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p-ISSN: 2663-3299

e-ISSN: 2663-3841

L-ISSN: 2663-3299

Vol. V, No. I (Winter 2020)

Page: 113 – 124

Validation of Self-Regulated Motivation Scale for Measuring English Oral Communication among Medical Students

Abstract:

The Self-regulated Motivation Scale (SRMS) has been widely used to measure students' motivation for learning in social sciences context. There is no evidence of its validation in the medical field. This study examined the scale's psychometric properties for measuring medical students' motivation for English oral communication in the Pakistani context. A total of 401 students participated in the study who responded to the 20 items scale. The scale was evaluated using the Exploratory and Confirmatory factor analysis approach. The hypothetical model was assessed based on Structural Equation Modeling (SEM) to determine the adequacy of the goodness of fit to the sampled data. The analysis confirmed that the hypothesized four-factor model of the SRMS had an excellent fit to the data. The findings of the study fully supported the multi-dimensionality of the scale. We conclude that SRMS is a valid and reliable scale for measuring medical students' motivation towards improved English oral communication.

Key Words:

Validation, Self-Regulated Motivation Scale, English Speaking, Medical Students

Introduction

Self-regulated learning is a learning approach in which individuals work in a team and become active agents in the learning process (Pintrich et al., 2000; Spruce & Bol, 2015). It is a complex and cyclical approach in which learners set goals for themselves and activate and sustain their behaviors (Zumbrunn et al., 2011). Self-directed learning allows learners to become motivated and behaviorally active participants in their learning process. During such a learning process, learners become self-efficacious and autonomous (Kistner et al., 2010). Students can organize and self-monitor and evaluate their learning. They can also select, adapt to, and manipulate the prevailing learning according to their own learning needs. This helps them enhance their learning as autonomous learners (Kizilcec et al., 2016; Zimmerman et al., 1996). There are different models of self-directed learning (SRL). Researchers have drawn attention towards an important point that self-directed learners can control and regulate their context. They develop their perceptions about the context and task (Lehmann et al., 2014). Self-regulated students can even monitor and change the learning tasks according to the conditions. This close interrelationship between studies, context, and self-regulated learning is considered to be essential principles of SRL (Winne, 2014). On the contrary, in English language learning environment, learners sometimes face situations where they are unable to describe these contexts because teachers fail to provide the necessary support which is essential to provide them opportunity for developing their English speaking competencies (Kim et al., 2015; Rose, 2011). In order to grapple

with the situation, it is important that language teachers must create sources which are helpful; for teaching the target language which is needed to become self-directed learners (Çelik et al., 2012; Mahmoodi et al., 2014). This is one of the challenges that language teachers and learners face in the context of the present medical study. This study aimed to validate the Self-Regulated Motivation Scale (SRMS) for measuring the self-

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regulated motivation direction that might help English language learners to improve their foreign language speaking skills. This will help improve knowledge of English language learners in the medical education

Measuring Self-Regulation

Many scales have been developed and used for measuring self-motivation of medical graduates' English speaking and their self-regulation (Winne & Perry, 2000; Xu et al., 2012). These scales included different questionnaires, interviews and even think-aloud protocol and so on. However, among all these scales, the SRMS has been widely used in different fields of studies for assessing students' self-regulated motivation towards language learning (Davis et al., 2002). Another important scale is the Learning and Study Strategies Inventory. This scale has been commonly used for measuring students' learning in various contexts. The scale measures students' motivation, schedule of study and selection of main ideas, self-test and learning strategies (Tseng et al., 2006). Studies have used the SRMS in the context of EFL classrooms. But the main focus of these studies has been assessing students' vocabulary in general education field. Another study used the same scale in Taiwanese context for assessing students' foreign language learning (Chang, 2005). Another study too focused on due to students' vocabulary assessment (Sperling et al., 2004). Hence, there are ample examples of using SRMS instrument in many fields for measuring students' language skills in general field of education. There is no evidence of evaluating learners' self-motivation or self-regulation of professional education such as medical field (Demiröden et al., 2016; Feri et al., 2016). They recommend evaluating the scale in the other fields of study. There is a clear paucity of its validation in the medical field of study which is very important due to its relation to human health and development and especially keeping in view the ever increasing role of medical practitioners. An increased attention is paid by researchers towards the self-regulated motivation of medical graduates' EFL learning skills. The present study, therefore, validates the SRMS in the context of medical education.

EFL and Medical Context

Greater attention is being paid towards the language skills enhancement of medical graduates due to its important position (Kaliyadan et al., 2015; Marton et al., 2015). Language skills development of medical students is considered to be a rewarding activity. Speaking is the most prominent communication skills. It is considered important for medical practitioners due to the multi-dimensional nature of the field (Winefield & Chur, Hansen, 2000). The most important objective of language learning is language communication. Studies have found that compared to other language skills, more emphasis is placed on speaking dimension in all fields of life. Although speaking is a complex skill, however, it is interactive in nature and is more important for medical graduates to successfully interact with diverse types of patients in the medical field (Marton et al., 2015). Hence, promotion of medical graduates' speaking skills is essential for this purpose, it is also necessary to improve their motivation towards EFL learning (Ung et al., 2016) and to improve their communication skills (Sarwar et al., 2014).

Many factors influence students' self-regulation and readiness for language learning (Cho & Kim, 2013). One such important factor their affective cognition and attitude as it relies on many psychological constructs such as motivation, anxiety and self-efficacy to speak (Dembo, 2013; English & Kitsantas, 2013). Teaching and learning speaking aspect of language is the most challenging aspect of language learning especially among the medical students who are preoccupied with technical aspects of their course. It becomes difficult to engage them in communication activity as most of the time they are busy in theory learning in close classroom environment or laboratories (Sandars & Cleary, 2011). There is a clear indication that language learning may be a challenging aspect for medical students during the formal education period (Artino Jr et al., 2011; Lajoie, 2008). Unfortunately, so far, little attention has been paid towards the important issue of developing English speaking skills of medical graduates as compared to arts and other social sciences. There is a need to explore the perceptions of medical graduates about the challenges of English language learning especially the

communication skill. For this purpose, this study aimed to find out which self-regulated motivational orientation might lead to improved speaking skills among medical graduates.

Aims of Study

- To examine the dimensions of SRMS by using EFA and CFA approaches
- To explore the validity and reliability of the scale
- To assess correlations among all dimensions of the scale.
- To evaluate relationships among all the dimensions on the scale.

Method

Participants and Procedure

The study was conducted using a survey design research design. The perceptions of 401 students were explored from medical colleges in Khyber Pakhtunkhwa province of Pakistan using SRMS in order to know about their motivation for speaking in English language. The total colleges were randomly selected out of 17 registered medical colleges. Then, 401 males students (n=280) and females (n=121) were conveniently selected from three oldest and reputable colleges. Among these students, 118 were from first professional year, 102 were from 3 professional year, 101 were from third professional year, 80 were from fourth professional year.

Measure

The SMRS consisting of 20 items was used for data collection for measuring motivation of students towards English speaking in the context of medical education. The respondents took 20 to 30 minutes to complete the questionnaires. The researchers personally administered the questionnaires to the respondents in their respective colleges on different days. Permission was sought both from the students and management of the colleges before going for collecting data. The students rated their responses about their motivation for speaking English on a SMRS having five point Likert scale ranging from strongly agree (5) to strongly disagree (1) with high score showing high level of motivation among the students.

Procedures

After getting approval from the colleges concerned, the researchers visited the colleges for data collection. The respondents were assured that their responses would be kept in confidentiality and would not be divulged without their permission. They were allowed not to respond as and when required. They were allowed to read the questionnaire many thoroughly and ask questions for clarification if any during filling out the questionnaires. The students could also abstain from answering any item which they thought to be necessary. The questionnaires were collected and checked for missing numbers through peer review. Finally, all data were uploaded on SPSS version 20 carefully for further analysis.

Analysis of Data

The responses of the medical students were coded and entered into SPSS version 20. Descriptive statistics such as mean and standard deviation were calculated on all items of the questionnaire. Principal component analysis was performed to identify the factor structure. The PCA is an exploratory technique. As a result, factors with eigenvalues more than 1.25 were retained on the scale (Hinkin, 1995). Factor coefficient for 0.40 or greater is needed to interpret the factor structure (Hair et al, 2010). A Cronbach's alpha of .70 is required as acceptable level for reliability coefficient for evaluating the internal consistency of a scale (Hinkin, 1995). Corrected-item total correlation was performed for identifying items which were problematic and needed revision and removal from the scale if found. We also performed Pearson's correlation coefficient for investigating the association between the dimensions of the scale. For further evaluating the relationships

between structural paths and latent variables, Structural Equation Modeling (SEM) was performed using AMOS 18. The SEM is a confirmatory technique unlike PCA. The major data analysis was conducted in two main stages. First of all, exploratory factor analysis was performed to identify the factor structure. Second, CFA was performed for testing the identified hypothetical model. The parameters of the hypothetical model were assessed based on AMOS 18. Five different goodness-of-fit indices were checked for assessing the fit of the model based on the total sample and gender. The indices included: (χ^2/df), (GFI), (AGFI), (CFI), (TLI) and (RMSEA).

Results

We applied the Principle Component Analysis (PCA) based on EFA approach to identify the dimensions. It is a dimension reduction technique used to identify the underlying factors in the data. The Kaiser-Meyer-Olkin (KMO) was conducted for examining the sample adequacy and Bartlett's Test of Sphericity to assess the suitability of the data for factor analysis.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.911
Approx. Chi-Square		1610.553
Bartlett's Test of Sphericity	df	190
	Sig.	.000

Table 1 shows enough evidence for KMO .91 and Bartlett's Test of Sphericity at 0.000 confirming the suitability to do EFA.

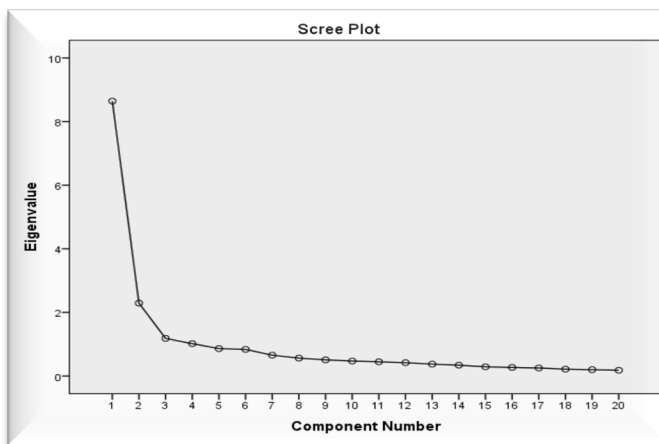


Table 2. Total Variance Explained

Eigenvalue			Rotation Sum of Squared Loading		
Total	Percentage of variance	Cumulating percentage	Total	Percentage of Variance	Cumulating percentage
8.643	43.217	43.217	4.623	23.113	23.113
2.290	11.448	54.665	4.511	22.556	45.668
1.183	5.916	60.581	2.709	13.547	59.216
1.017	5.083	65.664	1.290	6.448	65.664
.861	4.305	69.969			
.836	4.182	74.151			
.654	3.269	77.420			

.562	2.809	80.229
.507	2.534	82.763
.471	2.353	85.116
.446	2.232	87.348
.418	2.088	89.436
.373	1.864	91.300
.339	1.697	92.998
.289	1.443	94.441
.268	1.340	95.780
.252	1.260	97.040
.214	1.071	98.111
.199	.993	99.105
.179	.895	100.000

Table 2 shows the factor structure using PCA method. The application of PCA approach produced a four-factor model collectively accounting for 65.66% of the variance. The first factor accounts for 23.11% of the conflict. This factor, named ‘regulation of affect,’ is explained by five items on the scale. The second factor, called ‘task value activation,’ accounted for 22.55% of the variance. This factor is explained by 6 items on the scale. The third factor, named ‘regulation of learning environment,’ accounted for 13.54% of the variance. Five items on the scale define this factor. The fourth factor, called ‘regulation of peers’ accounted for 6.44% of the variance. Four items on the scale explain this factor. Table 3 denotes the factor loadings, communalities (h²) mean, and SD for every item in the SRMS. Computing Pearson’s correlation coefficients investigated the inter-relationships between the factors. The correlation among all the four factors is given in Table 4. All the correlation coefficients are significant and have positive correlations with each other.

Table 3. Factor loadings, (h²), Means and Standard Deviation for each Item in the SRMS

Item #	Factor 1	Factor 2	Factor 3	Factor 4	h ²	Mean	SD
1	.747				.693	2.35	.972
2	.779				.717	2.55	1.058
3	.621				.648	2.39	.977
4	.790				.696	2.99	1.228
5	.720				.688	2.30	.941
6		.806			.536	3.69	.927
7		.777			.766	3.78	.972
8		.397			.655	2.40	1.121
9		.727			.669	2.55	1.079
10		.499			.579	3.33	1.052
11		.675			.687	2.40	.978
12			.597		.612	2.44	.966
13			.623		.744	2.33	.983
14			.653		.684	2.13	.864
15			.440		.720	3.77	.995
16			.374		.654	2.74	1.040
17				.696	.641	2.43	1.009
18				.855	.539	2.45	.937
19				.740	.573	2.30	.892
20				.350	.634	2.72	1.136

*The factors are: F1 (regulation of affect), F2 (task value activation), F3 (regulation of learning environment), and F4 (regulation of peers).

Table 4. Correlations Matrix of Self-Regulated Motivation Scale (SRMS)

	RA	TVA	RLE	RP
RA	1	.264**	.632**	.710**
TVA	.264**	1	.516**	.290**
RLE	.632**	.516**	1	.664**
RP	.710**	.290**	.664**	1

** Correlation is significant at the 0.01 level (2-tailed). * The factors are: RA (regulation of effect), TVA (task value activation), RLE (regulation of learning environment and RP (regulation of peers)

CFA Process

For testing the four hypothesized model, we conducted CFA based on variance covariance matrix in AMOS 18. We estimated the parameters of the model by path analysis using the maximum likelihood procedure (Hair et al, 2010). After identifying the four factor model, we assessed the model fit by using five different model fit indices. The final order measurement model is shown in Figure 2.

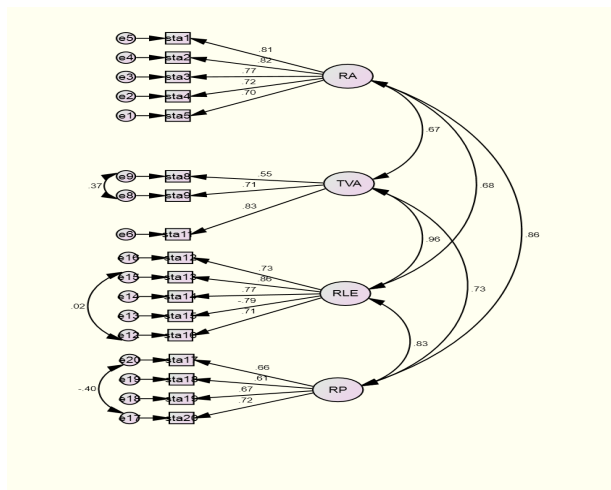


Figure 2. Model of Factorial Structure for SRMS

During the model fit analysis, items 6, 7, and 10 were excluded from the final proposed model (Figure 2) due to non-significant factor loadings of these items on the related factors in the measurement model. The final model was left with 17 items for measuring the underlying constructs of the scale. As shown above (Figure 2), the final model was separately tested for each data sample based on gender. As a result of measuring the

hypothesized model, we found that the SRMS was a multidimensional construct having four dimensions: regulation of effect, task value activation, regulation of learning environment, and restriction of peers as independent factors on the scale. Table 5 shows that the χ^2 value is significant at ($p=0.000$) that did not reveal goodness of fit. However, psychometric studies have indicated that p -value can be become significant if their sample size is small (reference). To get rid of this situation, psychometric research has recommended employing the ratio of chi-square to the degree of freedom as a superior index to assess a good model fit. In this study, the ratio of ≤ 2 shows the superior goodness of fit between the sampled data and the four-factor model (Hair et al., 2010), as indicated in Table 5. Due to the sensitive nature of the chi-square in relation to sample size, different other indices are suggested for assessing the sufficiency for getting model fit. Review of the values in all the indices provided evidence that the four-factor model represented an excellent fit to the sample data

Table 5. Goodness of Fit

	Fitness Indices	Achieved Fit Value
Fit Statistic	Chi-square (χ^2)	244.217
	DF	110
	CMIN/DF	2.220
	GFI	.929
	RMR	.042
	RMSEA	.240
	NFI	.840
	TLI	.880
	CFI	.093
	AGFI	.911

Table 5 shows that all the fit statistics as evidence for the goodness of fit were at acceptable level

Table 6. Validity Evidences for SRMS

Dimensions	CR	AVE	RLE	RA	TVA	RP
Regulation of learning environment (RLE)	0.725	0.600	0.935			
Regulation of effect (RA)	0.876	0.587	0.683	0.786		
Task value activation (TVA)	0.743	0.598	0.961	0.675	0.945	
Regulation of peers (RP)	0.763	0.547	0.825	0.862	0.731	0.768

Table 6 provides enough evidence for discriminant and convergent validity of the model based on the analysis of the data as all the values are within acceptable level.

Inter-Dimensional Relationship

We also tested the relationship among the dimensions of the scale separately using Sequential Equation Modeling (SEM). We analyzed the strength and direction of relationship between the dimensions one by one. The SEM was used as an advanced statistical technique to examine the complex relationship among the dimensions of the scale (Hair et al., 2010). In psychometric research, SEM is used as a confirmatory approach to analyse hypothesis, structural theory or a phenomenon (Byrne, 2001). In this study, we used SEM to test the relationship among the dimensions of SRMS. Figure 3 indicates the strength and direction of relationship between the first dimensions: regulation of affect (RA) with regulation of learning environment (RLE), task value activation (TVA) and regulation of peers (RP) on the scale.

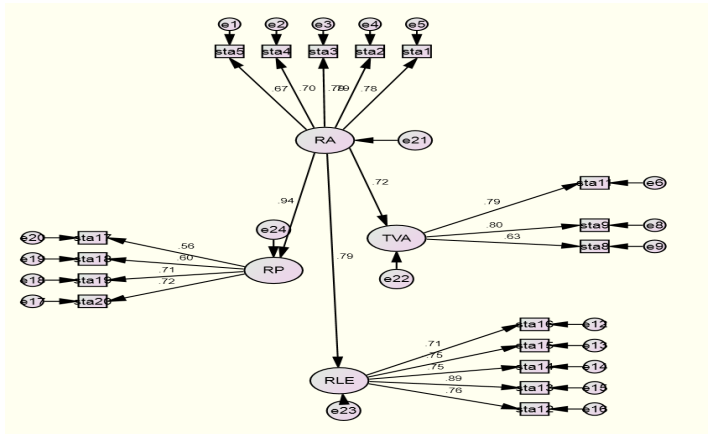


Figure 3: Structural Model 1

Table 7. Structural Model 1

			Estimate	S.E.	C.R.	P	Label
RP	<---	RA	1.221	.169	7.228	***	
TVA	<---	RA	.881	.140	6.307	***	
RLE	<---	RA	.928	.141	6.573	***	

Table 7 shows that RA has significantly strong positive relationship with RLE, TVA and RP. The path coefficient values range from .920 to 1.221 and critical ratio ranges from 6.573 to 7.228 with p-value significant at 0.000.

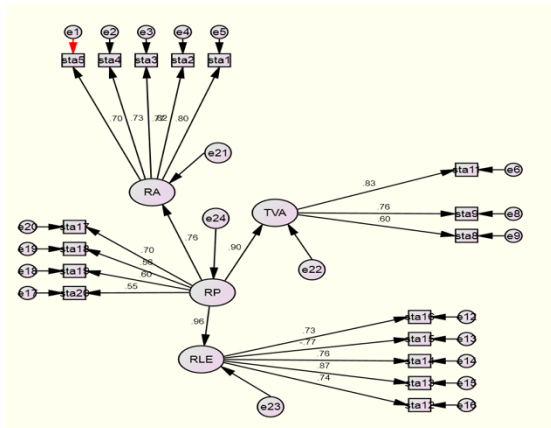


Figure 4: Structural Model 2

Table 8. Structural Model 2

			Estimate	S.E.	C.R.	P	Label
TVA	<---	RP	1.152	.180	6.405	***	
RLE	<---	RP	1.153	.187	6.181	***	
RA	<---	RP	.799	.145	5.517	***	

Table 8 shows that RP has significantly strong positive relationship with TVA, RLE and RA. The path coefficient values range from .799 to 1.153 and critical ratio ranges from 5.517 to 6.181 with p-value significant at 0.000.

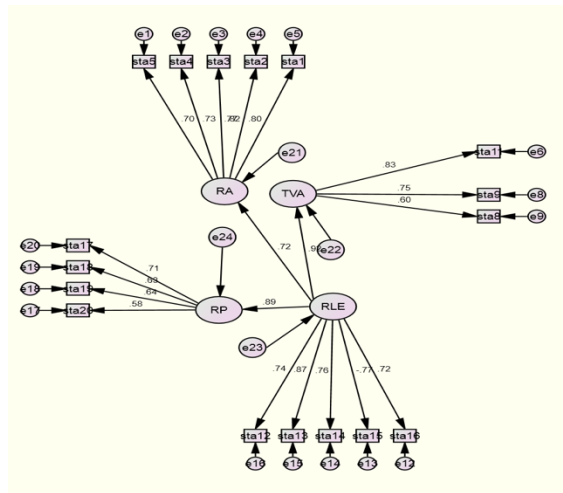


Figure 5: Structural Model 3

Table 9. Structural Model 3

			Estimate	S.E.	C.R.	P	Label
RP	<---	RLE	.781	.129	6.043	***	
TVA	<---	RLE	.992	.114	8.736	***	
RA	<---	RLE	.639	.099	6.476	***	

Table 9 shows that RLE has significantly strong positive relationship with RP, TVA and RA. The path coefficient values range from .639 to .992 and critical ratio ranges from 6.043 to 8.736 with p-value significant at 0.000.

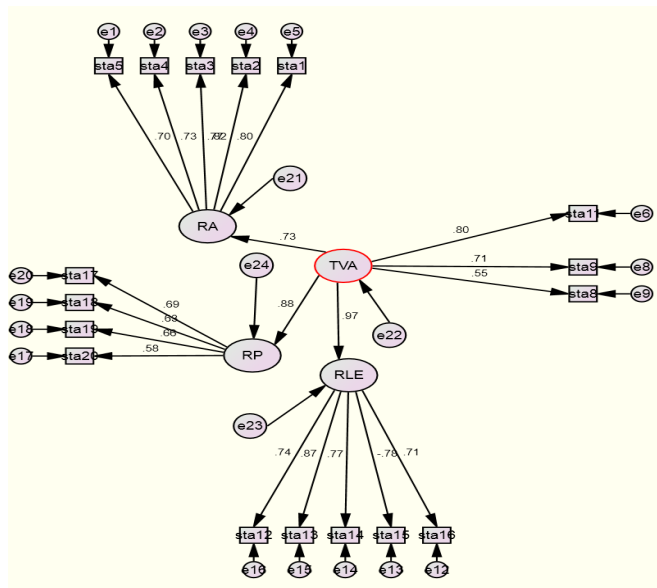


Figure 6: Structural Model 4

Table 10. Structural Model 4

			Estimate	S.E.	C.R.	P	Label
RA	<---	TVA	.611	.088	6.914	***	
RP	<---	TVA	.742	.116	6.382	***	
RLE	<---	TVA	.916	.105	8.691	***	

Table 10 shows that TVA has significantly strong positive relationship with RA, RP and RLE. The path coefficient values range from .611 to .916 and critical ratio ranges from 6.382 to 8.691 with p-value significant at 0.000.

Discussion

This paper reports on the validation of SRMS in Pakistani medical field related to its importance for improving English language communication among medical students. Former studies have examined the factor structure of the scale mostly by EFA approach. Little studies have evaluated the factor structure of the instrument by using CFA in the field of medicine in Pakistan based on SEM analysis and specifying the relationships among the dimensions of variables of the scale.

On the basis of the collected data, we assessed the four-factor structure using Varimax rotation. In order to evaluate the psychometric properties of the SRMS, to specify the four-factor model, to identify the mode, to assess the model fit, we used CFA approach. We also used the fit indices to check the goodness of fit of the model to the data. The model was well identified as each factor of the model had enough items more than three, which is required for model identification.

Through assessing the model, we found that the new structural model of SRMS fits based on gender in the medical field. Based on the analysis, we can conclude that SRMS is a 17 items reliable and valid measure for assessing the attitudes of students in the medical field. The findings of the present study provide good support that medical educators can use this scale for assessing medical students' attitudes on their motivation towards English communication. This study could not provide examples for literature on its application in the medical context related to students' English language. Little is known on the validation of the use of EFA or CFA approaches and SEM in the context of Pakistan. Further studies are recommended for validation of the SRMS in other contexts.

Conclusions

Results of the present research provide evidence for SRMS being a reliable and psychometrically sound scale for measuring medical students' motivation for communication in English. The study further concludes that the four-factor model is a valuable model having four dimensions relate to motivation for speaking in the English language. The model provides direction to increase English speaking among students of the medical field. We further recommend that researchers of medical education in Pakistan and outside may test the model based on their own data.

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