallel to the ability and mixed model classification of EI measures, Petrides and Furnham (2001) classify EI measures as trait and state measures (emotional self-efficacy), which refers to a constellation of behavioral dispositions and self-perceptions concerning one’s ability to recognize, process, and utilize emotion-laden information.

The most appropriate method of measuring EI is currently an area of controversy. The trait model refers to dispositional information collected through typical performance measures (self- or peer-report). Petrides and Furnham distinguish this type of emotional intelligence from ability emotional intelligence, which concerns actual abilities measured with maximal-performance tests. Based on the ability model, Mayer and Salovey (1997) began testing the validity of their four-branch model of emotional intelligence with the Multi-branch Emotional Intelligence Scale (MEIS). Composed of 12 subscale measures of emotional intelligence, evaluations with the Multi-branch Emotional Intelligence Scale indicate that emotional intelligence is a distinct intelligence with three separate sub factors: emotional perception, emotional understanding, and emotional management. Based on the original measurement, Mayer, Caruso, and Salovey (1999) developed the Mayer–Salovey–Caruso Emotional Intelligence Test. The scale yields six scores: an overall emotional intelligence score (expressed as an emotional intelligence quotient, or EIQ), two area scores (Experiential Emotional Intelligence, or EEIQ and Strategic Emotional Intelligence, or SEIQ), and four branch scores corresponding to the four branches of emotional intelligence.

Based on the trait model, the Emotional Intelligence Scale (EIS) (Schutte et al., 1998) has been used in a number of studies (e.g. Austin, Saklofske, Huang, & McKenney, 2004; Ciarrochi, Chan, & Bajgar, 2001; Petrides & Furnham, 2000; Saklofske, Austin, & Minski, 2003; Schutte et al., 2001). However, the largest problem in using this scale is the structure of the scale. Schutte et al. (1998) proposed that their scale was a unidimensional EI measure; two separate studies have suggested that there are four sub-factors (Optimism/Mood Regulation, Appraisal of Emotions, Social Skills, and Utilisation of Emotions) in addition to an overall EI factor (Petrides & Furnham, 2000; Saklofske et al., 2003). Austin et al. (2004) added 8 items into the original 33-item scale and found the modified 41-item version EIS had a more satisfactory psychometric index. Factor analysis showed the modified scale had a three-factor structure, which included regulation of emotion, utilisation of emotion, and appraisal of emotion.

Bar-On (1997) introduced the Bar-On EQ-i instrument, which contains 133 items. This scale was also used by some researchers (Austin et al., 2004; Bar-On, 1996, 1997, 2002, 2006). However, Bar-On's definition of EI is slightly different from the definition of Mayer and Salovey, and the scale includes a number of dimensions that may not relate to EI directly (e.g., problem solving, social responsibility, etc.).

There are still some other EI measures. Salovey, Mayer, Goldman, Turvey, and Palfai (1995) developed a 30-item Trait Meta-Mood scale to measure EI. Goleman (1995) developed a 10-item measure of EI without any validation evidence. However, none of these measures were validated in China.

Recently, Wong and Law (2002) developed a new EI measurement, which contains 16 items and four subscales. Their research showed the strong convergence with previous EI measures such as the Trait Meta-Mood and the EQ-i. Besides, this EI score could also predict external criterion variables such as life satisfaction. However, this scale was based on Hong Kong Chinese employees, we still have no evidence on the applicability of this scale in other Chinese populations such as university students in Mainland China.

With growing interest in the emotional intelligence of different cultural groups, a need has emerged for translated versions of scales measuring emotional intelligence. The aim of the present paper was to evaluate the reliability and validity of the WLEIS in a sample of Chinese university students. We were interested in assessing the relationship of the WLEIS with both personality and other psychological characteristics. We expected that the WLEIS score will have moderately positive correlations with the Openness, Agreeable and Conscientiousness dimensions of the Big Five model, and negative correlations with the Neuroticism dimension (McCrae & Costa, 1987). We also expected that subjects high on WLEIS would show high Positive Affect (PANAS: Watson, Clark, & Tellegen, 1988) and Warmth (one facet of the Extraversion dimension in the Big Five personality model), and low Negative affect, Loneliness (the UCLA Loneliness Scale, Russell, 1996; Russell, Peplau, & Cutrona, 1980; Russell, Peplau, & Ferguson, 1978), and Depression (Davis, 1980, 1983). We will also test the construct validity and reliability of the WLEIS in Chinese university students.

2. Method

2.1. Participants

Questionnaires were administered to 1458 students in two universities located in Beijing and Shandong province in China. In this research sample, 62.3% of participants were male (three did not report their gender). Participants ranged from 17 to 29 years old, with a mean age of 19.8 ± 1.4 years old (four did not report their age). In sample 1 (Beijing), 918 undergraduate university students were recruited for the study. All these students were first-year full-time students in one university in Beijing. The group comprised 648 males and 268 females (2 missing data). The mean age of the group was 19.3 years ($SD = 0.9$ years). In sample 2 (Shandong province), 397 undergraduate university students were recruited. The group comprised 197 males and 200 females. The mean age of the group was 20.5 years ($SD = 1.4$ years). In sample 3 (Shandong province), 143 undergraduate university students were recruited. The group

comprised 60 males and 82 females (1 missing data). The mean age of the group was 21.5 years ($SD = 1.6$ years).

2.2. Measures

WLEIS (Wong & Law, 2002): this scale contained 16 items. The response format of the WLEIS is a 7-point Likert-type scale (1 = totally disagree, 7 = totally agree). There are four subscales in the questionnaire: Self Emotion Appraisals, Others' Emotion Appraisals, Regulation of Emotion, and Use of Emotion. A sample item from the Self-Emotions Appraisal is "I really understand what I feel." A sample item from the Use of Emotion to facilitate performance dimension is "I would always encourage myself to try my best." A sample question from the Regulation of Emotion dimension is "I can always calm down quickly when I am very angry." A sample item from the Others' Emotion Appraisal is "I have good understanding of the emotions of people around me." We translated the original questionnaire and required the collaborators abroad to back-translate it and revise where inappropriate.

Emotional Intelligence Scale (Schutte et al., 1998): This scale contains 33 items (e.g. "I am aware of my emotions as I experience them") and has a unidimensional self-report measure of EI. It has previously demonstrated good reliability and has been shown to be predictive of various outcomes by Schutte and colleagues, who provide the full scale in their study. The alpha coefficient of this questionnaire was .89 in sample 1.

The UCLA Loneliness Scale (ULS): This scale (Russell, 1996; Russell et al., 1978, 1980) is the most widely used instrument for the assessment of loneliness (Cramer & Barry, 1999; Shaver & Brennan, 1991). The ULS asks respondents to report "how often" they experience an assortment of lonely and non-lonely feelings (the exact wording of the 20 items can be found in Russell, 1996, p. 23). It was anticipated that participants presented with response options emphasizing higher frequencies would report experiencing feelings relative to loneliness more often. The alpha coefficient of this questionnaire was 0.88 in sample 1.

The Zung's symptoms of depression scale (ZSDS): ZSDS (Zung, 1967) is a 20-item self-report measure of the symptoms of depression. Subjects rate each item with regard to how they have felt during the preceding week using a 4-point Likert scale, with 4 representing the most unfavorable response. The sum of the 20 items, after correcting for the 10 items that are reverse-scored, produces a raw score that is converted into a self-rating depression score. Overall, the ZSDS has been shown to be relatively valid and to have high internal consistency, exhibiting an alpha coefficient of 0.84. The alpha coefficient of this questionnaire was 0.79 in sample 1.

The Positive and Negative Affect Schedule (PANAS: Watson et al., 1988): The PANAS consists of 20-items, ten measuring positive affect (PA) (e.g. excited, proud) and 10 measuring negative affect (NA) (e.g. upset, nervous). Using a scale from 1 to 5, participants rate the degree to which each mood is being experienced at that particular point in time. The PANAS Scales have been shown to be stable and reliable over an 8-week interval ($\alpha = 0.89$ for PA subscale, $\alpha = 0.85$ for NA subscale), while virtually independent and valid (Watson & Clark, 1997; Watson et al., 1988). The alpha coefficient of PA and NA subscales were .85 and .83 in sample 1.

The Interpersonal Reactivity Inventory: IRI (Davis, 1980, 1983) is a 28-item, self-report inventory that assesses four dimensions of empathy: (1) empathic concern, a tendency to feel sympathy, compassion, and concern for others; (2) perspective-taking, the ability and proneness to adopt the

point of view of others; (3) fantasy, a tendency to identify with characters in fictional works; and (4) personal distress, the tendency to become upset and anxious when observing other people in negative circumstances. [Davis \(1980\)](#) reports internal consistencies ranging from 0.68 to 0.79 for the subscales, and test–retest reliabilities ranging from 0.61 to 0.81 over intervals of between 60 and 75 days. The factor structure of the scales appears to be similar in male and female samples. The construct validity of the scales has been supported through correlations with other empathy measures and with measures of other theoretically related variables ([Davis, 1983](#)). The internal consistencies ranged from 0.64 to 0.75 for the subscales in sample 2.

The Big Five Adjective Scale: This scale was developed by [McCrae and Costa \(1987\)](#). To limit the length of the questionnaire, we adopted a simplified method ([Law, Wong, & Song, 2004](#)) that randomly selected 6 items for each of the Big Five Personality dimensions from the original 80-item scale, resulting in a 30-item measure. The internal consistencies ranged from 0.70 to 0.81 for the subscales in sample 3.

Warmth: One facet of the Extraversion dimension of the Big Five model ([Costa & McCrae, 1989](#)), which contained 8 items (e.g. “This person is known as a warm and friendly person.”). We asked the counselor of each student to evaluate the students’ interest in and friendliness towards others. The internal consistency was 0.72 in sample 3.

Demographic information was also collected including age, gender and major information. All the questionnaires used in this research were in Chinese language.

3. Results

3.1. Structure validity

We conducted confirmatory factor analysis (CFA) on the 16 items to examine the structure validity. Cases with missing data were deleted listwise. Results of the confirmatory factor analysis are presented in [Table 1](#). Comparing with the one-factor model, the four-factor model fit well. These results meet the criteria for goodness of fit indices ($>.90$) and root mean square residual ($RMR < .05$) (see [McDonald & Marsh, 1990](#)), which means the WLEIS scale retained a four-factor structure in our Chinese university students sample.

3.2. Internal consistency and item homogeneity

Internal consistency was assessed using Cronbach’s α and item homogeneity was assessed using mean inter-item correlation (MIC). As shown in [Table 2](#), internal consistencies of the whole scale

Table 1
CFA results of the four-factor and one-factor model

Sample	χ^2	RMSEA	GFI	AGFI	CFI
Four factor	381.42	0.045	0.97	0.96	0.97
One factor	15792.61	0.300	0.42	0.33	0.02

Note: N total = 1458.

Table 2
Reliability and homogeneity of the WLEIS scales in males and females

Scale	Male		Female		Total	
	MIC	α	MIC	α	MIC	α
Total	.29	.86	.29	.87	.27	.86
SEA	.48	.79	.46	.78	.52	.81
OEA	.57	.84	.57	.84	.55	.83
ROE	.64	.88	.47	.78	.40	.72
UOE	.44	.76	.65	.88	.62	.87

Note: N total = 1458, males = 907, females = 548 (three missing data), MIC = mean inter-item correlation; α = Cronbach's alpha.

SEA, OEA, ROE, UOE stand for self emotion appraisal, others' emotion appraisal, regulation of emotion and uses of emotion.

and sub-scales of the WLEIS were excellent. It is worth pointing out that the MIC coefficients for the subscales of UOE for both men and women were very high, indicating possible redundancy among items comprising these subscales. The WLEIS total was less homogeneous than any composite scale which was expected given that WLEIS total was designed to tap a broad dimension of emotional intelligence.

3.3. Concurrent validity

The scores obtained from the WLEIS and the emotional intelligence scale (EIS; Schutte et al., 1998) was correlated to assess the concurrent validity of the WLEIS. As expected, higher scores on EIS were substantially associated with high scores on the WLEIS ($r = .79, p < .01$), and also related to the four dimensions of the WLEIS, respectively. The high scores on EIS were associated with SEA, OEA, ROE and UOE ($r = .62, p < .01$; $r = .59, p < .01$; $r = .49, p < .01$ and $r = .59, p < .01$). The results showed that these two scales used to measure emotional intelligence had high or moderate correlations, which showed the WLEIS has concurrent validity.

3.4. Convergent/discriminant validity

We would expect a valid measure of emotional intelligence to be related to the measures that assess general emotional status, some specific emotions such as depression and loneliness, and some other psychological constructs related to emotion. As shown in Table 3, the total EI score and the scores of the four subscales had moderate negative correlations with loneliness, depression and the distress subscale in the interpersonal reactivity inventory, and a low negative correlation with negative affect. The EI score also had a moderate positive correlation with positive affect and the perspective taking subscale in the interpersonal reactivity inventory. Besides, there were low positive correlations between the total score and three subscale (SEA, UOE and OEA) scores with the Fantasy and Emotional concern subscale scores.

We also analysed the correlations between EI scores and the Big Five personality score (see Table 4). The results indicated that the EI scores had moderate negative correlations with Neuroticism ($r = -.46, p < .01$), and moderate correlations with Agreeableness ($r = .23, p < .01$),

Table 3
Correlations of the WLEIS and other measures

	PANAS		ZSDS	UCLA	Interpersonal reactivity inventory			
	PA	NA			Fantasy	Emotional concern	Perspective taking	Distress
Total	0.39**	-0.18**	-0.37**	-0.27**	0.16**	0.15**	0.42**	-0.33**
SEA	0.27**	-0.15**	-0.32**	-0.20**	0.12*	0.11*	0.34**	-0.23**
ROE	0.25**	-0.20**	-0.24**	-0.19**	-0.03	-0.03	0.30**	-0.40**
UOE	0.40**	-0.14**	-0.39**	-0.26**	0.20**	0.23**	0.25**	-0.18**
OEA	0.21**	-0.04	-0.21**	-0.12*	0.18**	0.14**	0.28**	-0.08

Note: PA = Positive affect; NA = Negative affect; ZSDS = Zung’s symptoms of depression scale; UCLA = UCLA Loneliness scale; Fantasy, Emotional concern, Perspective taking and Distress are the four subscales of the interpersonal reactivity inventory.

* $P < .05$.
** $P < .01$.

Table 4
Correlations of the WLEIS and Big Five personality score

	<i>N</i>	<i>E</i>	<i>O</i>	<i>A</i>	<i>C</i>
Total	-0.46**	-0.16	0.23**	0.23**	0.35**
SEA	-0.33**	-0.06	0.08	0.02	0.19*
ROE	-0.05	0.01	0.20*	0.18*	0.04
UOE	-0.38**	-0.14	0.20*	0.16	0.27**
OEA	-0.45**	-0.21*	0.14	0.23**	0.39**

* $P < .05$.
** $P < .01$.

Openness ($r = .23, p < .01$) and Conscientiousness ($r = .35, p < .01$) subscales. But there was no correlation between EI scores and the Extraversion subscale score ($r = -.16, p > .05$). These results were similar with the results of Wong and Law’s research (2002).

To avoid the common method bias, we obtained the evaluations of the students from the counselor. As expected, the Warmth scores were positively correlated to the scores on the WLEIS ($r = .39, p < .01$), and also related to the three dimensions of the WLEIS, respectively. The high scores on EIS were associated with SEA, OEA and ROE ($r = .27, p < .01$; $r = .41, p < .01$ and $r = .26, p < .01$).

Overall, the results above indicated that the EI measurement in this research has convergent and discriminant validity.

3.5. Analysis of gender and age differences

To examine the effects of gender group, an independent-samples *t*-test was performed on the total score of the WLEIS and the four subscales. The results indicated that males’ total emotional intelligence score was higher than the score of female students (see Table 5). Specifically, male students’ scores on the subscale OEA and UOE were significantly higher than the female scores.

We also analysed the correlation between EI score and age but did not find significant results.

Table 5
Gender differences on the WLEIS and subscales

Scale	Male		Female		<i>t</i> Score
	<i>M</i>	SD	<i>M</i>	SD	
Total	5.19	0.77	5.07	0.76	2.756**
SEA	5.54	0.91	5.50	0.99	0.733
OEA	4.89	1.18	4.60	1.20	4.481**
ROE	5.03	1.13	5.05	1.10	-0.385
UOE	5.29	1.06	5.14	1.00	2.632**

* $P < .05$.

** $P < .01$.

4. Discussion

The present study provided support for the reliability and validity of a relatively new measure of emotional intelligence, the WLEIS (Wong & Law, 2002). The original purpose of developing the WLEIS was to be beneficial for future leadership and management research. In this research, we found this scale can also be used in a Chinese university student sample.

This inventory had a stable structure. The results of confirmatory factor analysis of the WLEIS presented here provide a replication of the four-factor structure obtained by Wong and Law (2002). The findings are also in agreement with the conceptual framework of EI as a multidimensional construct. The factors overlap some of those in the conceptual model of Salovey and Mayer (1990) with the model categories of appraisal and expression of emotion, regulation of emotion, and utilisation of emotion being represented in the factor structure.

The correlation between EI scores of the WLEIS and Shutte's EI scale (1998) were investigated. The results showed that higher scores on EIS were substantially associated with high scores on the WLEIS and were also related to the four dimensions of the WLEIS respectively, demonstrating the WLEIS's concurrent validity in a Chinese university student sample.

The pattern of correlations of EI scores with other measures found in the present study is generally in accordance with the findings from other studies (Dawda & Hart, 2000; Newsome, Day, & Catano, 2000; Petrides & Furnham, 2000; Schutte et al., 1998; Saklofske et al., 2003). The expected positive associations of EI with positive affect and negative associations with loneliness, depression and negative affect were found. The patterning of EI factor correlations with personality traits in Table 4 is also of interest, indicating the relations between these factors and personality traits. The above findings demonstrated the discriminant and convergent validity of the WLEIS in a Chinese university student sample.

In our research, the males' total emotional intelligence score was higher than that of females. Specifically, male students' scores on the subscales OEA and UOE were significantly higher than the scores of females. This is the opposite result of some previous research where women have repeatedly had higher scores than men on tests of EI (e.g., Day & Carroll, 2004; Mayer et al., 1999; Schutte et al., 1998; Van Rooy, Alonso, & Viswesvaran, 2005). However, not all studies have found gender differences, and more studies are needed in this area. Bar-On (1997) for in-

stance, found no significant gender differences on the overall EI score, and the effect explained less than 1% of the variance. Females scored slightly better than males for the overall average, and also for many of the EQ-i sub-scales, but it should be noted that males scored higher on other subscales. Another example is the research of Saklofske et al. (2003) where they found complicated patterns of the gender difference on the EI Scale scores. There was no significant gender difference on the Optimism/Mood regulation factor. On the appraisal of emotions and social skills factors, females scored higher than males. Males scored higher than females on the Utilization of Emotions factor, which was partially in agreement with our findings. The discrepancy may be due to measurement choice. It should also be noted that the gender difference in our research was quite small, and the significance of the difference may be possibly due to the large size of the sample.

There are, however, two limitations in our research. First, this scale is a self-report assessment. We still cannot avoid the social desirability bias. It is relatively more trait-oriented rather than skill-oriented and thus if the EI tested here could be trained and developed it still needs to be verified. Perhaps it must be accepted that the degree to which the entire constellation of trait EI self-perceptions is accurate cannot be determined. However, some researchers proposed that self-reports must be given priority over objective measures in the study of affect when discrepancies arise (Watson, 2000). We should further examine the applicability of this EI test in training in the future. Second, all the data in this research were collected in Chinese universities. While the findings expand the generalizations of the use of the WLEIS originally developed by Wong and Law (2002) with employees in Hong Kong, we still do not know if the scale can be used in other cultures. Therefore its cross-cultural validity needs to be verified with further studies.

In sum, the present study provided evidence of the validity of the WLEIS in a university student sample, demonstrating the generality of the WLEIS on both mapping the structure of EI and measuring EI.

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