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Psychometric Properties of the Chinese Translation of the Mindful Attention Awareness Scale (MAAS)

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Abstract The present study examined the reliability and validity of a Chinese translation of the Mindful Attention Awareness Scale (MAAS). Three questionnaires, the MAAS, the Positive and Negative Affect Schedule (PANAS), and the brief version of the World Health Organization's Quality of Life (WHOQOL-BREF), were completed by 263 Chinese undergraduates (207 males, 56 females). Seventy of these students were assessed again with the MAAS after 20 days to evaluate the scale's test–retest reliability. Results from confirmatory factory analysis indicated that a one-factor solution fit the MAAS data satisfactorily. Reliability coefficients, including Cronbach's alpha, Guttman split-half, item–total correlations, and test–retest, were also satisfactory. Addressing validity, the MAAS was negatively correlated with PANAS negative affect and positively associated with PANAS positive affect as well as with the quality of life indexed by the WHOQOL-BREF. The Chinese version of the MAAS appears to be a reliable and valid instrument to assess levels of mindfulness in a Chinese college population.

Keywords Mindfulness · MAAS · Reliability · Validity · Chinese translation

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Introduction

Mindfulness-based training is recognized as a form of training in attention. Particularly in the initial stages of mindfulness practice, participants actively focus their attention on present-moment experience (Tang and Posner 2009). Research has demonstrated that mindfulness-based training can effectively enhance attention performance. For instance, Tang et al. (2007) showed that after 5 days of integrative body–mind training, which emphasized mindfulness practice, participants showed stronger improvements in the conflict score on the attention network test compared to participants receiving relaxation training. Lutz et al. (2009) demonstrated that a 3-month intensive training (10–12 h/day) in mindfulness effectively improved attentional stability in comparison with a novice mindfulness training group training 1 h/day. Another investigation (Brefczynski-Lewis et al. 2007) using functional magnetic resonance imaging revealed that the attention-related brain regions were activated in both expert mindfulness trainees and novice trainees when in mindfulness trials in contrast to rest trials. These results suggest that mindfulness-based training can strengthen attentional capacities and thereby improve self-regulation (Lutz et al. 2008; Tang and Posner 2009).

Given the centrality of mindful attention to mindfulness-based training, it has become important to assess it—to know, for example, whether mindfulness itself improves

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with training and whether this quality of attention and changes in it are related to and responsible for the various mental health, behavior regulation, and interpersonal benefits that have been ascribed to mindfulness and its training.

The present research was designed to assess the reliability and validity of a Chinese translation of one of the most frequently used self-report measures of mindfulness. The Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003) is a self-report-based instrument used to assess individual differences in the frequency of attention to and awareness of present-moment experience. The scale was originally validated among American college students and community adults (e.g., Brown and Ryan 2003; MacKillop and Anderson 2007), as well as individuals with cancer (Carlson and Brown 2005). Semantic equivalence of the scale items has been demonstrated cross culturally (between Americans and Thais; Christopher et al. 2009) and between those untrained and trained in mindfulness (Brown and Ryan 2003). The scale appears to be sensitive to mindfulness training, with significantly higher scores among those trained in mindfulness than in age- and gender-matched controls (Brown and Ryan 2003); MAAS scores have also shown significant increases over the course of mindfulness training (Shapiro et al. 2007), and Brown and Ryan (2003) found that patients with breast and prostate cancer receiving mindfulness training showed declines in mood disturbance and stress that were significantly associated with increases in MAAS scores over time (see also Carlson and Brown 2005).

A growing number of investigations have provided evidence to validate the role of mindfulness in psychological well-being. Brown and Ryan (2003; see also Jermann et al. 2009; Brown et al. 2011) found that the MAAS correlated with a variety of well-being constructs, including negative associations with indicators of cognitive and emotional disturbance and positive associations with indicators of subjective well-being. The MAAS has been shown to predict a number of objective outcomes in several life domains (see Brown et al. 2007, 2011 for reviews), including better regulation of attention (Cheyne et al. 2006), better judgment and decision making (e.g., Lakey et al. 2007), lower susceptibility to depressive relapse/recurrence after mindfulness training (Michalak et al. 2008), lower biological susceptibility to social stress (Brown et al. 2010), and greater sensitivity to physiological health (O'Loughlin and Zuckerman 2008).

Research aiming to disclose the neural correlates of such adaptive functioning has shown MAAS scores to correlate with cortical and limbic markers of lower emotional reactivity (Creswell et al. 2007; Way et al. 2010). MAAS scores have also been positively related both to higher activations in regions of the prefrontal cortex (PFC) during emotional threat and a downregulation of amygdala activation through this PFC activation, which is thought to reflect better emotion regulation (e.g., Creswell et al. 2007).

To our knowledge, there is no Chinese version of the MAAS available, and no research using the MAAS has been performed with Chinese populations. Thus, the purpose of the present study was to examine the psychometric properties of a Chinese translation of the MAAS in a Chinese population of university students. We also sought to provide initial evidence for the reliability of the translated scale by examining its internal consistency and test–retreat reliability and the scale's validity by examining its correlation with emotional traits and quality of life.

Method

Participants

The participants were 263 Chinese undergraduates (207 males and 56 females, mean age=20.5 years, SD=1.01, range=16–24 years) who attended psychology courses in the Dalian University of Technology, China. All completed a battery of questionnaires in a single session. In addition, 70 of these participants were randomly chosen to complete the MAAS again over a 20-day interval for test–retest reliability assessment.

Procedure

The copyright holders Brown and Ryan authorized the Institute of Neuroinformatics in the Dalian University of Technology to translate the English version MAAS into Chinese. Then an English college teacher, who held a Master of Arts degree in foreign linguistics and applied linguistics and was unfamiliar with the concept of mindfulness, back-translated the Chinese-version MAAS into English. Finally, the first author compared the back-translated version of MAAS to the original one and discussed each item on the MAAS with the back-translator, so as to ensure conceptual equivalence between the translated instrument and the original one (Ember and Ember 2001).

Measures

MAAS Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003), the 15-item trait version of the MAAS, has a single-factor structure with items rated from 1 (almost always) to 6 (almost never). Across multiple samples, Brown and Ryan (2003) reported internal consistency

coefficients above .80. Higher mean scores on the scale reflect higher levels of dispositional mindfulness.

PANAS The Positive and Negative Affect Schedule (PANAS, Watson et al. 1988) is a 20-item measure of positive and negative affect. The measure has been validated in Chinese (Huang et al. 2003); these authors reported Cronbach's alpha for the positive affect subscale and the negative affect subscale was .85 and .83, respectively.

WHOQOL The World Health Organization Quality of Life, Brief Form scale (WHOQOL-BREF, Skevington et al. 2004) provides an indicator of quality of life. The 26-item scale was developed from the World Health Organization's Quality of Life-100 scale (WHOQOL-100). The first two items refer to general quality of life and general health, and the remaining 24 items are divided into four health domains, namely physical, psychological, social relationship, and environmental quality. Skevington et al. (2004) reported that Cronbach's alpha for the four domains in a Chinese sample were acceptable for the physical domain (.82), the psychological domain (.89), the social domain (.76), and the environment domain (.70).

Statistical Analysis

Before all analyses, missing item values on the MAAS were imputed. Amongst the 15 items of MAAS, there were eight items with at least one missing value; however, the percentage of missingness for each of these items was very low (range, 0.38–0.76%). Among 263 respondents, only five (1.1% of all the respondents) missed one item, and three respondents (1.9%) missed two items on the MAAS. Considering the extent of missingness was very small, the mean score of each item was substituted to these missing values (Fox-Wasylyshyn and El-Masri 2005).

Confirmatory factor analysis of the MAAS was completed first and was conducted using LISREL 8.70. SPSS 13.0 was used to assess item–total correlations, internal consistency (Cronbach's α and the Guttman split-half coefficient), and test–retest reliability. Test–retest score agreement using paired samples t test was also assessed in SPSS. Pearson correlations between the MAAS and both the PANAS and WHOQOL-BREF were also computed using SPSS 13.0.

Results

Confirmatory Factor Analyses

The goodness of fit of the original one-factor model of the MAAS (Brown and Ryan 2003) was tested by confirmatory factor analysis with maximum-likelihood estimation (Hau et al. 2004). Model fit was estimated with the following fit indices: (1) chi-square to *df* ratio (χ^2/df), wherein a value of no more than 3 indicates a good fit (Carmines and McIver 1981); (2) the comparative fit index (CFI); (3) the non-normed fit index (NNFI); generally, values of the CFI and NNFI exceeding .90 indicate a good fit (Hau et al. 2004); and (4) the root-mean-square error of approximation (RMSEA), in which the criterion for a good model fit is <.05, and .05≤RMSEA<.08 indicates a reasonable fit (Browne and Cudeck 1993).

In the present study, the fit indices were χ^2/df=241.89/90=2.69, CFI=.94, NNFI=.93, and RMSEA=0.079. These results suggested that the single-factor model of the Chinese version of the MAAS was adequate. Comparatively, the fit indices of the 15-item model in the student sample of Brown and Ryan's study (2003) were χ^2/df=189.57/90=2.11, CFI=.91, and RMSEA=0.058. In the published French version of the MAAS (Jermann et al. 2009), the available fit indices were χ^2/df=145.03/90=1.61, CFI=.92, and RMSEA=0.057.

Descriptive Statistics and Gender Difference Analysis

In the 263 samples, descriptive statistics involving minimum, maximum, mean, standard deviation, skewness, and kurtosis were analyzed. Table 1 presented the detailed results.

Then we conducted the independent samples test to analyze the gender difference. The results showed no significant differences in the mean scores between the male and female student sample with $t(df)$=1.513(261), p=.131.

Internal Consistency and Corrected Item–Total Correlation

Cronbach's alpha and Guttman's split-half reliability coefficient for the MAAS were .85 and .81, respectively. The corrected item–total correlation of the items ranged from .345 to .674, except for items 4 and 5, which showed correlations of .250 and .249, respectively (see Table 1, second column). For comparative purposes, Table 2 also lists the item–total correlation coefficients presented by Brown and Ryan (2003). As can be seen there, the item–total correlations were quite similar across the two studies.

Test–Retest Reliability

Test–retest reliability over 20 days, which was assessed with a Pearson correlation, was .54 (p<.01). Assessment of

Table 1 Descriptive statistics for MAAS

Minimum	Maximum	Mean	Std. deviation	Skewness	Kurtosis
2.07	6.00	4.24	.74	−.27	−.19

Table 2 Corrected item–total correlation of MAAS items

Item	Sample of present study	Brown and Ryan's study
01	.429	.45
02	.569	.42
03	.610	.49
04	.250	.39
05	.249	.25
06	.345	.31
07	.611	.72
08	.566	.67
09	.601	.38
10	.674	.61
11	.402	.49
12	.547	.57
13	.475	.26
14	.574	.69
15	.470	.41

test–retest agreement using the paired samples t test revealed no significant differences in the mean scores between test–retest administrations, with $t(69)=.12$, $p=.91$. These values indicate that the scale showed reasonable stability over 20 days, and participant scores showed no significant variation over time.

Correlations with Affect and Quality of Life

Table 3 presents the associations between MAAS and both the PANAS and the WHOQOL-BREF. The MAAS was significantly positively correlated with PANAS positive affect and inversely associated with PANAS negative affect. The MAAS was significantly positively related to all the subscale scores on the WHOQOL-BREF.

Discussion

The purpose of the present study was to investigate the factor structure, reliability, and validity of the Chinese version of MAAS among a Chinese population. The results were consistent with those reported by Brown and Ryan (2003) as well as by Jermann et al. (2009).

Specifically, as in this previous research, confirmatory factor analysis found a single-factor structure, the internal consistency of the scale was comparably high, and the test–retest reliability was significant, though the absolute value was somewhat lower than reported in Brown and Ryan (2003). These findings indicated that the Chinese version of MAAS has adequate scale reliability. Moreover, consistent with previous studies (Brown and Ryan 2003; Jermann et al. 2009), the Chinese version of MAAS showed significant positive relations with positive affect and quality of life and a negative association with negative affect. These preliminary results support the concurrent validity of the scale in showing that individuals with higher mindfulness tend to experience more positive moods and report a higher quality of life.

Limitations and Future Research

The present study had several limitations. First, the sample was composed of university students, so the results may not be generalized to other adult populations. Future research should seek to validate the Chinese version of MAAS in a general adult population and in clinical, mental, and physical health populations. Second, while the present results suggest that Chinese students' scale responses behave similarly to those of Western adults, it is not clear whether the two populations comprehend the concept of mindfulness similarly. Hence, comparing eastern and western respondents' understanding of the items on the MAAS will be an important research endeavor. Finally, the present research scarcely began to test the validity of the Chinese MAAS, and future research will need to test the application of the scale for valued experiential, neurological, and behavioral outcomes. The present research also offers possibilities for research examining the utility of the MAAS for testing cross-cultural hypotheses regarding mindfulness and its outcomes.

Table 3 Correlations of MAAS with PANAS and WHOQOL-BREF

	PANAS		WHOQOL-BREF					
Scale	PA	NA	OQL	GH	Physic D	Psych D	SR	ED
MAAS	.232*	−.322**	.287**	.220*	.393**	.433**	.279**	.316**

PANAS Positive and Negative Affect Schedule, *PA* positive affect, *NA* negative affect, *WHOQOL-BREF* World Health Organization Quality of Life Scale, Brief Form, *OQL* overall quality of life, *GH* general health, *Physic D* physical domain, *Psych D* psychological domain, *SR* social relationships, *ED* environment domain

*$p<.001$; **$p<.0001$

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