

## **Psychometric Evaluation of the Malay Version of the Multidimensional Beck Youth Inventories-2 (BYI-2 Malay): Measuring Self-Concept, Anxiety, Depression, Anger, and Disruptive Behaviour among Adolescents in Sheltered Homes**

**Wai-Eng Ding<sup>1\*</sup>, Kit-Aun Tan<sup>1</sup>, Jia-Yuin Fam<sup>2,3</sup>, Firdaus Mukhtar<sup>1</sup>, Munn-Sann Lye<sup>4</sup>, Hamidin Awang<sup>1</sup> and Khadeeja Munawar<sup>5,6</sup>**

<sup>1</sup>*Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia*

<sup>2</sup>*Department of Human Development and Family Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia*

<sup>3</sup>*Centre for Commercial Law and Justice, Sunway Business School, Sunway University, 47500 Selangor, Malaysia*

<sup>4</sup>*Department of Population Medicine, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, 43000 Kajang, Selangor, Malaysia*

<sup>5</sup>*Department of Psychology, Jeffrey Cheah School of Medicine and Health Sciences, Monash University, 47500 Bandar Sunway, Malaysia*

<sup>6</sup>*Department of Psychology, Faculty of Social Sciences and Liberal Arts, UCSI University, Cheras, 56000 Kuala Lumpur, Malaysia*

### **ABSTRACT**

The purpose of this study was to evaluate the psychometric properties of the Malay version of the Beck Youth Inventories-Second Edition (BYI-2 Malay) in a sample of adolescents living in the nongovernment-run sheltered homes. In this study, 300 adolescents completed the BYI-2 Malay, the Beck Depression Inventory-Malay (BDI-Malay), the Beck Anxiety Inventory-Malay (BAI-Malay), the Automatic Thoughts Questionnaire-Malay (ATQ-

Malay), and the Rosenberg Self-Esteem Scale-Malay (RSES-Malay). The internal consistency estimates for the BYI-2 Malay scales, as measured by Cronbach's alpha, were excellent: .86 for self-concept, .89 for anxiety, .92 for depression, .92 for anger, and .92 for disruptive behaviours. The five-factor model of the BYI-2 Malay (i.e., Self-Concept, Anxiety, Depression, Anger, and Disruptive Behaviour) showed a good fit to the data. Evidence for concurrent validity

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#### *E-mail addresses:*

[dingcpsy@gmail.com](mailto:dingcpsy@gmail.com) (Wai-Eng Ding)

[tanka@upm.edu.my](mailto:tanka@upm.edu.my) (Kit-Aun Tan)

[jiayuin@sunway.edu.my](mailto:jiayuin@sunway.edu.my) (Jia-Yuin Fam)

[drfirebt@gmail.com](mailto:drfirebt@gmail.com) (Firdaus Mukhtar)

[lyems9@yahoo.com](mailto:lyems9@yahoo.com) (Munn-Sann Lye)

[hamidin@upm.edu.my](mailto:hamidin@upm.edu.my) (Hamidin Awang)

[khadeeja.munawar14@gmail.com](mailto:khadeeja.munawar14@gmail.com) (Khadeeja Munawar)

\* Corresponding author

was established between the BYI-2 Malay Self-Concept scale and the RSES-Malay ( $r = .41$ ), between the BYI-2 Malay Anxiety scale and the BAI-Malay ( $r = .60$ ), and between the BYI-2 Malay Depression scale and the BDI-Malay ( $r = .69$ ). The evidence for convergent validity was established between the BYI-2 Malay Anger scale and the ATQ-Malay ( $r = .71$ ), and between BYI-2 Malay Disruptive Behaviour scale and the ATQ Malay ( $r = .52$ ). The present findings shed light on the utility of the BYI-2 Malay in aiding clinicians as well as therapists for identifying multiple symptoms of social and emotional problems in adolescents.

*Keywords:* Beck Youth Inventories, factor structure, reliability, validity

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## INTRODUCTION

Research on social and emotional problems among adolescents has grown apace in recent decades. It has been suggested that various social and emotional difficulties may escalate during adolescence. Such difficulties include identity confusion (Sokol, 2009), anxiety (Baxter et al., 2014), depression (Kaur et al., 2014), aggressive behaviours (Kaya et al., 2012), and problematic behaviours (McMorris et al., 2007). More importantly, many of these difficulties are claimed to predate negative repercussions in suicidal (Greene et al., 2009) and criminal behaviours (Anderson et al., 2015). A large epidemiological study by the National Health and Morbidity Survey in Malaysia showed that one in five Malaysian adolescents had depression symptoms, of

these, 17.7% were girls and 18.9% were boys (Institute for Public Health, 2018). This highlights a timely need for identifying social and emotional problems in Malaysian adolescents at an early stage.

The high prevalence and multiple detrimental effects of social and emotional problems on psychological well-being in adolescents signal a need for a valid and reliable measure. The Beck Youth Inventories (BYI; J. S. Beck, Beck, & Jolly, 2001) appears to be an appealing self-report measure in that it assesses social and emotional problems among adolescents in a multidimensional manner. Unlike the BYI, the Beck Depression Inventory (BDI; A. T. Beck et al., 1961) and the Beck Anxiety Inventory (BAI; A. T. Beck & Steer, 1990) only assess social and emotional dimension in a unidimensional manner. Besides, the comorbidity of depression and anxiety is common. Cummings et al. (2014) reported that depression was often comorbid with generalized anxiety disorder in children and adolescents. Also, Rapee (2018) stated that children with anxiety disorder rarely met the main diagnostic criteria for a single disorder due to its strong comorbid conditions with other internalising disorders such as depression. A recent systematic review reported that low self-esteem was positively associated with depression and anxiety in young people aged 18 and below, this is especially evident among those with depression and anxiety (Keane & Loades, 2017). Meanwhile, Kerr and Schneider (2008) also showed that children who lost anger control were more likely

than others to exhibit both externalizing and internalizing problem behaviours. Understanding childhood anger plays an important role in managing consequences of anger not only in short-run but also long-run. Hence, the scope of the BYI-2 scales is fairly broad as it addresses at least five areas of social and emotional problems in children and adolescents that are comorbid, yet each scale of the BYI-2 is relatively a specific measure of functioning.

The first edition of the 100-item BYI consists of five scales including self-concept, anxiety, depression, anger, and disruptive behaviour. These scales capture social and emotional functioning among children and adolescents from 7 to 14 years old. Each scale consists of 20 items. The BYI has demonstrated adequate psychometric properties (J. S. Beck, Beck, & Jolly, 2001). In past research, high internal consistency estimates for the BYI scales were reported with Cronbach's alpha ranging from .87 to .93 in Mathiak et al. (2007), from .87 to .92 in Thastum et al. (2007), and from .90 to .94 in Steer et al. (2005). Steer et al. (2005) reported the concurrent validity between the BYI Depression scale and the Child Depression Inventory (CDI; Kovacs, 1992) ( $r = .81$ ), between the disruptive behaviour scale of the BYI and the Oppositional Scale of the Conners Rating Scales-Revised (CRSR; Conners et al., 1998) ( $r = .49$ ), and between the BYI Anger scale and the Conners' Oppositional Scale ( $r = .41$ ). In addition, Thastum et al. (2009) showed that the BYI could discriminate between normal and clinical populations as the proportion of

children in the clinical group exceeding the 90<sup>th</sup> percentile of the BYI was significantly different from normative samples for all the scales. Also, a recent study by Blackmon et al. (2015) showed that an abbreviated version of depression scale of the BYI could significantly detect depression in cancer surviving adolescents. Moreover, Steer et al. (2005) showed evidence that BYI was a reliable and valid tool to screen child psychiatric outpatients who were diagnosed with mood, anxiety, adjustment, attention-deficit, and disruptive behaviour disorders.

The BYI is available in other languages such as Danish (Thastum et al., 2009) and Polish (Mathiak et al., 2007). Thastum et al. (2009) performed an exploratory factor analysis (EFA) of the BYI since the factors were correlated and non-rotated EFA was done. Thastum et al. (2009) reported several cross-loadings and six items did not load above .31. Specifically, all anxiety items loaded above .31 on first factor, 18 disruptive behaviour items loaded above .31 on the second factor, 17 anger items loaded above .31 on the third factor, all self-concept items loaded above .31 on the fourth factor, lastly 11 depression items loaded above .31 on the fifth factor. To reduce item complexity, Thastum et al. (2009) performed confirmatory factor analysis (CFA) with item-parcelling method in which 20 items of each scale were randomly allocated to four five-item parcels. Thastum et al. (2009) retained all original 100 items after CFA, and the findings showed a good fit for the data for each of these five scales ( $\chi^2/df = 5.7$ , CFI = .96, TLI = .94, and RMSEA = .06).

The item presentation of the second edition of the BYI (BYI-2; J. S. Beck, Beck, Jolly, & Sterr, 2005) is identical to the BYI. The rationale for choosing the BYI-2 in this study because it extends its predecessor by providing a standardized norm from aged 7 up to 18 years old. A study by J. S. Beck, Beck, Jolly, and Steer (2005) showed that the BYI-2 demonstrated these adequate psychometric properties: the internal consistency within each scale of the BYI had Cronbach's alpha ranging from .86 to .91 for ages 7-10, from .86 to .92 for ages 11-14, and from .91 to .96 for ages 15-18. Additionally, convergent validities were shown for children from ages 7 to 14 between the BYI-2 Depression scale and the CDI ( $r = .72$ ), the BYI-2 Anxiety scale and the Revised Children's Manifest Anxiety Scale (RCMAS; C. R. Reynolds & Richmond, 1997) ( $r = .70$ ), the BYI-2 Disruptive Behavior scale and the Conduct Problems scale of the Conners-Well's Self-Report Scale-Short (CASS-S; Conners, 1997) ( $r = .69$ ), and the BYI-2 Self-Concept scale and the Piers-Harris Children's Self-Concept Scale (PHSCS; Piers, 2002) ( $r = .61$ ). Furthermore, convergent validities were found for adolescents from ages 15 to 18 between the BYI-2 Depression scale and the CDI ( $r = .67$ ), the BYI-2 Anxiety scale and the RCMAS ( $r = .64$ ), the BYI-2 Disruptive Behavior scale and the Conners' Conduct Problems scale ( $r = .76$ ), and the BYI-2 Self-Concept scale and the PHSCS ( $r = .77$ ). Convergent validity for children and adolescents between the BYI-2 Anger scale and the Reynolds Bully Victimization

Scales for School (RBVSS; W. Reynolds, 2003) was  $r = .61$ .

The BYI-2 is also available in Chinese (Cho et al., 2009) and Norwegian (Kornør & Johansen, 2016). The norms of both Chinese and Norwegian versions of the BYI-2 were based on primary and secondary school children. A similar study was conducted by Cho et al. (2009) but no EFA results were reported. However, using the CFA, Cho et al. (2009) reported that the Chinese version of the BYI-2 had an acceptable fit to data. Cho et al. (2009) reported that the Cronbach's alphas of the scales of depression, anxiety, anger, disruptive behaviour, and self-concept were over .90, and the criterion validities of all these scales were statistically significant. Kornør and Johansen (2016) also reported high internal consistency with Cronbach's alpha ranging from .84 to .92 for the Norwegian version of the BYI-2. However, no information on criterion validity was reported for the Norwegian version. Also, past studies showed that scores for anxiety, depression, angry, and disruptive behaviour on the BYI-2 were higher (J. S. Beck, Beck, Jolly, & Steer, 2005; Cho et al., 2009), and self-concept was lower in children and adolescents from special education sample and clinical population than community sample of similar age groups (J. S. Beck, Beck, Jolly, & Steer, 2005).

### **Present Study**

The BYI and BYI-2 have been used internationally (Beebe et al., 2010; Melnyk et al., 2014). With respect to psychometric properties of the BYI-2, the

scale has demonstrated good reliability and convergent validity (J. S. Beck, Beck, Jolly, & Steer, 2005; Cho et al., 2009). However, only limited evidence pertaining to the psychometric properties of the translated versions of the BYI-2 when it was administered in participants aged from 7 to 18 years old across populations. The presence of a Malay version of the BYI-2 could inform our current management of, and prevention for, social and emotional problems in adolescents. Moreover, previous studies examining the psychometric properties of the BYI-2 have yet to employ CFA, allowing to evaluate its factor structure. The BYI-2 was selected in this study because it can measure various domains of social and emotional functioning by using a single tool.

The present study aimed to answer one research question: Whether the BYI-2 is a reliable and valid tool to screen for depression, anxiety, anger, and disruptive behaviors as well as self-concept in adolescents? Using confirmatory factor analytic approach, the aim of this study was to investigate the factor structure, reliability, and validity of the BYI-2 in a sample of adolescents living in the nongovernment-run sheltered homes. We targeted this population for one important reason: As far as social and emotional problems are concerned, adolescents from the orphanage population were at greater risk for depression, anxiety and phobia, post-stress traumatic disorder, low self-esteem and other psychosocial problems than adolescents from general population (Cluver et al., 2012; Fawzy

& Fouad, 2010; Mohammadzadeh et al., 2018; Nalugya-Sserunjogi et al., 2016; Puffer et al., 2012; Ramagopal et al., 2016; Ruiz-Casares et al., 2009). One-thirds of the adolescent orphans had suicidal intentions (Ramagopal et al., 2016).

## METHOD

### Participants

The total sampling frame consisted of 331 participants, only 300 participants met inclusion and exclusion criteria. The final sample included 300 adolescents (45.7% female and 54.3% male), aged 13 to 17 years old ( $M = 14.77$ ,  $SD = 1.39$ ). Ethnicity breakdown for the sample revealed that 98.3% were Malay. All of them were Muslims (100.0%). Most of the sample had lost at least one parent (53.3%).

### Measures

**The Malay Version of the Beck Youth Inventories-Second Edition (BYI-2 Malay).** The 100-item English version of the BYI-2 is a self-report measure designed to assess social and emotional functioning of children and adolescents (J. S. Beck, Beck, Jolly, & Steer, 2005). It consists of 5 scales including self-concept, anxiety, depression, anger, and disruptive behaviour. Every scale has 20 items. Participants rate the item based on a 4-point Likert scale ranging from 0 (*being never*) to 3 (*always*). The BYI-2 scales can be administered individually or collectively. The BYI-2 has demonstrated good internal consistency with Cronbach's  $\alpha$  ranged from .86 to .96 (J. S. Beck, Beck, Jolly, & Steer, 2005). In the present study,

the BYI-2 was translated based on Beaton et al.'s (2000) recommendations. In stage 1, the BYI-2 was initially translated into Malay language by two bilingual translators, one with knowledge and the other one without knowledge on psychology. In stage 2, these two translators resolved the discrepancies in their translations such as "*Orang mahu mendampingi saya.*" was chosen for the item "People want to be with me." instead of "*Mereka mahu mendampingi saya.*", and "*Saya baik seperti kanak-kanak lain.*" was chosen for the item "*I am just as good as the other kids.*" instead of "*Saya sama seperti kanak-kanak lain.*". In stage 3, a professional language interpreter examined quality and accuracy of the translation by deciding the most appropriate Malay terminology. For instance, the statement of "*Saya menggigil.*" was chosen over the statement "*Saya menggeletar.*" for the item "I get shaky." The Malay version of the BYI-2 was then translated back to English by another two independent translators. There were several differences between the back-translated version and the original version, but the differences were minor. For example, the back-translated version reads "People think I'm good at things.", while the original version reads "Others think that I'm good at something.", and the back-translated version reads "I feel like I'm a good person.", while the original version reads "I feel like I'm a nice person.". In stage 4, face and content validity were obtained through expert committee members to decide on the most appropriate terminology in Malay language, and on the discrepancies between

the original and back-translated versions. In stage 5, a pilot study was conducted involving 42 adolescents residing in an orphanage. Minor revisions were done with respect to language and cultural terms in Malay. The cultural term discrepancy was, for instance, *jenaka* versus *buat lawak*. These adolescents were not included in the validation sample of the BYI-2 Malay.

**Beck Depression Inventory-Malay (BDI-Malay).** The 20-item self-report BDI-Malay (BDI-Malay; Mukhtar & Oei, 2008) is a self-report measure of depression symptoms. Participants rated items on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*severely*). The BDI-Malay has two subscale scores, namely cognitive/affective and somatic/vegetative and yields a total score. In past research, Cronbach's alphas for the subscales ranged from .71 to .91 (A. T. Beck et al., 1961). Due to the focus of our study, only the total score was used. Cronbach's alpha for the BDI-Malay in the present study was .88.

**Beck Anxiety Inventory-Malay (BAI-Malay).** The 21-item BAI-Malay (Mukhtar & Zulkefly, 2011) is a self-report measure of anxiety symptoms. Participants rated items on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*severely*). The BAI-Malay has three-factor solution (subjective anxiety, autonomic, and neurophysiology) and yields a total score. In past research, Cronbach's alphas for the subscales ranged from .66 to .89 (Mukhtar & Zulkefly, 2011). Due to the focus of our study, only the total score was

used. Cronbach's alpha for the BAI-Malay in the present study was .91.

**Automatic Thoughts Questionnaire-Malay (ATQ-Malay).** The 17-item ATQ-Malay (Oei & Mukhtar, 2008) is a self-report measure of negative automatic thoughts. Participants rated items on a 5-point Likert scale ranging from 1 (not at all) to 5 (all the times). The ATQ-Malay has two subscale scores: negative self-concept/negative expectations and personal maladjustment and yields a total score. In past research, Cronbach's alphas for the subscales ranged from .83 to .93 (Oei & Mukhtar, 2008). Due to the focus of our study, only the total score was used. Cronbach's alpha for the ATQ-Malay in the present study was .93.

**Rosenberg Self-Esteem Scale-Malay (RSES-Malay).** The 10-item RSES-Malay (Yaacob, 2006) is a self-report measure of global self-esteem. Participants rated items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In past research, Cronbach's alpha for the RSES-Malay was .84 (Yaacob, 2006). Cronbach's alpha for the RSES-Malay in the present study was .54.

### Procedure

There is no official list of orphanages in Malaysia. The Malay-operated nongovernment-run sheltered homes that sheltered underprivileged children and adolescents including orphans were identified via multiple sources: the official website of Department of Social Welfare

Malaysia, the Registry of Society Malaysia, and the Department of Islamic Selangor. Government-run sheltered homes due to differences in governance and facilities were excluded in this study. Non-Malay-operated sheltered homes were also excluded in this study due to different religious affiliation and language barriers. Nine Malay-operated nongovernment-run sheltered homes that represented each district of all nine districts in the state of Selangor, Malaysia were randomly selected. Written consent was obtained from the legal guardians of nongovernment-run sheltered homes where the adolescents were residing because all of them of below 18 years old. All adolescents from each home were invited to participate in this study on a voluntary basis. Only those who fulfilled the inclusion criteria were recruited. Most of them were from underprivileged families including orphans. The inclusion criteria for the participants were as follows: aged 13 to 17 years, had been staying in nongovernment-run sheltered homes for at least one day and fluent in the Malay language. The exclusion criteria were learning disorders, current use of psychotropic medication, currently attending psychotherapy, had organic brain disorder due to physical injuries, diseases or intoxication of substances, and absent on the day the data were collected. The exclusion criteria were included in the BYI-2 questionnaire. Information pertaining to the exclusion criteria were solely obtained through self-disclosure. They completed the set of questionnaires approximately within 15 to 20 minutes.

### **Ethical Information**

Approval was obtained from the Universiti Putra Malaysia Ethics Committee for Research Involving Human Subjects (Reference No.: UPM/TNCPI/RMC/1.4.18 (JKEUPM)/F1. Furthermore, formal permission was sought from the authors of the scale. Permission for translation and data collection on Beck Youth Inventories was granted by Vice President, Finance Clinical Assessment, NCS Pearson, Inc. Informed consent was obtained from the legal guardians of the nongovernment-run homes where the participants were residing.

### **Data Analysis**

We used the SPSS 22 and AMOS 22 (IBM Corporation, 2011) for data analyses. We also examined data accuracy and statistical assumptions in terms of missing values, normality, and outliers. We conducted three major analyses. First, the CFA was performed to confirm the factor structure of the BYI-2 Malay. Having acknowledged that chi-square ( $\chi^2$ ) is insufficient in assessing model fit, the five-factor model was further evaluated by using a set of goodness fit indices including the relative chi-square ( $\chi^2/df$ ), normed fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA). A measurement model is considered good, if the fit indices fulfil the following acceptable ranges:  $\leq 5$  for  $\chi^2/df$  (Schumacker & Lomax, 2010),  $\geq .90$  for CFI (Bagozzi & Yi, 1988), NFI, TLI (Bentler & Bonett, 1980), and IFI (Bollen, 1989), and  $\leq .08$  for RMSEA

(Browne & Cudeck, 1992). Secondly, we obtained Cronbach's  $\alpha$ s as the reliability estimates of the BYI-2 Malay scales. Thirdly, a series of Pearson's  $r$  tests were performed in examining the validity of the BYI-2. The relations between the BYI-2 Self-Concept scale and the RSES-Malay, between the BYI-2 Anxiety scale and the BAI-Malay, and between the BYI-2 Depression scale and the BDI-Malay were tested to establish the concurrent validity. As there have been consistent links between anger and automatic thought and between disruptive behaviour and automatic thought (R. Beck & Fernandez, 1998; Flouri & Panourgia, 2014; Sukhodolsky et al., 2004; Yavuzer et al., 2014), we tested the relations between the BYI-Malay Anger and the ATQ-Malay and between the BYI-2-Malay Disruptive Behaviour and the ATQ-Malay to establish the convergent validity.

## **RESULTS**

### **Descriptive Statistics**

Table 1 shows means, standard deviations, skewness, and kurtosis indices for study variables. It is notable that all skewness and kurtosis indices for study variables were in the acceptable range (Kim, 2013; Kline, 2010). The participants completed all the questionnaires. The missing cases were less than 4.8%.

### **Factor Structure of the BYI-2 Malay**

The original 100-item five-factor model of the BYI-2 showed a poor fit to the data,  $\chi^2/df = 1.95$ , NFI = .50, CFI = .67, IFI = .67, TLI



Table 1  
Means, standard deviations, skewness, and kurtosis

Instruments	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
BYI-2 Malay				
Self-concept	29.38	8.37	0.04	0.05
Anxiety	22.94	9.68	0.48	-0.06
Depression	19.15	10.76	0.89	0.94
Anger	18.96	10.53	0.72	0.15
Disruptive behaviour	15.22	9.36	1.11	1.82
RSES-Malay	33.04	5.01	0.04	-0.09
BAI-Malay	17.94	9.95	0.34	-0.21
BDI-Malay	15.33	9.54	0.84	0.57
ATQ-Malay	34.10	11.84	1.11	1.40

Note. BYI-2 Malay = Beck Youth Inventories Second Edition-Malay; Rosenberg Self-Esteem Scale-Malay (RSES-Malay); Beck Anxiety Inventory-Malay (BAI-Malay); Beck Depression Inventory-Malay (BDI-Malay); Automatic Thoughts Questionnaire-Malay (ATQ-Malay).

= .66, RMSEA = .06 (see Model 1; Table 2). Prior to conducting CFA in the present study, EFA was conducted. The results of EFA showed that most items loaded in the first factors, and cross-loadings and some items did not load above 0.31. To avoid instability of factor solution, we combined the items into parcels by random assignment (Little et al., 2002). The BYI-2 comprised five factors. Each factor consisted of four parcels. There were 5 items per parcel.

The parcelled five-factor structure of BYI-2 Malay model demonstrated a good fit to the data,  $\chi^2/df = 2.22$ , NFI = .91, CFI =

.95, IFI = .95, TLI = .94, RMSEA = .06 (see Model 2, Table 2). All values fell within the acceptable ranges.

As shown in Table 3, all standardized factor loadings were above .50 at  $p < .001$  (Fornell & Larcker, 1981; Hair et al., 2010). Figure 1 shows the results of CFA that tested the original 100 items five-factor model of the BYI-2 Malay.

Table 4 shows intercorrelations among BYI-2 Malay scales. All Pearson's *rs* were statistically significant except for the relationship between Self-Concept and Anxiety.

Table 2  
Goodness of fit indices of the BYI-2 Malay

BYI-2 Malay	$\chi^2/df$	NFI	CFI	IFI	TLI	RMSEA
Acceptable range	$\leq 5$	$\geq .90$	$\geq .90$	$\geq .90$	$\geq .90$	$\leq .08$
Model 1	1.95	.50	.67	.67	.66	.06
Model 2	2.22	.91	.95	.95	.94	.06

Note. BYI-2 Malay = Beck Youth Inventories Second Edition-Malay;  $\chi^2/df$  = relative chi-square; NFI = normed fit index; CFI = comparative fit index; IFI = incremental fit index; TLI = Tucker Lewis index; RMSEA = root mean square error of approximation. All values were significant at  $p < .0001$ .

Table 3  
Standardized factor loadings of the BYI-2 Malay

Inventory	Parcel	Standardized factor loadings
Self-concept	Parcel 1	.73*
	Parcel 2	.82*
	Parcel 3	.75*
	Parcel 4	.73*
Anxiety	Parcel 1	.70*
	Parcel 2	.75*
	Parcel 3	.80*
	Parcel 4	.75*
Depression	Parcel 1	.83*
	Parcel 2	.83*
	Parcel 3	.80*
	Parcel 4	.81*
Anger	Parcel 1	.82*
	Parcel 2	.85*
	Parcel 3	.82*
	Parcel 4	.83*
Disruptive Behaviour	Parcel 1	.81*
	Parcel 2	.85*
	Parcel 3	.86*
	Parcel 4	.80*

Note. BYI-2 Malay = Beck Youth Inventories Second Edition-Malay  
\* $p < .001$

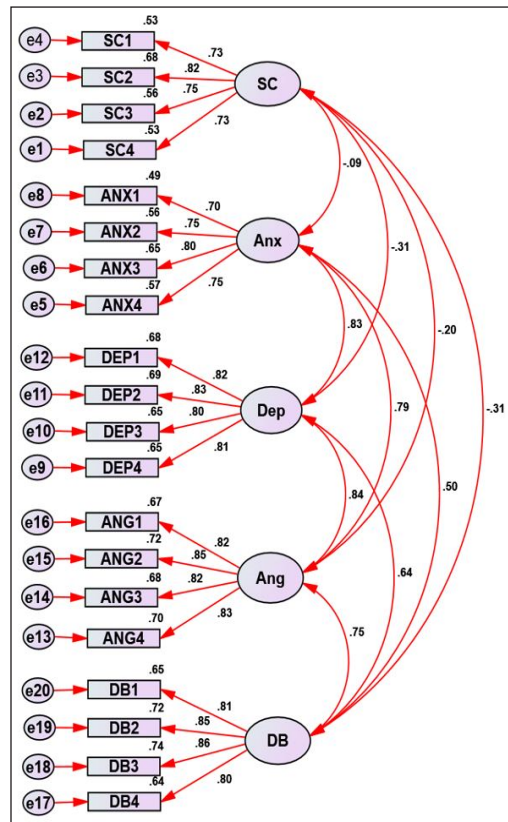


Figure 1. Inter-correlations among the BYI-2 Malay scales

Table 4  
Intercorrelations and reliability among the BYI-2 Malay Scales

	Self-Concept	Anxiety	Depression	Anger	Cronbach's $\alpha$
Self-Concept					.86
Anxiety	-.07				.89
Depression	-.28*	.71*			.92
Anger	-.17*	.69*	.76*		.92
Disruptive Behaviour	-.26*	.42*	.57*	.67*	.91

Note. BYI-2 Malay = Beck Youth Inventories Second Edition-Malay  
\* $p < .01$  (2-tailed)

**Reliability of the BYI-2 Malay.** In the present sample, Cronbach's alpha values were .86 for self-concept, .89 for anxiety, .92 for depression, .92 for anger, and .92 for disruptive behaviours (see Table 4).

**Validity of the BYI-2 Malay.** Table 5 shows relations of the BYI-2 Malay scales to the RSES-Malay, BAI-Malay, BDI-Malay, and ATQ Malay. There were significant correlations between the BYI-2 Malay Self-

Concept scale and the RSES-Malay ( $r = .41$ ) and between the BYI-2 Malay Anxiety scale and the BAI-Malay ( $r = .60$ ), and between the BYI-2 Malay Depression scale and the BDI-Malay ( $r = .69$ ). Evidence for concurrent validity was established. There were significant correlations between BYI-2 Malay Anger scale and the ATQ-Malay ( $r = .71$ ) and between BYI-2 Malay Disruptive Behaviour scale and the ATQ Malay ( $r = .52$ ). Evidence for convergent validity was established.

## DISCUSSION

The purpose of our study was to establish the psychometric properties of the BYI-2 Malay when administered to a sample of adolescents residing in the nongovernment-run sheltered homes. To examine the factor structure of the BYI-2 Malay, we performed a CFA with item parcelling as a solution to reduce item complexity. All goodness-of-fit indices suggest a good fit to the data. Consistent with the previous findings (J. S. Beck, Beck, Jolly, & Steer, 2005), the BYI-2 Malay is indeed a multidimensional

scale encompassing self-concept, anxiety, depression, anger, and disruptive behaviour.

Consistent with previous studies, all BYI-2 Malay scales have demonstrated high internal consistency (J. S. Beck, Beck, Jolly, & Steer, 2005; Cho et al., 2009; Kornør & Johansen, 2016). All Pearson's  $r$ s were statistically significant except for the relationship between the BYI-2 Self-Concept and Anxiety scale. Our finding is consistent with a previous study on the validation of the Dutch version of the BYI-2 yielding a weak relationship between these two scales (Steer et al., 2005; Thastum et al., 2009). In the present study, some factor loadings for the BYI-2 Self Concept and Anxiety parcels did not exceed .80, suggesting that a larger sample size is needed for future studies (Tabachnick & Fidell, 2007).

At the preliminary level, the BYI-2 Malay Depression, Anxiety, and Self-concept scales have demonstrated concurrent validity. No standardized measures for anger and disruptive behaviours are available in Malay language. Hence, obtaining

Table 5  
*Relations of the BYI-2 Malay to the RSES-Malay, BAI-Malay, BDI-Malay, and ATQ-Malay*

	Scales of the BYI-2 Malay				
	Self-Concept	Anxiety	Depression	Anger	Disruptive behaviour
RSES-Malay	.41*	-.35*	-.51*	-.42*	-.25*
BAI-Malay	-.16*	.60*	.57*	.63*	.46*
BDI-Malay	-.33*	.53*	.69*	.67*	.53*
ATQ-Malay	-.25*	.58*	.76*	.71*	.52*

*Note.* BYI-2 Malay = Beck Youth Inventories Second Edition-Malay; RSES-Malay = Rosenberg Self-Esteem Scale-Malay; BDI-Malay = Beck Depression Inventory-Malay (BDI-Malay); BAI-Malay = Beck Anxiety Inventory-Malay; ATQ-Malay = Automatic Thoughts Questionnaire-Malay (ATQ-Malay).

\*  $p < .01$  (2-tailed)

concurrent validity for the full scale is not achievable. We reported positive correlations between the BYI-2 Malay Anger and the ATQ-Malay, and between the BYI-2 Malay Anger and Disruptive Behaviours scales. This lends preliminary support for convergent validity. Negative automatic thought could lead adolescents to a feeling of irritable (Novaco, 2010), and behave aggressively (Calvete & Cardeñoso, 2005; Novaco, 2010). Kerr and Schneider (2008) demonstrated that children who lost anger control were more likely than others to exhibit both externalizing and internalizing problem behaviours.

### **Limitations**

Several limitations should be noted. First, in this study, we recruited less than 500 adolescents living in the sheltered homes. Following subject to item ratio, a sample size of 500 is recommended for a 100-item scale such as the BYI-2 (Osborne & Costello, 2005). This sample size of 300 was sufficient for factor analysis, although a sample size of 500 is regarded as desirable (Tabachnick & Fidell, 2007). Second, in examining the factor structure of the BYI-2 Malay, a CFA with item parcelling was performed. Although item parcelling seems to be an option in handling complex model, it can potentially lead to model misspecification and the parameter estimates are masked and distorted (Little et al., 2002). Third, evidence validity for the full BYI-2 Malay scales could not be established. Existing scales which could be administered to evaluate all five domains of

the BYI-2 are still not available in Malay. Last but not least, given all participants of this study were Malay adolescents residing in the sheltered homes, the interpretation of the present findings should not go beyond this population. To expand the psychometric properties of the BYI-2 Malay in the future, the scale should be administered in other populations such as children from 7 to 12 years old, and with a larger sample size of 500 to 1000 participants of different ethnicity. We also recommend using clinical samples to evaluate the sensitivity and specificity for the BYI-2 Malay.

### **CONCLUSION**

To the best of our knowledge, the present study is the first to investigate the psychometric properties of the BYI-2 in a Malaysian sample. As evident in this study, the BYI-2 Malay is a reliable and valid scale to measure depression, anxiety, self-concept, anger, and disruptive behaviours in adolescents despite taking the study limitations into consideration. In present study, parcelled solutions appear to ameliorate the effects of roughly categorized and nonnormally distributed items on model fit. Nevertheless, the factor structure of the BYI was developed as unidimensional as possible and has been well studied (J. S. Beck, Beck, & Jolly, 2001). Hence, the item parcelling can be used as an alternative method in this circumstance to counter the issue of misfitting. The chance of getting biased parameter estimates are low. Despite the fact that 100 items were parcelled, the BYI-2 Malay should be used as a full

scale in that all items were retained in the CFA. Due to its multidimensionality, the BYI-2 Malay can cover the potentiality of comorbidities of disorders within its five scopes of measurement. Also, the BYI-2 Malay is brief and easy to be administered in which it maximizes the adolescents' cooperation and minimizes the time needed for administration.

Our recent findings shed light on the utility of the BYI-2 Malay in aiding clinicians as well as therapists for identifying multiple symptoms of social and emotional problems in adolescents. However, the BYI-2 Malay should not be used as a diagnostic tool. The scale does lend support for the preliminary establishment of a psychiatric diagnosis based on the Diagnostic and Statistical Manual of Mental Disorder-Fifth Edition (DSM-5) or the International Classification of Diseases-11<sup>th</sup> Revision (ICD-11). With the existence of the BYI-2 Malay as a promising screening tool for social and emotional problems, prevention and treatment can be formulated and monitored.

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