

## **Psychometrics Properties of School Motivation Inventory in Bangladeshi Culture: Exploratory and Confirmatory Study**

**Muhammad Akram uz Zaman (PhD)**

Dept. of Psychology, Jagannath University, Dhaka, Bangladesh

**A. K. M. Rezaul Karim (PhD)**

Dept. of Psychology, University of Dhaka, Bangladesh

The study of school motivation behavior of adolescent is crucial for every culture; but there is no valid scientific tool for measuring the same in Bangladeshi culture. Considering the significance of the School Motivation Inventory (SMI), the purpose of the present study was to culturally adapt the SMI (Indian Bangla version) into Bangla and validate in Bangladeshi culture. One thousand participants (491 males & 509 females) participated in the study. Exploratory Factor Analysis (EFA) which was done on sample 1 ( $n_1 = 500$ ) identified a three-factor of the SMI with 30 items. The three factors namely 'Commitment, interest & enthusiasm' 'Affiliation with parents and peers' and 'Making excuse and blaming others' together explained 42.35% of the total variance. When analyzed the data for sample 2 ( $n_2 = 500$ ) in Confirmatory Factor Analysis (CFA), it was revealed that the three-factor model with 30 items is an acceptable model fit [ $\chi^2(398) = 2.18$ , RMSEA = .05; RMR = .07; CFI = .90, GFI = .89] to the data. Moreover, the SMI showed good internal consistency (Cronbach's  $\alpha = .91$ ) and strong convergent and discriminant validity. Thus, the Bangla version of SMI appears to be valid and reliable and therefore may be used in further research for measuring school motivation behavior of adolescent student in the perspective of Bangladesh.

*Keywords:* School motivation, scale, factor analysis, exploratory, confirmatory<sup>1</sup>

### **Introduction**

The term 'motivation' refer to a physiological drive-pushing a person or an animal, wish to achieve, extrinsic and intrinsic motivation, need for

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<sup>1</sup> Correspondence concerning this article should be addressed to Muhammad Akram uz Zaman (PhD) Dept. of Psychology, Jagannath University, Dhaka, Bangladesh A. K. M. Rezaul Karim (PhD) Dept. of Psychology, University of Dhaka, Bangladesh [akrambro@gmail.com](mailto:akrambro@gmail.com)

achievement, competence, self-confidence, hope for success, production of energy required for academic works and fear of failure (Bozanoğlu, 2004; Deci & Ryan, 2008). Ryan and Deci (2000) defined motivation is “an internal state that arouses, directs, and maintains behavior”. Psychologists have made a distinction in motivation based on intrinsic and extrinsic factors. Intrinsic motivation refers to the natural tendency to seek out challenges as one pursues personal interests and goals (Choi, Mogami., & Medalia, 2010); Ryan & Deci, 2000). When individuals are intrinsically motivated, they engage in activities without expecting incentives or rewards. On the other hand, individuals that engage in tasks because of rewards or punishment are extrinsically motivated (Ryan & Deci, 2000).

Motivation has lots of aspect for measuring the different motivational concept. Among them school motivation inventory is one of them which has been developed on the basis of intrinsic motivation (Ryan & Deci, 2002, 2008). For the overall development, performance, achievement, teaching and learning of adolescent student, it is urgent need to know their school motivation behavior pattern. But, in the perspective of Bangladesh, no standard psychometric motivational scale which can measure the school motivation behavior of adolescent student. Considering this, it has been taken to culturally adapt the SMI in Bangladeshi culture in the present study. The SMI is a multidimensional scale developed in support of Self-Determination Theory (Ryan & Deci, 2002, 2008), a strongly validated theory stating that motivation and regulation are moderated by three innate needs: autonomy, belonging, and competence. As applied to education, the theory posits that students who perceive volition in a task, those who report stronger connections with peers, schools and teachers, and those who perceive themselves as competent in a task are more likely to internalize the task and excel. It has been shown that (Deci & Ryan, 2008) promotion of these needs in educational environments can lead to higher quality learning, as well as greater conceptual understanding, personal growth, and positive adjustment.

Roy and Biswas (1997) defined school motivation as a psychological forces (motives, attitudes, etc.) spanning over affective (emotion), cognitive and moral dimensions of behavior that impel students to do school work. Wentzel (1998) reported that different aspects of motivation are subject not only to contextual influences at school but also to socialization practices in the home. There is increasing recognition among scholars regarding motivation that adolescent's overall

motivation, adjustment, and success at school requires willingness as well as an academic ability to meet social as well as academic challenges (Hinshaw, 1992).

Researchers (such as Ormrod & Jones, 2015) have used various approaches to examine factors that affect students' motivation pattern in learning environments. They reported that students' perceptions of their academic environment have a powerful influence on the quality of their learning. Researchers are trying to explore how students' external environments interact with their internal needs, cognition, and affection and many theories have been developed to explain these interactions (Schunk, Meece, & Pintrich, 2014).

Jones and Skaggs (2016) studied on 338 undergraduate students who provided questionnaire responses in reference to 221 different courses at a large public U.S. university Using MUSIC Model of Academic Motivation Inventory which measures college students' beliefs related to the five components of the MUSIC Model of Motivation (Jones, 2012). They found that motivational inventory is very much useful to instructors and researchers assessing the effects of motivational behaviour and beliefs on academic success.

Mucherah, Finch, Smith, & Ambrose-Stahl (2014) explored the relationship between classroom climate, reading motivation, and achievement. It was found that indeed the relationship of classroom climate to reading achievement was mediated by student reading motivation, and certain aspects of this mediated relationship were moderated by gender. In a study conducted in the United States examining middle school students' motivation to read. Results showed that motivation to read decreased as grade level increased (Kelley & Decker, 2009) while students in higher grades (8-9 grades) had significantly lower reading motivation compared to the primary school students in Hon Kong (Lau, 2009). Lau (2009) also reported that motivation, specifically reading motivation, begins to decline in adolescence which has prompted an increased interest in motivation among adolescents.

An important study conducted by Nakagami, Xie, Hoe and Brekke (2008) examining mediating factors of psychiatric rehabilitation highlighted the strength of the relationship between Intrinsic Motivation (IM) and psychosocial functioning by suggesting that IM can directly promote neurocognitive improvement and that IM is vital to treatment strategies for improving functional abilities in people with schizophrenia.

Wentzel (1998) studied on adolescents having supportive relationships with their parents, teachers, and peers in relation to motivation at school (school- and class-related interest, academic goal orientations, and social goal pursuit). The research findings indicate that parent support was a positive predictor of school-related interest and goal orientations. Boggiano, Main, and Katz (1991) found females significantly more extrinsically motivated than males. A review of the literature by Schiefele, Krapp, and Winteler (1992) strongly suggests that female students' academic performance is less associated with their interests than male students' academic performance. Even less is known about the motivation of children from different racial and ethnic groups.

### **Rationale**

Good motivation to school and academic activities help student to accomplishing those necessary responsibilities which help them throughout his academic life. But lack of proper motivation to academic activities may cause inappropriate academic behaviors, such as giving up immediately against challenges, impatience, lack of perseverance, not enjoying the work done, poor results, drop out etc. For this reason, it is important to boost up the adolescent students' motivation to school and academic activities, to identify their school motivation status and to make policy which will increase and maintain adolescent students' motivational feeling to school and academic activities. In that cases, SMI is one of the scientific scale which will help to identify adolescent students' nature of school motivation behavior. As a result, teachers, authority and parents will be able to select the proper academic behavior for adolescent students which will help adolescent students to acquire academic success in their life (Haslofca & Korkmaz, 2016).

Considering the above definition, argument, and literature review, it is assumed that though the school motivation behavior of adolescents is important for their sound academic development and achievement but very little has been published for measuring the same in Bangladeshi culture. So, contemplating the importance of this topic a scientifically reliable instrument is inevitable for measuring the motivational behavior of adolescents. Though the importance of having a cultural specific Bangla version SMI has increased in social science (psychology, sociology, adolescent study, and other relevant areas), however, the scale was not adapted in Bangladeshi culture so far. For this reason, the present researchers have initiated to adapt SMI in Bangladeshi culture.

### **Objectives of the study**

1. To culturally adapt Indian version SMI for Bangladeshi culture.
2. To adapt and validate SMI in Bangladeshi culture

### **Hypothesis of the study**

There would be significant adapted SMI for Bangladeshi culture for measuring school motivation behavior of Bangladeshi adolescents.

## **Methods**

### **Participants**

A total of 1064 eleventh grade adolescent students (524 males & 540 females) of Dhaka Metropolitan City (DMC) were participated in this study. The participants were selected randomly from the population (Approximately 52, 000). Because of incomplete responses 64 participants were dropped. Participants' age ranged from 14 to 19 years with a mean of 16.43 and standard deviation of 0.89. Among the participants 49.25% were boys and 50.75% were girls. Of them, 23.12 % of the participants were from lower class, 62.69% from middle class, and 14.19 % were from upper class.

### **Inclusion criteria**

The participants was included both male and female students of 11<sup>th</sup> grade drawn from DMC. Only those participants were included in the study who gave their informed consent to participate in the study.

### **Research design**

Cross-sectional research design was used for the present study

### **Measures**

#### **School Motivation Inventory (SMI)**

The School Motivation Inventory (SMI) was first developed by Kozeki (1981) in Hungary. Subsequently, an English version of this measure was prepared by Entwistle in collaboration with Kozeki (Kozeki & Entwistle, 1984; Entwistle & Kozeki, 1985). The English version of the scale was translated into Bangla and validate in Indian culture by Roy and Biswas (1997). The scale consists of 60 Likert type items (26 positive & 34 negative) encapsulated in ten dimensions under four broad dimensions such as affective domain (Warmth and empathy from parents, identification with teachers, and affiliation with peers), cognitive domain (Independence and self-confidence, competence in knowledge and skills,

interest and enthusiasm in activity), moral domain (Trust, conscience and self-esteem, need for order and compliance with norms, responsibility and anticipating consequences) and 'pressure and excessive demands from adults'. Each of the dimensions of the Bangla version SMI contains 6 items.

Each item has 5 response alternatives ranging from 'strongly agree' to 'strongly disagree'. These responses are assigned a score of 5 (Strongly agree) to 1 (Strongly disagree) for the positive items while reversed scoring is done for the negative items. Higher score indicates higher level of school motivation while lower score indicates lower level of school motivation. The English version SMI has high internal consistency (Cronbach's  $\alpha$ ) and satisfactory validity. The internal consistencies of the 10 dimensions of the adapted Bangla version SMI range from .46 to .69 which express moderately high in magnitude. The Bangla version scale has content validity, concurrent validity, and factorial validity (Roy & Biswas, 1997). The correlation between the English and Bangla version ranges from .71 to .95 which indicates concurrent validity (Roy & Biswas, 1997) of the SMI.

### **Procedure**

At first, written permission was taken from the author (Roy & Biswas, 1997) of the scale for cultural adaptation (in Bangladeshi culture). In the present study, Bangla version of Indian's SMI was considered for cultural adaptation. The present investigators felt that it is necessary to culturally adapt SMI in Bangladeshi culture. This consideration was essential considering the range of differences in socio-cultural aspects (e.g., differences in language utterance, habit, customs, thinking pattern, religion etc.) of Bangladesh and India. For this reason, TT (Team Translation) approach (Harkness, 2008), also called Committee Approach, was used in the present study which contains the following stages.

**Stage 1: Checking and modification.** The researcher sits together with the supervisor to check and modify the existing Bangla version SMI (Indian). Thus, the first drafts of the scale was prepared.

**Stage 2: Review.** Six reviewers (Experts in Bangla & Psychology) independently reviewed corrected, and judged some of the items (Where needed). Each expert independently rated the language using 2-point scale (Where, 0 = Not correct, 1 = Correct) and the relevancy of each item using another 2-point scale (Where, 0 = Not relevant, 1 = Relevant).

**Stage 3: Adjudication.** Two adjudicators (The researcher & his supervisor) decided whether the SMI is ready to move to detailed pretesting. Following the reviewer's evaluation in stage 2, accuracy of language was examined by calculating for each item the Accuracy Index ( $AI = \text{Number of rating at 1} / \text{Number of experts}$ ). The item yielding an AI of 1 ( $AI = 6/6$ ) was considered to be correctly and reliably modified (Karim & Nigar, 2014).

The adjudicators modified 9 SMI items as these items had AI values  $< 1$ . The experts in stage 2 suggested some corrections to the clarity, wording, and organization of these items. The adjudicators ensured the accuracy of modification by reviewing those items ( $AI < 1$ ) in the light of their comments and suggestions. They also examined the relevance/suitability of the items in Bangladeshi culture by calculating for each item the Relevance Index ( $RI = \text{Number of rating at 1} / \text{Number of experts}$ ). They considered an item yielding an RI of 1 or .83 ( $RI = 6/6$  or  $RI = 5/6$ ) to be relevant or suitable (Karim & Nigar, 2014). Because of the RI values  $< .83$ , one SMI item was dropped. Thus, the second draft of the Bangla version SMI was finalized for piloting/pretesting on a small representative group of participants.

**Stage 4: Pretesting/pilot study.** Pilot study was carried out on eleventh grade students of 'Uttara United School and College' ( $n = 100$ ). Participants were requested to provide information by taking comments about the readability, feasibility, clarity, comprehensiveness, easily answerable, and 'style and formatting' of the scale's items. It is seen that the percentages of participants responded 'Yes' on the readability, logicity, clarity, comprehensiveness, easily answerable and 'style and formatting' ranged from 84 % to 98 % for SMI which ensured good face validity of the measure. However, no item was reported to be seriously erroneous or ambiguous to be discarded. Thus, the third draft was prepared for final fielding.

#### **Data acquisition.**

Standard data collection procedures were followed in the study. At the beginning, participants were briefed about the general purpose of the study and good rapport was established with them. They were informed both verbally and in writing that the investigation is purely for academic and their responses to the questionnaires would be kept confidential. After completion of their task, the questionnaires were collected and they were given thanks for their sincere cooperation. Sixty four participants were excluded from final analyses as they provided

incomplete responses to the questionnaires. Thus, the complete response rate was 93.98%.

### **Data analyses**

Each participant's responses were scored according to the scoring principles of the SMI. The data analysis was done in three phase. At first, item analysis was done followed by EFA and CFA. Data for the 500 ( $n_1$ ) odd numbered participants were subjected to EFA whereas data for the 500 ( $n_2$ ) even numbered participants were subjected to CFA. It was checked whether the data were suitable for factor analysis or not and results were satisfactory.

### **Results**

#### **Factor structure of SMI**

In order to have a single school motivation score for each participants, the items under the 'Making Excuse and Blaming Others' dimension of the scale were scored in reversed order (Because this dimension measures negative aspect of school motivation unlike the two other dimensions which measure positive aspect of school motivation).

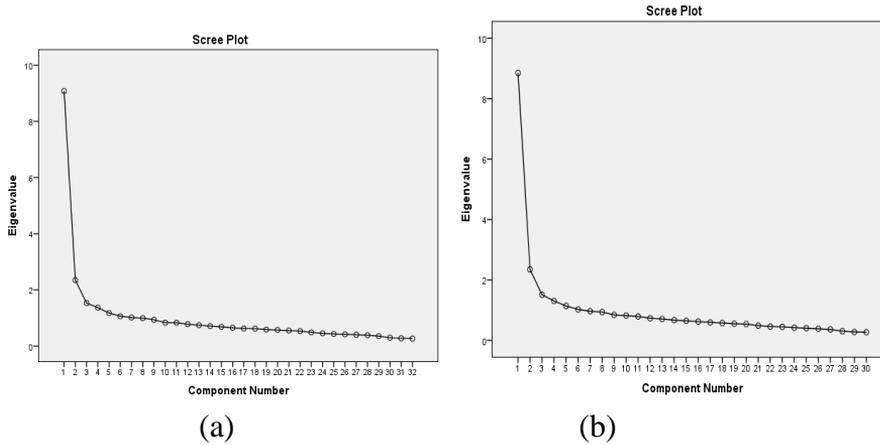
**Item analysis.** The item analysis was carried out for the 59 items of the SMI (One item was eliminated in the adjudication stage modification). The correlation-matrix (data not shown), contained 469 negative values leading us to excluded 27 items (Item no.06, 08, 09, 10, 12, 14, 15, 16, 18, 20, 21, 22, 23, 24, 30, 33, 37, 38, 40, 43, 45, 46, 50, 54, 58, 59, and 60). Thus, 32 items were retained for factor analysis. The inter-item correlations for these items (Table 1) indicate that, out of 496 inter-item correlation coefficients 441 (88.9%) were significant, the average inter-item coefficients being .24. All the item-total correlations were significant (100%) and ranged from .32 to .58 with a mean of .52.

**Exploratory factor analysis.** In order to examine whether data were suitable for factor analysis measures of sampling adequacy were carried out on the 32-item SMI. Inspection of the *R*-matrix revealed a good number of coefficients .30 and above (35.28%). The determinant of the *R*-matrix was .0000186 ( $>. 00001$ ; Field, 2005). This indicates that there is no multicollinearity (Very highly correlated variables) or singularity (Perfectly correlated variables) problem in the data. The KMO measure of sampling adequacy for these set of variables was .92 which falls in the range of being superb (.92  $>. 90$ ; Kaiser, 1970). Bartlett's test of sphericity indicated a  $\chi^2$  value of 5318.21 ( $p < .001$ ). All these together support the factorability of the *R*-matrix. Data for the 32-item SMI were

therefore subjected to EFA. Method of PC with varimax rotation was used. The initial analysis with Eigen value  $> 1.00$  (the Kaiser-Guttman criterion) extracted 7-factor solution, accounting for 54.94% of the total variance (Data not shown). However, an inspection of the scree plot indicates a clear break after the 3<sup>rd</sup> component (Figure 1a) leading us to retained 3 components.

Figure 1

*The Scree Plots Generated in EFA: (a) for 32 Items, and (b) for 30 Items.*



Considering Cattle's view, data were subjected to another EFA limiting the number of factors to 3 with all factor loadings  $< .40$  suppressed. The three-factor together accounted for 40.49% of the total variance (Data not shown), but the item no. 02 loaded at  $< .40$ . The low factor loading indicates that perhaps item no. 02 cannot measure of school motivation in Bangladeshi culture. After discarding this item data were further subjected to EFA with all factor loadings  $< .40$  suppressed limiting the number of factors to 3 (Figure 1a). A three-factor solution of the SMI was identified. Now, the variance explained by the factors increased from 40.49 to 41.36 (.87%), but item no. 01 showed loaded at  $< .40$ . Discarding item no. 01 the data were further run in EFA with all factor loadings  $< .40$  suppressed without specifying the number of factors. Once again, scree plot (Figure 1b) is similar but total variance further increased from 41.36% to 42.35% (.99%) which was deemed to be the most statistically and conceptually appropriate and more interpretable to the SMI. These three factors which were rotated to position of maximum orthogonality in 6 iterations explained together 42.35% of the total variance (Table 2).

Table 2  
*Rotated Factor Matrix for a Reduced Set of SMI Items (Item 01 and 02 Discarded)*

Item numbers	Factor loadings		
	F1	F2	F3
Item 05	.43		
Item 17	.46		
Item 25	.47		
Item 26	.65		
Item 27	.57	(.47)	
Item 28	.57	(.43)	
Item 29	.53		
Item 31	.48		
Item 34	.48		
Item 36	.58		
Item 44	.44		
Item 48	.60		
Item 49	.61		
Item 52	.59		
Item 53	.67		
Item55	.48		
Item 56	.74		
Item 03		.48	
Item 04		.45	
Item 07		.59	
Item 11		.74	
Item 13		.56	
Item 19		.59	
Item 51		.56	
Item 57		.52	
Item 32			.71
Item 35			.50
Item 39			.61
Item 41			.71
Item 42			.75
Eigenvalue	5.80	4.16	2.75
Variance explained	19.32	13.85	9.17
Cronbach's (standardized) $\alpha$	.90	.80	.72

*Note.*  $n = 500$ .

Factor loadings  $< .40$  were suppressed.

Items corresponding to the parenthesized loadings did not conceptually fit with the corresponding factors.

Extraction method: varimax with Kaiser normalization.

Rotation converged in 6 iterations.

Factor 1 accounts for 19.32% of the variance, Factor 2 accounts for 13.85% of the variance, and Factor 3 accounts for 9.17% of the variance. Before labelling the factors we identified two pairs of cross-loadings between the factors. Specifically, item 27 was cross-loaded on Factor 1 and Factor 2 with the loadings of .57 and .47 respectively; item 28 was cross-loaded on Factor 1 and Factor 2 with the loadings of .57 and .43 respectively. Both the items were grouped under Factor 1, the factor of their larger loading and best conceptual fit. Thus, Factor 1 comprises item no. 5, 17, 25, 26, 27, 28, 29, 31, 34, 36, 44, 48, 49, 52, 53, 55, and 56 which labeled as 'Commitment, Interest, and Enthusiasm'; Factor 2 comprise item no. 3, 4, 7, 11, 13, 19, 51, and 57 which we termed as 'Affiliation with Parents, and Peers'; and Factor 3 comprises item no. 32, 35, 39, 41, and 42 which we termed as 'Making Excuse and Blaming Others'.

**3.1.3 Confirmatory factor analysis of SMI.** The CFA in the present study revealed that the three-factor model identified for the SMI in EFA is an acceptable model fit to the data (Table 3).

Table 3

*Model Fit Indices Obtained in CFA for 30-item SMI*

	$\chi^2$	df	$\chi^2/df$	RMSEA	RMR	CFI	GFI
Unmodified fit indices	1034.29*	402	2.57	.06	.08	.86	.87
Modified fit indices	867.4*	398	2.18	.05	.07	.90	.89

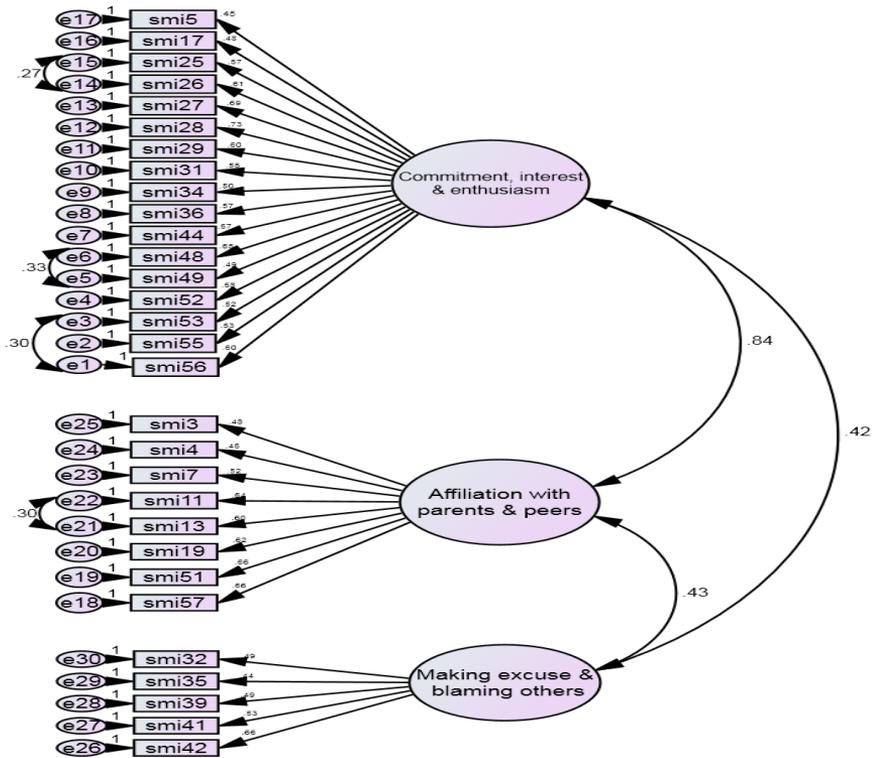
$n = 500$ . \*  $p < .05$ .

The above Table 3 indicates that the value of  $\chi^2$  was significant ( $p < .05$ ). The normalized  $\chi^2$  value is 2.57 ( $< 5$ ). The values of RMSEA and RMR fit well. However, the values of CFI and GFI (Unmodified) lie below the criterion values. So, MIs were examined which identified similar theoretical content between some of the items. Parameters with high MIs  $> 33$  have been noted as potential areas for structure misfit leading to poor fit the model. Four modification index values greater than 33 were identified which indicate four correlated measurement errors, one between items 11 and 13, one between items 25 and 26, one between item 48 and 49, and a fourth one between item 53 and 56. So, when the CFA was run allowing the items in each pair to covary the model was quite improved. The modified fit indices indicated an acceptable model

fit to the data [ $\chi^2(398) = 867.4$ , RMSEA = .05, RMR = .07; CFI = .90, GFI = .89]. The factor structure of the three-factor solution is given in Figure 2.

Figure 2

*Factor Structure of the Three-Factor Solution for the SMI (Standardized Parameter).*



*Note.* Items 11 and 13 were allowed to covary due to their similar content (happiness) and high modification indices. This was also done for items 25 and 26 (knowledge), items 48 and 49 (try to work), and item 53 and 56 (joyful) (Barke, Nyenhuis, & Kroner-Herwig, 2012; Lowe, Ang., & Loke, 2011; Walker, 2010).

The above figure displays standard parameters. As we see, factor loadings of the three factors varied from .45 to .73. Particularly good at assessing their latent variables were items which have the largest factor loadings. These are smi28 (.73) for the latent variable ‘Commitment, Interest, and Enthusiasm’, smi51 (.66) and smi57 (.66) for ‘Affiliation with Peers and Parents’, smi42 (.66) for ‘Making Excuse and Blaming Others’. The lowest factor loading was for smi4 (.45) and smi5 (.45) for the latent variable ‘Commitment, Interest, and Enthusiasm’ and

‘Affiliation with Peers and Parents’. Correlation between latent variables varied from .42 to .84. The lowest correlation ( $r = .42$ ) was found between ‘Commitment, Interest, and Enthusiasm’ and ‘Making Excuse and Blaming Others’. The highest correlation ( $r = .84$ ) was found between ‘Commitment, Interest, and Enthusiasm’ and ‘Affiliation with Peers and Parents’. The correlation indicates that these two latent variables are inseparable among the three-factor model of SMI.

### **Validity**

As reported by the judges the Bangla version SMI has good content and face validity (See the method section for details). Both the face and content validity ensured translation validity of the scale. The convergent validity of the Bangla version SMI was examined by correlating with ACERQ (Adaptive Cognitive Emotion Regulation) and EIS (Emotional Intelligence Scale). Results indicate that SMI has positive and significant correlation with above mentioned scales, such as between SMI and ACERQ ( $r = .39, p < .01$ ), between SMI and EIS ( $r = .39, p < .01$ ). On the other hand, the discriminant validity was checked by correlating between SMI and CHS (Children Hopelessness Scale), between SMI and HS (Hostility Scale). Results further indicate that the SMI has negative and significant correlation with CHS ( $r = -.45, p < .01$ ) and HS ( $r = -.23, p < .01$ ) which indicates that the scale has good discriminant validity.

### **Reliability**

The inter-item correlation matrix of the scale contained no negative values, indicating that the items were measuring the characteristics that the respective scale was supposed to measure. The reliability of the Bangla version of the scale was further examined by estimating internal consistency. The coefficient of the Cronbach’s  $\alpha$  was calculated. Cronbach’s  $\alpha$  (Unstandardized) for the Bangla version SMI was .91 for the 1<sup>st</sup> sample ( $n_1$ ), .91 for the 2<sup>nd</sup> sample ( $n_2$ ), and .91 for the combined sample.

### **Discussion**

The aim of this study was to culturally adapt SMI to Bangladesh, which was developed to determine the school motivation behaviour and the directions that affect the academic learning status of adolescent students. Analysis of the data in EFA identified a three -factor model for the SMI comprising 30 items (30 items dropped). Factor 1 (17 items) measures ‘Commitment, Interest, and Enthusiasm’ Factor 2 (8 items) measures ‘Affiliation with Parents and Peers’, and Factor 3 (5 items) measures ‘Making Excuse and Blaming Others’. These factors together

accounted for 42.35% of the total variance, their individual contributions ranging from 9.17% to 19.32% (Table 2). Among ten components of the original scale three components ('Affiliation with Peers', 'Interest and Enthusiasm in Activity', 'Warmth and Empathy from Parents') finally exist in the adapted scale with their partial items. The newly adapted scale has three components combining the above mentioned three components. The items of removed components exist partially under various new components in the adapted scale except 'Pressure and Excessive Demands from Adults' components which all items were retained in the adapted scale. Finally, 30 items out of 60 items of the original scale were sustained in the adapted scale. This massive difference regarding SMI among Bangladesh, India, and Hungarian may be due to diverse socio-cultural characteristics, cultural norms, socio-economic condition, social competition and unrest, individualism pattern of western countries and collectivistic pattern of Bangladesh, response style, religious norms, customs, thinking and attitudinal pattern, etc. This differences demand to further validation of the SMI in Bangladeshi culture rigorously.

So, the finding is inconsistent with the original scale which comprises ten factors (Entwistle & Kozeki, 1985; Roy & Biswas, 1997). Results of the CFA demonstrated acceptable model fit to the data [ $\chi^2(398) = 867.4$ , RMSEA = .05, RMR = .07, CFI = .90, GFI = .89] and also a factor solution which is consistent with the EFA factor solution. The factors of the Bangla version SMI shows good to high internal consistency (Cronbach's  $\alpha = .68$  to .89), the first factor being most reliable as indicated by its highest coefficient (Cronbach's  $\alpha = .89$ ). Experts (e.g., Cortina, 1993; Kline, 1999) reported that value below .70 can realistically be considered due to the diversity of the construct being measured in behavioral science. All the factors have significant correlation with the SMI ( $r = .30$  to .64). In order to examine the convergent and discriminant validity, inter-scale correlations were calculated. It was hypothesized that SMI should be positively correlated with EIS and ACERQ in order for its convergent validity, and negatively correlated with CHS and HS for its discriminant validity. As hypothesized, SMI has significantly positive correlations with EIS and ACERQ ( $r = .39$  to .39) and significantly negative correlations with CHS and HS ( $r = -.23$  to  $-.45$ ).

All this together indicate that the SMI has good convergent and discriminant validity. The internal consistency of Bangla version SMI is consistent with Indian Bangla (from .46 to .68 for India) version (Roy &

Biswas, 1997). Thus the adapted SMI can be considered as a valid and reliable instrument for measuring school motivation behavior of adolescent student in Bangladeshi culture. However, validation of SMI over the world is very limited. There are some other similar types of SMI which has good validation study over the world. For example, Academic Motivation Scale (AMS) for sports high school students (Haslofca & Korkmaz, 2016) which has good reliability coefficients (from .77 to .86) in Turkish language. Then MUSIC Model of Academic Motivation Inventory (Jones & Skaggs, 2016) has also good reliability coefficient (from .46 to .67).

### **Limitations and suggestions**

As with many other studies this study has some limitations. First, it was conducted on a small number of participants ( $n = 1000$ ) compared to the total population ( $N = 52,000$ ), and the sample was selected only from seven 'schools and colleges' as representative of one hundred and ninety eight educational institutions in DMC, but not covering the whole country. Second, the rating scales used in this study were self-reported. It was therefore possible that some adolescents might not give or disclose accurate information about their unexpected experiences though this study was completely anonymous. Third, the three factors identified in the present study explained only 42.35% of the total variance not the whole of the total variance. Though conventional practice as appeared in scientific papers indicates that if the factors together can explain 35% or more (e.g., Barke et al., 2012; Fichman, 1999) of the total variance then the results can be accepted. Fourth, this study was confined only to the eleventh grade adolescent students studying in DMC only.

Finally, half of the total items have been discarded through statistical analyses which is unexpected though review of the past studies indicate that this is not unusual. For example, there are some validation studies which excluded about 50% of the items of a scale based on item analysis and factor analysis (e. g., Yoon, Lee, & Goh, 2008). Moreover, it may happen especially for a big measure. Whether the retained items are representative and cover the measuring domain can be judged by the percentages of the total variance explained by the identified factors. Conventional practice as appeared in scientific papers indicates that if the factors together can explain 35% or more (e.g., Barke, Nyenhuis, & Kroner-Herwig, 2012) of the total variance then the results can be accepted. So, all the evidences support the item exclusion of the SMI. In future research if the above limitations turns into positive side, then,

some good things will come out and present weakness can be removed. Finally, in order to confirm the present findings further research should be carried out on participants covering a wide range of age groups taken from other representative parts of the country.

### **Implication**

The present research is the first to culturally adapt SMI in Bangladeshi culture. In the empirical vein, it adds new knowledge to the literature in behavioral sciences especially in psychometrics and psychology adapting SMI in Bangladeshi culture. In addition to this theoretical importance, the present findings, especially the inconsistent aspects of the findings, raise some further research questions about SMI in Bangladeshi culture. This psychometric contribution equips us for future research to the greater understanding of the SMI regarding adolescents' learning, achievement, adjustment and development.

In practical vein, the adapted SMI will help policy makers, counselors, psychologists (e.g., clinical, child), educationists, social workers, parents, care givers, government officials, mental health practitioners, NGOs and other officials, who are working with adolescent students, for measuring school motivation behavior of adolescents in the context of Bangladesh. The adapted SMI and results can help to identify the motivational behavioral aspect to school, teachers, learning, and authority of adolescents and how to motivate them to reduce their demotivated behavior towards the same. At the end, results of SMI may help teachers, parents, and administrators to improve school motivation behavior of adolescent students through proper planning.

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