

Further Evaluation of the Psychometric Properties of the Behavioral Activation for Depression Scale

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ABSTRACT

The Behavioral Activation for Depression Scale (BADs), a four-factor (Activation, Avoidance/Rumination, Work/School impairment, and Social Impairment), 25-item scale, was to assess response contingent positive reinforcement (RCPR) that underlies the depression. So far, all the studies that examined its psychometric properties supported its usefulness in assessing RCPR in western culture. The purpose of the current study was to further evaluate psychometric properties of BADs that measures RCPR in a non-western culture. Based on a sample of 440 college participants from China, the results revealed that the four-factor of 25-item structure had a good fit to the data except for two items loaded differently from what was hypothesized. The data seemed to support BADs as a valid measure of RCPR and the results were discussed in the context of cultural differences. *Key words:* Depression, Behavioral Activation for Depression Scale, exploratory structural equation modeling, cultural difference.

Novelty and Significance

What is already known about the topic?

Many studies have examined the psychometric properties of the Behavioral Activation for Depression Scale (BADs).

These studies support BADs as a valid tool assessing the response positive reinforcement in Western culture.

What this paper adds?

Further evaluate BADs in a non-western culture, giving some culture differences in perception of depression.

This study was the first to examine the BADs using samples from non-western culture.

The study provided more empirical support for the RCPR model of behavioral theory.

Depression has been widely studied over the past decades, as researches indicate that it is the leading cause of disability in middle and high income countries (WHO, 2004) and there is a large unmet need for treatment (Greden, 2002). At the present, depression is the fourth biggest contributor to the global burden of disease, and unfortunately, it

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is expected to become the second biggest contributor, only following heart disease, by the year 2020 (Murray & Lopez, 1997).

Contributing to the treatment of depression, a variety types of psychotherapy have emerged, such as cognitive behavior therapy (Gloaguen, Cottraux, Cucherata, & Blackburn, 1998), interpersonal psychotherapy (Cuijpers, Geraedts, van Oppen, *et al.*, 2011), behavioral activation (Ekers, Richards, & Gilbody, 2008), problem-solving therapy (Malouff, Thorsteinsson, & Schutte, 2007), non-directive supportive therapy (Cuijpers, Driessen, Hollon, *et al.*, 2012) and so on. With investigating across three decades, Behavioral activation (BA) has been shown to be effective in treating depression (e.g., Porter, Spates, & Smithan, 2004). Recent researches demonstrated that BA could perform equivalent to Paroxetine and even better than cognitive therapy in treating moderate to severe depression in a large randomized trial (Dimidjian, Hollon, Dobson, *et al.*, 2006). Overall, BA holds promise for treating an increasing number of conditions in a variety of settings, including populations with psychiatric and medical comorbidities, adolescents and the elderly as well as adults, and racially and ethnically diverse populations (Dimidjian *et al.*, 2011; Kanter, Puspitasari, Santos, & Nagy, 2012). Although only as a component of cognitive therapy for depression (Beck, Rush, Shaw, & Emery, 1979), BA was found to produce similar outcomes to the full cognitive therapy package (Jacobson, Dobson, Truax, *et al.*, 1996). In addition, by utilizing fMRI technique to investigate the effectiveness of BA treatment for adults with and without depression, Dichter *et al.* (2010) found that 75% of adults with depression who received BA were treatment responders, which supporting its utility in improving depressive symptoms as measured by brain functioning.

The behavioral theory of depression behind BA is that depression can be characterized primarily by losses of, reductions in, or chronically low levels of response contingent positive reinforcement (RCPR) which may occur directly or through increases in avoidance behavior controlled by aversive stimuli (Dimidjian, Barrera, Martell, *et al.*, 2011; Lewinsohn, 1974). Thus, BA focuses on the function of behavior and the role of aversive controlling stimuli and avoidance behavior in depression (Martell, Addis, & Jacobson, 2001); as such, BA treatment increases and maintains the rate of RCPR by reducing avoidance behavior and improving activation of positive reinforcement. Specifically, BA is a therapeutic process that emphasizes structured attempts to increase overt behaviors that are likely to bring the patients into contact with reinforcing environmental contingencies and to produce corresponding improvements in thoughts, mood, and overall quality of life (Hopko, Lejuez, Ruggiero, & Eifert, 2003; Manos, Kanter, & Busch, 2010). During the course of treatment, BA employs a series of strategies, which, in general, begin with assessment techniques (activity monitoring and values assessment), followed by activation techniques (activity scheduling and procedures targeting avoidance), and then concluding with a range of procedures that aim to increase the likelihood of successful completion of activation (see Kanter, Manos, Bowe, *et al.*, 2010 for details).

In order to assess when and how clients become more activated over the course of treatment, Kanter, Mulick, Busch, *et al.* (2006) developed an instrument to measure the purported changes in client behavior guided by RCPR. The measure is called the

Behavior Activation for Depression Scale (BADS; Kanter, Mulick, Busch, *et al.*, 2006). Results, based on both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), suggested a four-factor structure of the BADS in an undergraduate sample. This four-factor structure was also supported using a community sample with elevated depressive symptoms (Kanter, Rusch, Busch, & Sedivy, 2009), a Dutch sample (Raes, Hoes, Van Gucht, Kanter, & Hermans, 2010), and a Spanish sample (Barraca, Pérez Álvarez, & Bleda, 2011). Specifically, the BADS is a 25-item self-report instrument consisting of four subscales: Activation (7 items, e.g., “I engaged in a wide and diverse array of activities”, “I was an active person and accomplished the goals I set out to do”); Avoidance/Rumination (8 items, e.g., “I only engaged in activities that would distract me from feeling bad”, “I spent a long time thinking over and over about my problems”), Work/School Impairment (5 items, e.g., “I was active, but did not accomplish any of my goals for the day”, “There were certain things I needed to do that I didn’t do.”), and Social Impairment (5 items, e.g., “I did things to cut myself off from other people”, “I was not social, even though I had opportunities to be”). The instrument showed adequate reliability and validity as well as a strong predictive power in both the undergraduate sample and the community sample, although it was noted that the activation subscale did not perform as strongly as hoped (Kanter *et al.*, 2009).

Notwithstanding the importance of research conducted with BADS to date, several issues warrant further study. First, although some studies on BADS have been conducted in western countries, no such a study has been conducted in non-western culture. Second, studies have revealed some significant differences regarding depression in non-Western population (Lu, Bond, Friedman, & Chan, 2010; Marsella, Sartorius, Jablensky, & Fenton, 1985; Nikelly, 1988; Zhang, Fokkema, Cuijpers, *et al.*, 2011). For example, individuals from Asian culture (e.g., China) tend to regard mental health problems such as depression in terms of social and moral ground rather than mental illnesses, and therefore, emphasized self-management (such as deny or avoid) and informal treatment (e.g., talking with friends or colleagues) strategies (Karasz, 2005; Laurence & Kirmayer, 2001). Such cultural differences in perspective also manifest themselves in depressive symptoms *per se*, such as depressed affect is expressed as more somatic symptoms (Cheung, 1995) rather than psychological symptoms (Parker, Gladstone, & Chee, 2001). More importantly, the conception of depression is influenced by different cultural view of individuals (Tsai & Chentsova-Dutton, 2010). In Western culture, individuals are viewed as independent, self-contained, and autonomous, with depressive symptoms being attributed to internal disturbances (Lewis-Fernández & Kleinman, 1994); In non-Western culture, such as in China, individuals are viewed as interdependent, connected with others, and defined by the social context. Thus, the same symptoms may be attributed to interpersonal disturbances (Markus & Kitayama, 1991). In other words, the symptoms are defined by a particular culture experience, and the meanings and implications of these same symptoms may vary considerably across cultures (Lu *et al.*, 2010; Tsai & Chentsova-Dutton, 2010). For example, some avoidance behaviors in Western cultural context may be reviewed as mal-adaptive and social impairment, which may activate the depression; but the same kinds of behaviors may be considered as normal or coping strategies in non-Western cultural context. Thus,

the correlations among depression and avoidance/impairment behaviors may not be as high as that found in the western culture.

With these cultural differences in mind, the primary goal of the current study was to further examine the psychometric properties of the BADS with a Chinese sample. We expect that the manifestation of behaviors as assessed by BADS scales may show somewhat different structural patterns in non-western culture. Specifically, we hypothesized that: (1) Although the overall four factor structure of BADS was expected to be replicated, some items related to avoidance or impairment may not load on their original factors. (2) Activation scale was not expected to strongly correlated avoidance behaviors. (3) Scales of avoidance/impairment of BADS should be strongly correlated with measure of depression and other similar measures. The significance of the study lies in the fact that it adds evidence to the current treatment outcome assessment literature with respect to cultural variation of the behavioral theory of depression underlying BADS.

METHOD

Participants

The sample consisted of 480 undergraduates from nine different universities in eight provinces in China. After excluding participants who did not finish the questionnaires, the total study sample was 440 participants, with 57.3% being female. The mean age of the participants was 20.4 years old ($SD= 3.64$). Twenty-one percent of the participants were minorities (e.g., Tibetans). In this sample, 48.4% were freshmen; 21.1% were sophomores; 12.0 % were juniors; and 18.6% were seniors. In addition, 27.7% of the sample reported they had experienced traumatic events.

Measures

In addition to BADS, participants completed several questionnaires for the research. The selection of the measures employed in the current study was based on several considerations. First, because behavior activation for depression is assumed to be implicated in anxiety, avoidance, or interpersonal relations, it was considered important to select measures tapping relevant domains of these psychological functioning. Second, it was important to select measures that were short, easily administered, and well-validated. The instruments that were used in the current study are presented below.

Behavior Activation for Depression Scale (BADS). The original English version of the 25-items BADS is a self-report questionnaire with four subscales (Activation, Avoidance/Rumination, Work/School Impairment, and Social Impairment) on a 7-point scale. Participants are instructed to rate how much each statement was true for them during the past week by circling a number from 0 (not at all) to 6 (completely). High scores were consistent with the name of the subscales (e.g., high scores on activation indicate more activation, and high scores on avoidance/rumination indicate more avoidance /rumination). The reported internal consistency ranged from 0.76 to

0.87, and reported test-retest reliability ranged from 0.60 to 0.76 (Kanter *et al.*, 2006). The Chinese version of the BADS was developed with a back-translation procedure (Brislin, 1986). First, the original English BADS was translated into Chinese by two individuals who were fluent in English. Second, the Chinese version was translated back into English by two different individuals, who were unaware of the original English version. Third, comparison of these translated versions and adjustments were made to ensure that the Chinese version was comparable with the original English version. Fourth, a panel of four researchers reviewed the Chinese version and original English versions to finalize the study version of BADS.

Simple Coping Style Questionnaire (SCSQ). The SCSQ (Xie, 1998) is a 20-item self-report instrument measuring two styles of coping: positive coping style (e.g., “Trying to come up with several strategies to solve problems”) and negative coping style (e.g., “Be dependent on others to solve the problems”). Participants indicated how often each strategy is used in daily life in response to frustration on a scale of 0 (never used) to 3 (always used). High scores on the positive coping subscale are related to lower mental disorders or fewer symptoms, and high scores on the negative coping subscale are related to more mental disorders or more symptoms. Cronbach’s α in the current sample was .71 for the positive coping subscale, 0.63 for the negative coping subscale, and .73 for the total scale, respectively.

The *Symptom Check List (SCL-90)*. The SCL-90 (Derogatis & Cleary, 1977) is a self-report scale consisting of 90 items grouped into 10 subscales. The scale was widely used in China to measure psychiatric symptoms. The Chinese version has shown adequate reliability (Feng & Zhang, 2001). In this study, we used one subscale: interpersonal sensitivity (e.g., “Feeling that people are unfriendly”). The Cronbach’s α of interpersonal sensitivity was 0.86.

The *Center for Epidemiologic Studies Depression Scale (CES-D)*. The CES-D (Radloff, 1977) is designed for measuring types and severity of depressive symptoms (e.g., “I was bothered by things that usually don’t bother me”; “I thought my life had been a failure”). It consists of 20 items representing the primary depressive symptoms: depressive mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, as well as sleep problems. Participants are asked to indicate the frequency of occurrence of these symptoms during the past week on a scale of 0 (occasionally or no) to 3 (almost all the time or lasting). High scores indicate a high level of depressive symptoms. It is suggested that the CES-D is more suitable for the general population rather than a clinical sample because it evaluates depressive mood but not the entire depressive syndrome. The Chinese version of CES-D is shown to have a good reliability and is also effective for different age groups (Zhang *et al.*, 2010). In the current sample, the Cronbach’s α was 0.87.

The *Acceptance and Action Questionnaire-II (AAQ-II)*. The AAQ-II (Bond *et al.*, 2011) is a 7-item self-report scale that assesses acceptance and experiential avoidance (e.g., “My painful memories prevent me from having a fulfilling life”; “Emotions cause problems in my life”). Participants are asked to rate how much each statement was true for them on a scale of 0 (never true) to 6 (always true). Higher scores indicate greater flexibility. The scale has shown satisfactory factor structure, reliability, and validity (Bond *et al.*, 2011). Cronbach’s α in the present sample was 0.87.

The *Automatic Thoughts Questionnaire (ATQ)*. The ATQ (Hollon & Kendall, 1980) is a 30-item self-report questionnaire, designed to measure the frequency of occurrence of automatic negative thoughts associated with depression on a 5-point scale (from 1= ‘not at all’ to 5= ‘always’). Higher scores indicate more automatic negative thoughts

(e.g., “I’m so disappointed in myself”; “I feel so helpless”). The Chinese version (Cao, Cheng, Tang, & Song, 2001) was used. Cronbach’s α in the present sample was 0.9.

Procedure

Students from nine universities in eight provinces filled out the questionnaires in the classroom. The questionnaires were mailed to the teachers who agreed to administer the survey. The study was approved by the research review board of the university, and the students were provided informed consent before completing the questionnaires.

Data analysis

In this study we used confirmatory factor analysis (CFA) and exploratory structural equation modeling (ESEM; Asparouhov & Muthén, 2009) to examine whether the items that assessed behavior activation for depression formed the original four-factor structure of BADS with the Chinese sample.

To determine the goodness-of-fit of the model, following fit indices were used: the Satorra-Bentler (SB) Scaled χ^2 (Satorra & Bentler, 1994), the Comparative Fit Index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), the Root Mean Square Error of Approximation (RMSEA; Steiger & Lind, 1980), and the Standardized Root Mean Squared Residual (SRMR; Hooper, Coughlan, & Mullen, 2008). The SB χ^2 was scaled for non-normality, with lower values indicating a better fit (Bentler, 1990). For both the TLI and CFI values greater than .90 typically reflect a good fit (Bentler & Bonett, 1980; Bollem, 1989). For the RMSEA, the value of less than .05 indicates a good fit and less than .08 indicates a reasonable fit (Browne & Cudeck, 1993). For SRMR, the value of less than .05 represents a good fit, and the value of less than .08 demonstrates an acceptable fit (Hooper *et al.*, 2008).

To examine the validity of the BADS with Chinese sample, we conducted correlational analysis between the BADS and the AAQ-II, ATQ, SCSQ, CES-D, the interpersonal sensitivity subscale of SCL-90, and SAD. The missing values were handled by using listwise deletion. The analyses were performed using SPSS 17.0 and Mplus 6.0.

RESULTS

In order to test whether the original factor structure developed by Kanter *et al.* (2006) could be replicated in Chinese context, a confirmatory factor analysis (CFA) was first conducted. Initial data screening indicated that the measured variables departed from a multivariate normal distribution in terms of skewness (range from -0.48 to 0.74) and kurtosis (range from -1.20 to -0.53) (West, Finch, & Curran, 1995). Therefore, a robust maximum likelihood estimation method was used in the analysis.

For the original 25-item four-factor model, the fit of the model was not good, with SB χ^2 (269) = 775.469, $p < .001$; RMSEA = .065, with 90% confidence interval = .060-.071, $p < .05$; CFI = .807; TLI = .785.

In order to identify a better model in the Chinese context, we re-examined the model with a new methodology of exploratory structural equation modeling (ESEM) proposed by Asparouhov *et al.* (2009), which was an integration of confirmatory factor analysis with exploratory features (Marsh *et al.*, 2010). As suggested by Asparouhov *et al.* (2009), many psychological assessments are not supported by CFAs because of very restrictive factor structure requirements, with an item only loading on one factor and zero loading on the other factors (i.e., simple structure). To overcome this problem, ESEM imposes a simple structure to the data but also allows items to cross load on other non-hypothesized factors, with item loadings on the hypothesized factor being higher than that of non-hypothesized factors. The model fit can still be assessed based on typical goodness-of-fit statistics normally associated with CFA. It has been demonstrated that the ESEM method indeed results in a better fit to the underlying factor structure compared with CFA (Asparouhov & Muthén, 2009).

The results of ESEM analysis on the 25-item of the BADS with Chinese sample indicated that the model had a good fit, with SB χ^2 (101) = 211.683, $p < .001$; RMSEA = .050, 90% confidence interval = .040-.059, $p = .49$; SRMR = .030; CFI = .911; TLI = .871. The resulting fit indices of RMSEA, SRMR, CFI, and TLI were comparable to those of the study by Kanter (2007). However, one important difference was that the item-factor loading structure was somewhat different from that of the original structure. Specifically, Item 22 (“My work/schoolwork/chores/ responsibilities suffered because I was not as active as I needed to be”) loaded on the avoidance/rumination factor rather than the work/school impairment factor, and Item 25 (“I began to feel badly when others around me expressed negative feelings or experiences”) loaded on the social impairment factor rather than the avoidance/rumination factor. Figure 1 shows the final model with the standardized factor solution.

The reliability of the scale was calculated with Cronbach’s α . The total scale and subscales demonstrated a moderate internal consistency. Specifically, the Cronbach’s α of total scale, Activation, Avoidance/Rumination, Work/School Impairment, and Social Impairment was .79, .79, .73, .60, and .76, respectively. Figure 1 also shows the inter-correlations among subscales of the BADS. All the correlations were statistically significant except for the correlation between activation and work impairment. Also the correlation between activation and avoidance was low but positive. Subscale-total scale correlations (removing each subscale from the total scale for its analysis) were found to be significant ($p < .01$) for all of four subscales: Activation $r = .429$, Avoidance/Rumination $r = -.704$, Work/School Impairment $r = -.664$, Social Impairment $r = -.768$.

Table 1 shows the correlations between the subscales of BADS and the scales of AAQ-II, ATQ, the interpersonal sensitivity subscale of SCL-90, CES-D scale, and SCSQ. As expected, the correlation coefficients were in the expected directions. Specifically, the activation subscale had a significant positive correlation with the positive coping style subscale of SCSQ and significant negative correlations with negative thoughts and depression scales. But this scale was not significantly correlated with the experiential avoidance, negative coping, or the interpersonal sensitivity scales. The avoidance and impairment scales significantly positively correlated with experiential avoidance, negative thoughts, negative coping, and depression, as expected.

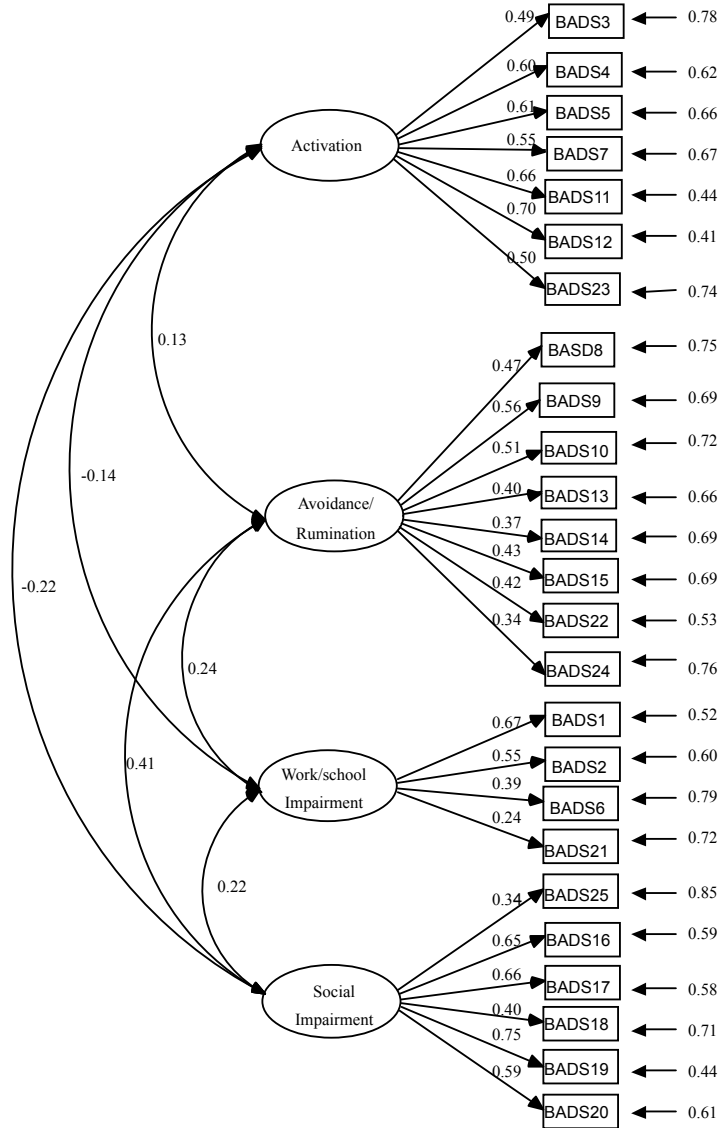


Figure 1. Standardized factor solution of BADS.

To further explore the construct validity of the BADS, we also examined the relations between scales of BADS and traumatic experiences using multivariate analysis of variance (MANOVA), with four scales of BADS as dependent variables. Results of the analysis indicated that there was a significant effect of experiences of trauma on the social impairment subscale, $t(431) = 4.062, p = .045$, and avoidance/rumination scale, $t(431) = 5.700, p = .018$ with participants who reported having experienced traumatic

Table 1. Correlation of BADS with other measures ($N = 440$).

	AAQ-II	ATQ	CESD	SCL-90-IS	SCSQ-PO	SCSQ-NE
AC	-.007	-.196**	-.263**	-.116	.470**	-.034
AV	.388**	.407**	.416**	.400**	.08	.317**
WI	.340**	.338**	.317**	.278**	-.031	.311**
SI	.430**	.450**	.489**	.453**	-.140*	.253**

Notes: WI= the work/school impairment subscale of BADS; AC= the activation subscale of BADS; SI= the social impairment subscale of BADS; AV= the avoidance/rumination subscale of BADS; AAQ-II= The Acceptance and Action Questionnaire-II; ATQ= The Automatic Thoughts Questionnaire; CES-D= The Center for Epidemiologic Studies Depression Scale; SCSQ-PO= the positive coping style subscale of SCSQ; SCSQ-NE= the negative coping style subscale of SCSQ; SCL-90-IS = the interpersonal sensitivity subscale of the SCL-90; ** $p < .01$; * $p < .05$.

Table 2. Means and Standard Deviations for BADS subscales by experiences of traumatic events.

	Ever experience ($n= 237$)		Never experience ($n= 137$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
AC	23.07	7.20	22.92	7.04
AV	25.35	8.31	23.16	7.33
WI	11.35	5.00	10.45	4.35
SI	14.01	6.88	12.38	6.69
BASDT	80.02	18.46	84.62	16.29

events reporting higher mean scores on these two subscales. Table 2 shows the means and standard deviations of BADS subscales by trauma experience group.

DISCUSSION

The purpose of the present study was to examine whether the items assessing behavioral activation for depression constituted the same item-factor structure as originally proposed with a non-western sample. Our hypotheses were supported. The results showed that although the same four-factor structure fit the data well with the Chinese sample using the method of ESEM, and the model fit indices were comparable to those in the study by Kanter *et al.* (2009). Some items assessing avoidance/impairment did not load on the original avoidance or impairment factors. Specifically, Item 25 (“I began to feel badly when others around me expressed negative feelings or experiences”), originally designed to assess avoidance, now loaded on social impairment factor. One reason for this switch may be that this item was an indicator of social impairment to Chinese participants in that it emphasizes impairment/stress in social interaction with others rather than intentional avoidance behavior. Thus, it seemed reasonable for Item 25 to load on the social impairment factor. Similarly, Item 22 (“My work/schoolwork/ chores/ responsibilities suffered because I was not as active as I needed to be”), originally

designed to assess work/school impairment, now loaded on avoidance factor, indicating that it might suggest avoiding performance rather than impairment to Chinese participants. Additional researches are called for clarifying the meanings of these items.

As hypothesized, the correlation between activation and avoidance measures was small and activation scale was not correlated with experiential avoidance scale. These correlations seemed interesting in contrast with findings from the previous western samples. In Chinese culture, not all avoidance behaviors are seen as problematic. In fact, some avoidance behaviors are considered necessary and may be seen as behaviors to activate and increase. For example, as suggested by Kanter *et al.* (2007), the hallmark feature of behavioral activation is to assist individuals to be more active in their lives, and individuals should engage in activities that could help them achieve their goals. The activation subscale is designed to assess this active behavioral feature. However, traditional Chinese culture advocates that people should actively avoid conflicts when achieving their goals. Given these strong avoidance practices shaped by Confucian bureaucracy and hierarchy, individuals are taught and are expected to actively use certain avoidance behaviors to accomplish necessary tasks; in other words, in a Chinese context, some avoidance behaviors may be viewed as positive activation behaviors. Thus, it is reasonable that these two subscales were positively rather than negatively correlated.

As expected, the subscales of avoidance/impairment were significantly correlated with other similar measures. In addition, participants who had traumatic experiences had higher levels of social impairment and avoidance. This finding supports the construct validity of the BADS as evidenced by the group difference. The importance of these findings was that the current study takes a further step in understanding the internal validity of the BADS, confirming its four-factor structure and demonstrating its generalization to a typically non-Western country. Overall, the results are in line with earlier studies that have examined the psychometric properties of the BADS. In addition, the study adds the impressive body of work that has provided empirical support for the RCPR model of behavioral theory. More importantly, the similarity in findings suggests that the measure can reliably be applied across culture, although it exists some cultural differences.

Of course, we should realize that the utility of BADS was to measure changes in patients receiving treatment for depression with BA. Thus, it is necessary to study the utility of the instrument in clinical settings to test whether the scale is sensitive to treatment effects in non-western culture. This study took the first step toward that goal.

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