



Mindful Parenting Assessed in Mainland China: Psychometric Properties of the Chinese Version of the Interpersonal Mindfulness in Parenting Scale

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Abstract

Objectives The Interpersonal Mindfulness in Parenting Scale is a 31-item self-report measure to assess mindful parenting, and has been revised into a Dutch, Portuguese, and Hong Kong version. The aim of this research was to explore the factor structure and psychometric properties of the Chinese version of the Interpersonal Mindfulness in Parenting scale (IM-P-C) in Mainland China.

Methods The Chinese version was translated from the original English version in the preliminary study. Exploratory factor analysis, confirmatory factor analysis, and measurement invariance analysis across gender, test-retest reliability were examined consecutively in study 1 ($n = 183$), 2 ($n = 294$), and 3 ($n = 48$). In study 4, its factor structure was examined in a clinical sample ($n = 288$).

Results A four-factor structure was found in study 1 and the scale scores showed adequate internal consistency. The four-factor structure was confirmed with a new sample in study 2. Measurement invariance analysis across gender suggested that both fathers and mothers interpreted the IM-P-C in a similar manner. Significant correlations were found between the IM-P-C and measures of over-reactivity, parental warmth, anxiety, depression, life satisfaction, and dispositional mindfulness. In study 3, results exhibited temporal stability over a period of 2 weeks. In study 4, the IM-P-C was validated in parents of children with autism.

Conclusions The present research demonstrated that mindful parenting in a Chinese population can be measured through the assessment of four dimensions (Interacting with Full Attention, Compassion and Acceptance, Self-regulation in Parenting, Emotional Awareness of Child) and confirmed that the Chinese version is an adequate measure for the studies of mindful parenting in Mainland China.

Keywords Mindful parenting · Interpersonal mindfulness in parenting scale · Chinese parents · Reliability and validity

Mindful parenting, which extends intrapersonal mindfulness into the interpersonal parenting process, has been defined as paying attention to children and parenting in a particular way: on purpose, non-judgmentally, and in the present moment (Coatsworth et al. 2010; Duncan 2007; Kabat-Zinn and Kabat-Zinn 1997). Over the past decade, increasing studies have found that mindful parenting could be beneficial for both children and parents.

Mindful parenting was found to be positively related to children's well-being (Medeiros et al. 2016) and negatively correlated with their symptomatology, which includes internalizing and externalizing problems (Geurtzen et al. 2015; Parent et al. 2016b) and risk behaviors (Turpyn and Chaplin 2016). Intervention programs integrating mindfulness with parenting can decrease children's psychopathology (Bögels et al. 2014; Coatsworth et al. 2010). For parents, mindful parenting was associated with less parenting stress (Beer et al. 2013; Bögels et al. 2014), more positive parenting practices (Gouveia et al. 2016), and better collaborative parenting (Parent et al. 2016a). In addition, mindful parenting was positively associated with parent-child interactions and communication (Lippold et al. 2015).

Although the concept of mindful parenting was first proposed by Kabat-Zinn and Kabat-Zinn (1997), Duncan and colleagues proposed a theoretical model of mindful parenting which explains how this parenting approach can have positive effects on

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the psychological functioning of parents and children and on the parent-child relationship (Duncan 2007; Duncan et al. 2009). This theoretical model encompasses five dimensions of mindfulness parenting: (1) *Listening with Full Attention* refers to parents listening to children with full attention in the present moment; (2) *Non-judgmental Acceptance of Self and Child* refers to accepting themselves and their children's traits and behaviors with more non-judgment; (3) *Emotional Awareness of Self and Child* refers to the ability of parents to be aware of themselves and their children; (4) *Self-Regulation in the Parenting Relationship* refers to being able to pause before acting, in order to choose parenting behaviors that are in accordance with parents' values and goals; and (5) *Compassion for Self and Child* refers to parents having less self-blame when they do not achieve parenting goals and caring and showing compassion for children when needed.

Based on the theoretical model, the Interpersonal Mindfulness in Parenting scale (IM-P) was developed. The initial version of the IM-P was a brief 10-item version consisting of four subscales: Present-Centered Attention in Parenting, Present-Centered Emotional Awareness in Parenting, Non-Reactivity/Low-Reactivity in Parenting, and Non-judgmental Acceptance in Parenting. The internal consistencies for some subscales were low (such as .45 for the subscale of Present-Centered Emotional Awareness) (Duncan 2007). Subsequently, under the theoretical model proposed by Duncan et al. (2009), the 10-item IM-P scale was extended into a 31-item version with 5 hypothesized subscales mentioned above. However, the authors of the IM-P did not examine its factor structure and psychometric properties, which left the five-factor structure a theoretically hypothesized structure.

Unlike the English version of the IM-P, which was developed from theoretical criteria, other language versions have been developed based on empirical data, such as the Dutch (de Bruin et al. 2014) and Portuguese versions (Moreira and Canavarro 2017), and very recently the Hong Kong Chinese version (Lo et al. 2018). Each of these three scales' item composition and factor structure differ from each other and from the original English version. The 29-item Dutch version was investigated in samples of mothers from the community, suggesting a six-factor model with subscales: Listening with Full Attention, Compassion for the Child, Non-judgmental Acceptance of Parental Functioning, Emotional Non-reactivity in Parenting, Emotional Awareness of Child, and Emotional Awareness of Self (de Bruin et al. 2014). It separated child-oriented items from parent- or parenting-oriented items. Relatively similar to the Dutch version, the 29-item Portuguese version formed a 5-factor model with subscales: Listening with Full Attention, Compassion for the Child, Non-judgmental Acceptance of Parental Functioning, Self-regulation in Parenting, and Emotional Awareness of the Child, which combined the Emotional Awareness of Self and the Emotional Non-reactivity in Parenting dimensions from the Dutch version together to create a single dimension named Self-regulation in Parenting.

Recently, the IM-P was validated in Eastern culture with a Hong Kong Chinese sample (Lo et al. 2018). This validated version has 23 items and revealed a 4-factor structure: Listening with Full Attention, Emotional Awareness in Parenting, Nonjudgmental Acceptance in Parenting, and Compassion for Child. The factor structures from all versions indicate that compassion for self could not be integrated with compassion for child as one factor.

Although the concept of mindfulness draws heavily on the thought from Eastern traditions such as Buddhism; it remains uncertain whether mindful parenting as applied in the West is the same concept and has the same effect as in Mainland China. This is because parenting is a culturally sensitive domain (Goodnow 1985). For example, Chao's studies showed that an authoritative parenting style was not as beneficial for Chinese immigrant families as for European families (Chao 1994, 2001). Recently, the IM-P was validated in a Hong Kong Chinese population (Lo et al. 2018). This population does not fully represent the Mainland Chinese population. Hong Kong Chinese have different parenting norms from the Mainland Chinese. Studies have shown that mothers in Hong Kong are more prone to adopt an authoritarian child-rearing style than mothers in Mainland China (Berndt et al. 1993; Lai et al. 2000). Meanwhile, previous validation studies did not examine whether the factor structure is consistent between mother and father. For example, the Dutch version of the IM-P was based on mother samples only (de Bruin et al. 2014).

In this research, the psychometric properties of the Chinese IM-P were examined among Mainland Chinese parents. Due to space limitations, a preliminary study conducted to test language comprehension is only briefly reported here. The preliminary study introduced a 30-item version of the Chinese IM-P. Study 1 used exploratory factor analysis to explore the factor structure of the 30-item Chinese IM-P in a sample of parents from the general community. Its convergent validity was also examined. A confirmatory factor analysis was conducted in study 2 to confirm the adequacy of the factor structure in a different sample of mothers and fathers. Reliability, convergent validity, and measurement invariance of factor structure across gender were also investigated. Since mindful parenting is regarded as a stable trait of parents (Duncan et al. 2009), study 3 further examined the 2-week interval test-retest reliability with a new sample of parents. Study 4 was added to examine whether the revised Chinese version of the IM-P was also valid in parents of children with autism. All of the samples of participants in the preliminary and the other four studies were recruited separately and at different times and there were no overlaps.

Preliminary Study

Three steps were taken to develop the preliminary version of the Chinese IM-P. First, the original 31-item English version

of the IM-P was translated into Chinese through a forward-backward translation procedure. Second, a sample of community mothers was recruited to investigate the factor structure of the original IM-P. Based on the four factor structure models from previous studies (English, Dutch, Portuguese, and Hong Kong), confirmatory factor analyses (CFA) were conducted first. The results revealed that none of the models fit our data well, which indicated exploratory factor analysis should be used to explore the factor structure in our Chinese population. However, exploratory factor analysis (EFA) revealed that no meaningful factor structure could be formed, such as the six-factor structure reported in Table S.1. Third, language contextualization and simplification of the items were conducted through individual interviews with ten mothers. Several items' wording was modified to be better understood by Chinese parents and one item ("Getting carried away with feelings when upset with the child") was deleted since this item is easily misunderstood with Chinese parents. The resultant preliminary version of the Chinese IM-P had 30 items. For more detailed information and statistical results, please refer to the [Supplementary Materials](#).

Study 1

The main aims of study 1 were to examine the performance of the items of the preliminary version of the Chinese IM-P and explore its factor structure. In addition, convergent validity was examined through the correlations between the Chinese IM-P subscales and parenting distress. We expected that the Chinese IM-P subscales would be negatively related with parenting distress.

Method

Participants

The sample included 183 participants from the general community among which 109 (59.6%) participants were female. The average age of participants was 36.25 years ($SD = 1.71$; range 25–54). One hundred sixty-two (88.5%) participants had only 1 child. The average age of the participant's oldest child was 10.17 years ($SD = 2.54$; range 7–18). The majority of participants (81.9%) had completed bachelor or above studies.

Procedure

Participants were invited to participate in a study about mindful parenting. To be included in the study, participants had to be the mother or the father of at least one child or adolescent. Only one of the child's parents could participate in the survey. Questionnaires were distributed online through a data

collection website (sojump®). Online questionnaires firstly consisted of an introduction of the study, a description of the study objectives, the inclusion criteria, and a short discussion of issues regarding research ethics. Participants were informed that this study was anonymous, and they were voluntary and no monetary or other compensation would be given. Only those who agreed to the study condition would complete the questionnaires including a series of demographic questions (e.g., gender, age, education, and number of children) and the related scales. One screening item was used which was "Please choose 'often true' for this item". If the participants did not choose "often true," their data would be regarded as invalid and excluded. One hundred eighty-eight questionnaires were received and 5 were excluded due to the screening item.

Measures

Mindful Parenting The 30-item Chinese IM-P formed in the preliminary study (please refer to the supplementary materials for more details) was used. Participants rated every item on a five-point Likert scale that ranged from 1 (never true) to 5 (always true). Higher scores reflect higher levels of mindful parenting.

Parenting Distress The Parenting Distress subscale from the Parenting Stress Index-Short Form (PSI-SF; Abidin 1995) was used to assess parenting distress. Participants ranked the items on a five-point Likert scale with higher scores indicating higher levels of parenting distress (e.g., "I feel trapped by my responsibilities as a parent"). The parenting distress subscale of the Chinese PSI-SF demonstrated good reliability ($\alpha = .87$; Yeh et al. 2001).

Data Analyses

First, the corrected item-total correlation (CITC) was assessed and was considered adequate when larger than .20 (Kline 1986; Streiner and Norman 2003). Second, item discriminability analysis was conducted to investigate whether each item could distinguish the participants who scored higher from those who scored lower. In this analysis, the high-score group and low-score group were chosen according to the top and bottom 27% of all scores respectively. Independent sample *t* tests were conducted between the high-score group and low-score group on each item (Crocker and Algina 1986; Gregory 2004). Third, an exploratory factor analysis with varimax rotation was performed to extract common factors. Fourth, to explore the internal consistency, the Cronbach's alpha was computed for each subscale and for the total scale. Finally, correlations between the total score, subscales, and parenting distress were analyzed to examine the convergent validity of the scale. The results when the demographic variables (age,

education, one child or not) were controlled were compared with when they were not. If there were no substantial differences, the results without controlling were reported (same as in studies 2–4). All analyses were performed using IBM SPSS 21.0.

Results

CITC and Item Discriminability

For all items except items 11, 14, 16, 22, 27, and 28, the CITC values ranged from .25 to .65. In the item discriminability analysis, there were 49 and 55 participants in low-score and high-score groups respectively. The critical ratio (CR) was significant for most of the items, except item 11 ($t(102) = -1.73, p = .09$), item 14 ($t(102) = -0.49, p = .63$), item 16 ($t(102) = -1.51, p = .13$), and item 27 ($t(102) = -0.62, p = .54$). Since the item numbering is different from the original IM-P, an item description is presented in Table 1. Due to these results, items 11, 14, 16, 22, 27, and 28 were deleted from the scale. The following analyses are all based on the 24-item version, which was named the IM-P-C (Interpersonal Mindfulness in Parenting–Chinese version) (For the final scale in Chinese, readers can refer Table S.2 in the Supplementary materials).

Exploratory Factor Analysis

The Kaiser-Meyer-Olkin test ($KMO = .85$) and Bartlett's test of sphericity ($\chi^2(325) = 1700.39, p < .0001$) confirmed the adequacy of the sample for EFA. According to the eigenvalue, screen plot, and meaningfulness of extracted factors, a four-factor model was preferred in this study, which accounted for 50.4% of the total variance. The items comprising of new factors are presented in italic in Table 1.

The first factor was named Interacting with Full Attention. It contained five items from the Listening with Full Attention subscale of previous versions and two items from the Self-Regulating in Parenting subscale of the Portuguese version. The second factor was named Compassion and Acceptance and most of the items focused on compassion and non-judgmental acceptance of one's child. It combined the Non-judgmental Acceptance of Self and Child subscale and the Compassion for Child subscale. The third factor was named Self-regulation in Parenting. It contained both the parent-oriented items from the Emotional Awareness of Self and Child subscale of the English version and items from the Self-regulation subscale. Items 12 and 17, although loading slightly higher on the second factor (.42 and .38), were assigned to this factor (loading of .37 and .38) because of their similarity to other items in this factor. The fourth factor was called Emotional Awareness of Child. All items in this factor

were the child-oriented items from the Emotional Awareness of Self and Child subscale of the English version.

Reliability Analyses, Correlations Between Subscales and Convergent Validity

Good Cronbach's alpha values were found for the total scale ($\alpha = .88$) and subscales (see Table 2). Correlations between subscales showed low to moderate inter-correlations (see Table 2). Convergent validity of the IM-P-C was illustrated by its zero-order correlation with measures of Parenting Distress. As expected, the IM-P-C total score was negatively correlated with Parenting Distress ($r = -.57, p < 0.001$), as well as all the other subscales (see Table 2).

Discussion

The main goals of the first study were to examine item performance and explore the factor structure of the preliminary version of the IM-P-C. The results revealed that item composition and factor structure were different from previously validated versions.

First, 6 items were deleted because of poor corrected item-total correlation and item discriminability, which resulted in a final version of 24 items, with 1 more item deleted earlier in the preliminary study. Most of the items deleted referred to compassion and non-judgmental acceptance of self. Chinese culture genuinely emphasizes parents', especially mother's, responsibility for children's development, Chinese parent's self-value is often based on their children's successes (Chao 1994; Ng et al. 2014). Therefore, they tend to put higher demands on themselves in a parenting context. According to the interview in the preliminary study, Chinese parents consider compassion for oneself to be an excuse for one's parenting mistakes. As a result, these items were hardly correlated with a positive parenting concept such as mindful parenting. These findings suggest that, in Chinese culture, compassion and acceptance of oneself may be better considered as a separate trait instead of a concept of mindful parenting.

The exploratory factor analysis resulted in a four-factor structure, which was more similar to the factor structure of the Portuguese IM-P, rather than that of the Hong Kong IM-P. Two items from the Self-regulation in Parenting were combined together with all the items from the Listening with Full Attention subscale of the Portuguese IM-P and named "Interacting with Full Attention". After deleting the items related to compassion and acceptance of self in parenting, items referring to compassion and non-judgmental acceptance of child and parenting were combined to form a subscale named "Compassion and Acceptance". The third subscale was called "Self-Regulating in Parenting", which contained most of the items from the subscale in the Portuguese IM-P with two more items which were deleted in their version. The

Table 1 Values of CITC and CR, factor loadings after a principal component with varimax rotation (study 1), and standardized factor loadings in CFA (study 2)

Item	CITC	CR	Original IM-P	Dutch IM-P	Portuguese IM-P	Hong Kong IM-P	Interacting with full attention	Compassion and acceptance	Self-regulation in parenting	Emotional awareness of child	CFA loadings
29. Busy thinking while not listening to child	.45	8.60**	LFA	LFA	LFA	LFA	.82	-.05	.02	.09	.61
25. Distracting when doing something with child	.58	10.61**	LFA	LFA	LFA	LFA	.79	.15	.13	.11	.81
21. Busy doing something when listening to child	.48	7.61**	LFA	LFA	LFA	LFA	.71	.08	-.01	.19	.54
30. Difficult to pay full attention to child	.49	8.69**	LFA	LFA	LFA	CC	.71	.22	.08	-.04	.68
24. Emotion influences parenting but realizing later	.25	5.09**	EASC	ENRP	SRP	NJAP	.68	-.01	-.11	-.11	.46
26. Regretting doing something when child making mistakes	.39	7.37**	SRPR	ENRP	SRP	NJAP	.65	.20	-.14	.04	.56
23. Playing with child without full attention	.56	9.37**	LFA	LFA	LFA	LFA	.61	.17	.18	.24	.66
9. Caring child when child feels upset	.47	7.11**	CSC	CC	CC	CC	.22	.64	-.11	.23	.55
18. Non-judgmental acceptance of child's opinions	.45	6.87**	NJASC	CC	CC	CC	.09	.64	.09	.17	.67
20. Patient with child when struggling	.65	11.29**	CSC	CC	CC	CC	.38	.52	.23	.26	.63
15. Kind to child when child feels upset	.42	6.44**	CSC	CC	CC	CC	.14	.52	.05	.23	.69
10. Accepting the results of parenting challenge	.37	6.15**	NJASC	NJAPF	NJAPF	EAP	.02	.51	.29	.04	.40
3. Listening to child even disagree with them	.63	9.11**	NJASC	CC	CC	-	.22	.49	.31	.39	.70
7. Accepting child's independence	.27	3.55**	NJASC	ENRP	NJAPF	-	.04	.49	.15	-.07	.49
5. Non-judgmental acceptance of child's emotion	.48	6.87**	NJASC	CC	CC	-	.09	.43	.36	.26	.62
17. Trying to keep balance of own emotion when upset	.57	9.65**	SRPR	ENRP	SRP	EAP	.29	.42	.37	.19	.68
1. Paying attention to feelings before acting when upset with child	.36	4.51**	SRPR	EAS	SRP	EAP	.03	.07	.74	.14	.37
4. Aware of impact of own feeling on parenting	.27	3.01**	EASC	-	-	-	-.13	.26	.66	-.02	.54
2. Aware of influence of child's feelings on own feelings	.41	5.36**	EASC	-	-	-	-.04	.36	.62	.12	.39
6. Calmly tell child own feeling when upset	.37	4.99**	SRPR	EAS	SRP	EAP	.11	-.05	.61	.35	.61
12. Stopping rather than reacting immediately when difficult with child	.41	6.29**	NJASC	EAS	SRP	EAP	.01	.38	.38	.25	.50
19. Aware of child's unspoken feeling	.48	6.72**	EASC	EAC	EAC	CC	.05	.16	.25	.77	.81
8. Easy to know child's feelings	.54	6.50**	EASC	EAC	EAC	-	.20	.18	.21	.71	.72
13. Easy to know child's worries	.41	5.90**	EASC	EAC	EAC	CC	.02	.27	.06	.71	.64

Table 1 (continued)

Item	CITC	CR	Original IM-P	Dutch IM-P	Portuguese IM-P	Hong Kong IM-P	Interacting with full attention	Compassion and acceptance	Self-regulation in parenting	Emotional awareness of child	CFA loadings
22. Reacting too quickly to child's behavior	.19	-2.97**	SRPR	ENRP	SRP	-					
27. Be hard on myself when make mistake	.02	-0.62	CSC	NJAPF	NJAPF	-					
28. Self-blaming during difficult times with the child	.14	-2.59*	CSC	NJAPF	NJAPF	NJAP					
11. Forgiving myself when regret parenting actions	.11	-1.73	CSC	NJAPF	NJAPF	EAP					
14. Be kind to self as parent	.01	-0.49	NJASC	NJAPF	NJAPF	NJAP					
16. Comparison with other parents	.08	-1.51	CSC	NJAPF	NJAPF	NJAP					

CITC: corrected item-total correlation. CR: t values in independent sample t test of item discriminability analysis. Factors in the original IM-P: CSC Compassion for Self and Child, NJASC Non-judgmental Acceptance of Self and Child, SRPR Self-regulation in the Parenting Relationship, LFA Listening with Full Attention, EASC Emotional Awareness of Self and Child. Factors in the Dutch IM-P: NJAPF Non-judgmental Acceptance of Parental Functioning, ENRP Emotional Non-reactivity in Parenting, EAS Emotional Awareness of the Child, LFA Listening with Full Attention, EAC Emotional Awareness of Child. Factors in the Portuguese IM-P: NJAPF Non-judgmental Acceptance of Parental Functioning, SRP Self-regulation in Parenting, CC Compassion for the Child, LFA Listening with Full Attention, EAC Emotional Awareness of Child. Factors in the Hong Kong IM-P: LFA Listening with Full Attention, NJAP Non-judgmental Acceptance in Parenting, CC Compassion for the Child, EAP Emotional Awareness in Parenting. * $p < .05$, ** $p < .01$

items of the last subscale “Emotional Awareness of Child” were the same as those of the Portuguese IM-P. Good reliability was found for the total scale and all subscales.

Convergent validity was supported by the significant correlations between the IM-P-C total scale and subscales and parenting distress. This was consistent with previous correlational studies (Beer et al. 2013; Corthorn and Milicic 2016) and intervention studies (Bögels et al. 2014).

Study 2

The goals of study 2 were threefold. First, the four-factor structure found in study 1 was cross-validated using confirmatory factor analysis in a second sample of parents of community children, with internal consistency also being examined. Second, factorial invariance between mothers and fathers was investigated. Third, construct validity was further examined through the correlations with dispositional mindfulness, parenting practices, life satisfaction, depression, and anxiety. We expected mindful parenting to be positively correlated with dispositional mindfulness, positive parenting practices, and life satisfaction and to be negatively correlated with negative parenting practices, depression, and anxiety.

Method

Participants

The sample consisted of 294 participants with 48.3% of participants being females and the mean age of participants being 38.97 years ($SD = 5.92$; range 29–59). Two hundred five (69.7%) participants had only 1 child and 69 (23.5%) had 2 children. The average age of the oldest child was 12.30 years ($SD = 4.75$; range 4–25). The majority of participants (64.6%) had completed bachelor or above studies and 32.3% participants had completed middle school or junior college studies.

Procedure

Participants were recruited from a middle school in South China and from an online data collection website (sojump®). The recruitment advertisement which contained the survey link was distributed to the parents of students in the middle school. The inclusion criterion was similar to study 1. Three hundred twenty-four questionnaires were received and 294 were valid since 30 participants chose the wrong answer on the screening question.

Table 2 Reliabilities and correlations between IM-P-C subscales and parenting distress

	Cronbach's alpha	Interacting with full attention	Compassion and acceptance	Self-regulating in parenting	Emotional awareness of child
Interacting with full attention		1			
Compassion and acceptance	.83	.39**	1		
Self-regulating in parenting	.78	.17*	.59**	1	
Emotional awareness of child	.74	.24**	.55**	.50**	1
Parenting distress	.73	-.65**	-.33**	-.26**	-.30**
	.91				

* $p < .05$; ** $p < .01$

Measures

Mindful Parenting The 24-item Chinese version of the IM-P (IM-P-C) described in study 1 was used. Please refer to Table 1 for the item description.

Over-Reactivity A subscale of the Parenting Scale (PS; Arnold et al. 1993) was used to assess parental over-reactivity. Participants were asked to rank items on a five-point Likert scale. Higher scores indicate higher levels of over-reactivity (e.g., “When my child misbehaves, I raise my voice or yell.”). The Chinese version of this subscale demonstrated good reliability ($\alpha = .87$; Zeng et al. unpublished manuscript). The Cronbach's alpha coefficient in the current sample was .88.

Parental Warmth A subscale of the Parental Acceptance-Rejection Questionnaire (Parent version: Parent PARQ; Rohner 1990) was used to assess the level of parental warmth. Participants were asked to rank the items on a seven-point Likert scale with higher scores indicating higher levels of parental warmth when interacting with their children (e.g., “I treat my child gently and with kindness.”). The Cronbach's alpha coefficient in the current sample was .92.

Depression and Anxiety The depression and anxiety subscales of the Depression Anxiety Stress Scales were used (DASS21; Taouk et al. 2001). Participants were asked to answer the items on a four-point Likert scale. Higher scores indicate higher levels of depression (e.g., “I felt that I had nothing to look forward to.”) or anxiety (e.g., “I felt scared without any good reason.”). Good psychometric properties were found for the Chinese version of DASS-21 ($\alpha = .77$ for depression subscale; $\alpha = .79$ for anxiety subscale; Gong et al. 2010). The Cronbach's alpha coefficients in the current sample were .86 and .83 for depression and anxiety respectively.

Dispositional Mindfulness Parents' mindfulness was assessed using the Chinese version of the Mindful Attention Awareness

Scale (MASS; Black et al. 2012; Deng et al. 2012) which has adequate reliability ($\alpha = .85$) and validity. Participants were asked to answer the items on a six-point Likert scale. Items were all reversely coded and higher scores represent higher levels of mindfulness (e.g., “I rush through activities without being really attentive to them”). The Cronbach's alpha coefficient in the current sample was .91.

Life Satisfaction Life satisfaction was assessed through the 5-item Satisfaction with Life Scale (SWLS; Diener et al. 1985). Participants were asked to rank the items on a seven-point Likert scale. Higher scores indicate higher levels of life satisfaction (e.g., “If I could live my life over, I would have it the same way.”). The Chinese version demonstrated adequate psychometric properties ($\alpha = .82$; Sachs 2003). The Cronbach's alpha coefficient in the current sample was .90.

Data Analysis

A confirmatory factor analysis (CFA) with robust maximum likelihood estimator (MLR) was performed to test the factor structure found in study 1. Model fit was assessed by multiple fit indices including CFI, TLI, SRMR, and RMSEA. Following Hu and Bentler (1999) and Browne and Cudeck (1993), CFI $\geq .90$, TLI $\geq .90$, SRMR $\leq .10$, and RMSEA $\leq .08$ indicated adequate model fit, whereas CFI $\geq .95$, TLI $\geq .95$, SRMR $\leq .08$, and RMSEA $\leq .05$ indicated good model fit. Factorial invariance, including configural invariance, metric invariance, scalar invariance, and error variance invariance of the IM-P-C across gender were tested following the general procedures by Milfont and Fischer (2010). Since the chi-square difference test is easily affected by sample size, the difference of model fit between two nested models (Δ CFI and Δ TLI) was also used to test measurement invariance. If Δ CFI or Δ TLI was smaller than .01, it indicated that the difference was not significant between these two models in the model fit (Cheung and Rensvold 2002; Meade et al. 2008). Based on the above results, the differences of factor mean in

mindful parenting were also accessed across gender. CFA and a test of factorial invariance were performed in Mplus 7.4 (Muthén and Muthén 1998-2017). All the remaining analyses including reliability and validity were performed using IBM SPSS 21.0.

Results

Confirmatory Factor Analysis and Internal Consistency

The 24 items were loaded on 4 factors as identified in study 1. The model fit was acceptable, $S-B\chi^2(246) = 483.83$ ($p < 0.01$), $CFI = .91$, $TLI = .90$, $SRMR = .05$, $RMSEA = .04$, 90% C.I. = (.03, .05), the p value of the close fit test for the null hypothesis of $RMSEA \leq .05$ was .84, providing support for the proposed four-factor model. All standardized factor loadings for the CFA were significant ($p < 0.001$), ranging from .37 (item 1) to .81 (item 21) (see Table 1).

Internal consistency of the total score based on 24 items of the IM-P-C was good ($\alpha = .90$). Internal consistencies of each subscale were listed as follows: $\alpha = .81$ for Interacting with Full Attention; $\alpha = .83$ for Compassion and Acceptance; $\alpha = .71$ for Self-regulation in Parenting; and $\alpha = .78$ for Emotional Awareness of Child. This demonstrated adequate reliability of the IM-P-C. Item-total correlations ranged from .33 (item 10) to .66 (item 13). All subscales showed moderate to significant inter-correlations ranging from $r = .37$ ($p < .001$) for Present-Centered Attention with Emotional Awareness of Child to $r = .64$ ($p < .001$) for Compassion and Acceptance with Self-regulation in Parenting.

Factorial Invariance across Gender

Factorial invariance across gender was tested and the results are shown in Table 3. Results demonstrated that there was an adequate model fit for the configural model and it served as a baseline model to evaluate more restrictive models. When factor loadings were constrained to be equal across gender (metric invariance), the difference in $S-B\chi^2$ between model A and B was small ($SB_{Diff} = 16.01(20)$, $p > .05$) and the differences in CFI and TLI were smaller than 0.01. It indicated that the factor loadings were invariant across gender. In addition to the constraints imposed on factor loadings, when intercepts of the observed variables were constrained to be equal across gender (scalar invariance), the difference in $S-B\chi^2$ between model B and C was not statistically significant ($SB_{Diff} = 17.99(20)$, $p > .05$); the CFI value remained the same and the difference in TLI was smaller than .01. These results indicated that the intercepts of the observed variables for mothers and fathers were consistent. Finally, when factor loadings, intercepts of the observed variables, and error variance were constrained to be equal (error variance invariance),

the difference in $S-B\chi^2$ between model C and D was not statistically significant ($SB_{Diff} = 26.17(24)$, $p > .05$); the CFI value remained the same and the difference in TLI was smaller than .01. It indicated that there was no substantial difference in error variance between mothers and fathers. Because of configural invariance, metric invariance, scalar invariance, and error variance invariance across gender, it could be concluded that the four-factor structure of IM-P-C was the same in mothers' and father's mindful parenting.

Based on the model with invariant factor loadings, intercepts, and error variances across gender, factor mean differences were assessed between mothers' and fathers' mindful parenting. Results indicated that mothers had higher scores on Interacting with Full Attention (difference = .42, $p < .01$) and Emotional Awareness of Child (difference = .33, $p < .05$). However, there were no significant differences in Compassion and Acceptance (difference = .04, $p > .01$) and Self-regulation in Parenting (difference = .03, $p > .05$).

Construct Validity

Convergent validity was examined by calculating correlations with measures of over-reactivity, parental warmth, anxiety, depression, life satisfaction, and dispositional mindfulness. The results are presented in Table 4. As expected, the IM-P-C total score and subscales were negatively correlated with over-reactivity, depression, and anxiety, while positively correlated with parental warmth, dispositional mindfulness, and life satisfaction.

Discussion

The four-factor structure of this 24-item Chinese version of the Interpersonal Mindful Parenting scale (IM-P-C) was cross-validated in this study. Reliabilities of the total scale and all subscales were good. Moreover, factorial invariance of the IM-P-C across gender was also examined. The results from this investigation suggested that the factor structure of IM-P-C was suitable for the father sample too. Father samples are relatively neglected in most research regarding mindful parenting; however, a father figure is essential for the healthy development of children (Pleck 2007). The results here gave us confidence in using the IM-P-C to investigate mindful parenting in Chinese fathers.

As expected, the IM-P-C total scale and subscales were negatively correlated with over-reactivity, depression, and anxiety, while positively correlated with parental warmth, dispositional mindfulness, and life satisfaction. These findings were in line with previous findings which suggested that mindful parenting was positively associated with positive parenting (e.g., positive reinforcement, warmth and affection) and negatively associated with negative parenting (e.g., hostility and inconsistent discipline) (Parent et al. 2016a, b). Parents with higher levels of

Table 3 Summary of fit statistics for testing the measurement invariance of IM-P-C four-factor model by gender

Model	S-B χ^2 (df)	CFI	TLI	RMSEA (95% CI)	<i>p</i>	AIC	Model comparison	Difference in S-B χ^2	<i>p</i>	Δ CFI	Δ TLI
A. Configural invariance	706.71(464)	.92	.90	.05 (.04, .06)	.60	15,639.35	–	–	–	–	–
B. Metric invariance	726.76(484)	.92	.91	.05 (.04, .06)	.71	15,619.40	A vs B	16.01(20)	.72	.00	+.01
C. Scalar invariance	744.98(504)	.92	.91	.05 (.03, .06)	.77	15,597.66	B vs C	17.99(20)	.59	.00	.00
D. Error variance invariance	783.52(528)	.92	.92	.04 (.03, .05)	.82	15,588.21	C vs D	26.17(24)	.35	.00	+.01

mindful parenting will notice the emotions and behaviors of both children and themselves more effectively in the present moment. Subsequently, they will choose to exercise positive parenting rather than negative parenting.

Study 3

This study examined the 2-week test-retest reliability of the IM-P-C in a new sample of parents.

Method

Participants

The sample included 48 participants with 72.9% being females and the mean age being 40.44 (SD = 7.85; range 26–59). Thirty-eight (79.2%) participants had only 1 child. The average age of the oldest child was 12.62 years (SD = 7.62; range 1–28). The majority (68.8%) had completed bachelor or above studies and 29.2% participants had completed middle school or junior college studies.

Procedure

Similar to the procedure of former studies, participants were recruited from an online data collection website (sojump®). Participants were asked to fill out the questionnaire two times and the time interval between the two measures was 2 weeks. A reward of 5 Yuan was provided to participants who completed this study.

Measure

The participants completed only the IM-P-C questionnaire, described in study 1.

Data Analysis

A paired *t*-test analysis was conducted using IBM SPSS 21.0.

Results and Discussion

Preliminary analysis showed that the data were normally distributed. Correlations between the T1 mean and T2 mean for total scale ($r = .89$) and subscales ($r = .80$ for Interacting with Full Attention; $r = .86$ for Compassion and Acceptance; $r = .66$ for Self-regulation in Parenting; $r = .81$ for Emotional Awareness of Child) were all positively significant (all *p*-values below .01). Moreover, there was no significant difference between the T1 mean and T2 mean for total scale and subscales (all *p* values above .54). The above results indicated a good test-retest reliability over a period of 2 weeks.

Table 4 Construct validity: the correlations between IM-P-C and traditional parenting, well-being, and mindfulness

	IM-P-C	Interacting with full attention	Compassion and acceptance	Self-regulation in parenting	Emotional awareness of child
Over-reactivity	-.68**	-.66**	-.54**	-.46**	-.46**
Parental warmth	.73**	.40**	.73**	.63**	.61**
Anxiety	-.46**	-.50**	-.42**	-.23**	-.22**
Depression	-.51**	-.54**	-.46**	-.27**	-.29**
Life satisfaction	.41**	.28**	.33**	.32**	.38**
Mindfulness	.54**	.64**	.42**	.32**	.27**

* $p < .05$; ** $p < .01$

Study 4

The goal of study 4 was to validate the four-factor structure of IM-P-C in parents of children with autism. Correlations with parenting distress and dispositional mindfulness were also calculated. We also expected to find a negative relationship of the IM-P-C with parenting distress and a positive relationship of the IM-P-C with dispositional mindfulness in this sample.

Method

Participants

The sample included 288 parents with 85% of participants being females and the mean age being 36.36 (SD = 5.00; range 26–63). Two hundred one (69.8%) participants had only 1 child, 86 (29.9%) had 2 children, and 1 had 3 children (0.3%). The average age of the children with autism was 5.33 years (SD = 2.67; range 1–15) and 84% of them were boys. The majority of participants (54.9%) had completed bachelor or above studies and 45.1% participants had completed middle school or junior college studies.

Procedure

The data collection procedure through the same website (sojump®) was similar to study 1. The recruitment advertisement and the survey link were shared on social networks, such as WeChat® groups and forums for parents of children with autism. To be included in the study, participants had to be the mother or the father of at least one child (0–18 years) who has been diagnosed with autism. Participants were informed that this study was anonymous, and participation was voluntary and a reward of 10 Yuan would be given to participants. Only those who agreed to the study conditions completed the questionnaires. Three hundred seventeen questionnaires were received and 29 were excluded due to wrong answers on the screening question.

Measures

The measures used in this study for Mindful Parenting, Parenting Distress, Parental Warmth, and Dispositional Mindfulness were the same as in study 2. The Cronbach's alphas were .89, .88, .92, and .88 respectively.

Data Analysis

A confirmatory factor analysis (CFA) with robust maximum likelihood estimator (MLR) was performed to test the factor structure of the IM-P-C in the sample of parents of children with autism. Internal consistencies of the IM-P-C and each subscale were also calculated. In addition, correlations between the IM-P-C total score, subscales and parenting distress, parental warmth, and dispositional mindfulness were analyzed to examine the convergent validity of the IM-P-C in this clinical sample. A CFA was performed with Mplus 7.4 (Muthén and Muthén 1998-2017). All remaining analyses including reliability and validity were performed using IBM SPSS 21.0.

Results

Confirmatory Factor Analysis and Internal Consistency

The four-factor structure identified in study 1 was examined. The model fit was acceptable, $S-B\chi^2(240) = 506.42$ ($p < .01$), CFI = .91, TLI = .90, SRMR = .06, RMSEA = .05, 90% C.I. = (0.04, 0.06), the p value of the close fit test for the null hypothesis of $RMSEA \leq .05$ was .22, providing support for the proposed four-factor model in the current sample. All standardized factor loadings for the CFA were significant ($p < .001$), ranging from .34 (item 4) to .83 (item 25) (Readers who are interested in the detailed results can refer to Table S.2 of the Supplementary Materials).

In the current sample, the internal consistency of the IM-P-C and its subscales were good: $\alpha = .89$ for total scale; $\alpha = .84$ for Interacting with Full Attention; $\alpha = .87$ for Compassion and Acceptance; $\alpha = .71$ for Self-regulation in Parenting; and $\alpha = .76$ for Emotional Awareness of Child. This

demonstrated adequate reliability of the IM-P-C in the sample of parents of children with autism. All subscales showed low to moderate inter-correlations ranging from $r = .19$ ($p < .001$) for Present-Centered Attention with Emotional Awareness of Child to $r = .68$ ($p < .001$) for Compassion and Acceptance with Self-regulation in Parenting.

Convergent Validity

Correlations with parenting distress, parental warmth, and dispositional mindfulness were calculated for convergent validity. The results are shown in Table 5. As expected, the IM-P-C total score was negatively correlated with parenting distress, while positively correlated with parental warmth and dispositional mindfulness. Similar results were found in the IM-P-C subscales, with the exception of the correlation between the Emotional Awareness of Child and Dispositional Mindfulness.

Discussion

In this study, the 24-item IM-P-C was further validated in parents of children with autism. The four-factor structure was supported in this clinical sample and the reliabilities were good. Autism spectrum disorders (ASD) is a pervasive developmental disorder. Children with ASD exhibit problems with attention and orientation, impaired social interaction, and a pattern of repetitive stereotypic activities (Kern et al. 2006; Kim et al. 2000). Compared with parents of typically developing children, parents of children with autism face more parenting stress, depression, and anxiety symptoms (Abbeduto et al. 2004; Estes et al. 2009). Mindful parenting might be beneficial in enhancing the well-being of these parents and reducing behavior problems of their children. Singh et al. (2006) found that after participating in a 12-week mindful parenting course, parents' mindful parenting increased and aggression, non-compliance, and self-injury in the children with autism decreased. Parents with a higher level of mindful parenting can expect positive outcomes in their children, as they can better understand their children and implement more appropriate parenting behaviors (Beer et al. 2013).

General Discussion

The primary goal of the four studies presented here was to revise the Interpersonal Mindfulness in Parenting scale into a psychometrically adequate measurement tool to use in Mainland China. We examined item composition, factor structure, internal consistency, convergent and incremental validity, and factorial invariance of the IM-P-C in different samples from a community population of parents. In addition, the IM-P-C was also validated in a sample of parents of children with autism.

The main difference of the IM-P-C from all previously validated versions of the IM-P was that items referring to compassion and acceptance of self were not integrated into this scale. According to the theoretical framework of mindful parenting, Compassion and Acceptance of Self is integral component (Duncan et al. 2009). However, in Mainland Chinese traditional culture, our findings suggest that compassion and acceptance of self in the parenting context may not be treated as a necessary component of mindful parenting. This elimination was not performed in the Hong Kong Chinese version (Lo et al. 2018); one reason is that studies examining differences of parenting styles among Chinese subcultures found that parents in Hong Kong were prone to be less warm and more controlling than parents in Mainland China (Berndt et al. 1993; Lai et al. 2000). Our findings further support recommendations of previous research with regard to thoroughly examining the applicability of the parenting practices construct in different Chinese subcultures. Be that as it may, this does not necessarily mean Mainland Chinese parents should completely neglect compassion and acceptance of the self. Gouveia et al. (2016) found that self-compassion has both a positive direct effect on parenting outcomes, as well as an indirect effect through enhancing mindful parenting. Therefore, we proposed that compassion and acceptance of the self may play an important but separate role in Mainland Chinese parenting culture, a role not treated as a component of mindful parenting. In future studies, we suggest the relationship between self-compassion and mindful parenting should be further examined in Mainland Chinese parents.

Factorial invariance was tested across gender. The results suggest that using the same factorial structure in the father sample could benefit the current research about mindful parenting in fathers. To our knowledge, previous mindful parenting literature rarely investigated father samples, but gender

Table 5 Construct validity in study 4: the correlations between IM-P-C and parenting stress, parental warmth, and mindfulness

	IM-P-C	Interacting with full attention	Compassion and acceptance	Self-regulation in parenting	Emotional awareness of child
Parenting distress	-.35**	-.40**	-.21**	-.26**	-.12*
Parental warmth	.75**	.38**	.73**	.56**	.55**
Mindfulness	.39**	.53**	.22**	.23**	.10

* $p < .05$; ** $p < .01$

differences in mindful parenting were found both in our sample and the Portuguese sample (Moreira and Canavarro 2017). Whether the father figure's mindful parenting has the same or a different effect on children's behavior or parenting outcomes needs further investigation.

There is growing interest concerning mindful parenting in Mainland China, especially regarding clinical samples. Researchers need a valid measurement tool to assess the effect of mindful parenting intervention programs. This research supports the application of the IM-P-C scale in evaluating parents of children with autism.

In summary, adequate psychometric properties of the IM-P-C were found in our studies. A four-factor structure was recommended. Internal consistencies and test-retest reliability of the total scale and subscales were all good. It can be applied in both mother and father samples, as well as clinical samples.

There are some limitations that should be addressed. First, participants in this research had a relatively higher education level than the norm in Mainland China. Related to this, information on the whereabouts of the families (rural or urban) was not collected in this research. Whether this scale is applicable for a sample of parents with lower education levels (or who live in more rural areas) needs to be examined. Second, only parenting practices and parental symptoms were assessed as validity criterion in this research. Children's developmental outcomes could be included as the validity variables. Despite these limitations, this research contributed to the measurement of mindful parenting in parents in Mainland China. With growing interest in mindful parenting in Eastern Cultures, this reliable measurement tool can benefit research in this field.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in this study.

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