Determining the Reliability of the
Reading Motivation Questionnaire in China

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Abstract—RMQ-EFL (reading motivation questionnaire in an English as a foreign language context) was developed to explore the motivation of secondary language learners in China. This study tends to extend the samples to college learners and to determine whether they are still valid. Using the Chinese RMQ-EFL version, this study analyzed 627 data collected from two vocational colleges. After factor analysis tests in SPSS and Amos, however, a five-factor model was achieved, which was not the same as the original models done by Wang and Gan (2021). Although the various indexes made the model acceptable, the study's limitations called for further studies to generalize the RMQ-EFL.

Keywords—reading motivation, RMQ, reliability, vocational college students

I. INTRODUCTION

Reading ability plays a crucial role in both L1 and L2 learning processes, which is agreed upon by various researchers (Kung, 2019; Lustyantie & Kasan, 2021; van der Elst-Koeimanet et al., 2022). In L2 learning, reading helps learners understand the meaning of the texts and learn about the target culture (Namaziandost et al., 2022). Due to its importance, studies tend to explore the factors influencing reading comprehension.

Researchers examined various variables that may have an impact on reading comprehension. Some studies focused on linguistic factors, such as vocabulary and syntactic knowledge (Laufer & Aviad-Levitzky, 2017; Shiotsu & Weir, 2007), and some on cognitive skills (Bosma & Pablos, 2020; Russak & Zaretsky, 2021). There are also recent studies cultivating the impact of individual differences like working memory (Huang et al., 2022; Innami et al., 2021) and various reading strategies (Fathi & Shirazizadeh, 2020; Yapp et al., 2021). Among various factors, motivation plays a core role in language learning (Mahmoodi & Yousefi, 2021).

II. LITERATURE REVIEW

Researchers tend to cultivate various instruments to explore the motivation constructs and verify them in the language learning processes. Wigfield and Guthrie (1997) developed the motivation for the reading questionnaire (MRQ), which included self-efficacy, intrinsic-extrinsic motivation and social motivation. Eleven sub-constructs further evaluated these constructs. There was an abbreviated version of MRQ called the perception of reading motivation questionnaire (PRMQ), which included perceived autonomy, self-efficacy, challenge and knowledge goals (Davis et al., 2018).

At the very beginning, the questionnaire was used to understand the reading motivation of L1 readers (Wang & Gan, 2021), but the scope was widened to the L2 readers. Mori (2002) redefined the reading motivation questionnaire based on MRQ. The motivation was subdivided into four English reading constructs: intrinsic value, attainment value, extrinsic utility value, and expectancy for success. Maghsoudi et al. (2021) figured out the effects of reading motivation dimensions on reading comprehension in the Iranian context. Similarly, Huang and Reynolds (2022) used the MRQ to study the reading motivation of EFL learners in China and found the factors that may impact college students' reading motivation. Due to the fast development of technology, e-learning is becoming more popular in education. There was a tendency to explore motivation in a technology-based language learning context. By adopting the MRQ, Patra et al. (2022) investigated the effects of online learning on EFL learners' reading comprehension and motivation. The study explored seven dimensions of motivation: reading for grades, reading efficacy, reading curiosity, reading involvement, the importance of reading, recognition for reading, and reading challenge. The results confirmed the positive impact of e-learning on reading comprehension and motivation.

China, owning the largest number of population, has the most English learners all over the world. Here, students learn English from primary school to college. It is important to understand their reading motivation (Zheng et al., 2019). To explore the reading motivation of Chinese secondary

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students, Wang and Gan (2021) developed a reading motivation questionnaire in English as a foreign language (RMQ-EFL). Thirty-on four-point Likert scales out of the initial 43 items were kept after the face and content validity and focus group interview, which were further grouped into seven dimensions (i.e., reading efficacy, curiosity, involvement, preference for reading challenge, recognition, compliance, and grades). Samples were randomly selected for exploratory factor analysis (EFA; n=139) and confirmatory factor analysis (CFA; n=139) using SPSS 24.0. By doing EFA, 25 items (Table 2) were retained and divided into 5 dimensions, which were (1) Reading efficacy (REF, 7 items, Cronbach's α= .898); (2) Reading enjoyment (REN, 7 items, Cronbach's α= .889); (3) Recognition (REC, 4 items, Cronbach's α= .823); (4) Involvement (INV, 4 items, Cronbach's α= .824), and (5) Compliance (COM, 3 items, Cronbach's α= .736). These five constructs could explain 66.09% of the total variance. Table 1 shows the descriptive statistics and significant relations in EFA. Table 2 shows the 25 items confirmed.

Table 1: Means, SDs, and correlations Factors

Factors	M	SD	1	2	3	4	5
F1 REF	2.40	0.49	1.000				
F2 REN	2.73	0.76	0.633***	1.000			
F3 REC	2.80	0.72	0.498***	0.493***	1.000		
F4 INV	2.90	0.69	0.564***	0.662***	0.521***	1.000	
F5 COM	2.74	0.67	0.263***	0.256***	0.337***	0.384***	1.000

Note. SD= standard deviation   ***p < .001

From "Development and validation of the reading motivation questionnaire in an English as a foreign language context" by Wang and Gan (2021).

According to the results of CFA, three items were removed due to the strong error covariance. At last, a 5-factor model with 22 items was established. The researchers also tested the concurrent validity of the reading strategies and correlations with reading achievement. The tests also showed that gender and grades were not significant in the results of RMQ-EFL.

The study of Wang and Gan (2021) filled the gap of exploring reading motivation in China's context, where English was studied as a foreign language. It is valuable for teachers and instructors to understand learners' learning processes and conduct more efficient instruction. However, the limitations still existed in this study. According to Wang and Gan (2021), the sample size was insufficient to generalize the results. Also, the participants were only students in grades 10-11. However, college students account for many English learners in China. As English has become a medium of global communication, it is compulsory for vocational college students to learn English because English can enable them to perform better in work or further study (Singkum & Chinwonno, 2021). The studies of college learners' reading

motivation are still lacking. The present study aims to determine the usability of RMQ-EFL in college-level Chinese learners. The version with 25 items will be used as the original questionnaire pool. The questionnaire will be a four-point scale from " very different from me" to " a lot like me," which is consistent with the study by Wang and Gan (2021) and Wigfieldand Guthrie (1997).

III. METHOD

A. Content Validation of the Questionnaire

There are six steps in adapting and validating the content of RMQ-EFL, namely the forward translation of the RMQ-EFL instrument, a consensus of the translations, back-translation, analysis by an expert committee, pretesting and then the presentation of the cross-cultural adaptation process to the developers. The process is illustrated in the flowing chart in Figure 1.
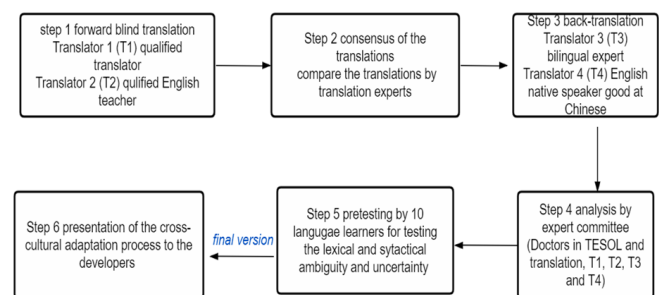

Figure.1: The Process of Content Validation

B. Data Collection

The questionnaire was delivered to students in two vocational colleges in Shanxi Province in China. The first part of the questionnaire was demographic content and the translated version of RMQ-EFL was the second. The questionnaires were delivered to English teachers and they would ask students to finish the questionnaires during the classes. After a week of data collection, 627 copies were fully answered and collected. The data were randomly divided into two sets for doing EFA (n=319) and CFA (n=308).

IV. RESULTS

A. Exploratory Factor Analysis

Statistical Package for Social Science (SPSS) 26.0 was used to analyze the collected data. The histograms of the data were normally distributed. However, the item analysis showed that item Q3 was not suitable to be included and was deleted. Twenty-four items were left for doing exploratory factor analysis (EFA). Table 2 shows the results of KMO and Bartlett's Test, which supported a further study of EFA. The rotated components matrix, as illustrated in table 3 and the five factors explained 70.621 variances. Figure 2 shows the five-factor models with 24 items, slightly different from the original version of Wang and Gan (2021). However, the five factors were named according to the RMQ-EFL (Table 3), reading enjoyment (REN, factor 1), reading efficacy (REF, factor 2), involvement (INV, factor 3), recognition (REC, factor 4) and compliance (COM, factor 5).

0.7. Also, all the AVE exceeded 0.5, which meant that the model had a convergent validity. Moreover, in table 6, the square roots of AVE were bigger than the Person correlation, demonstrating the discriminant validity of the model (Fornell & Larcker, 1981).

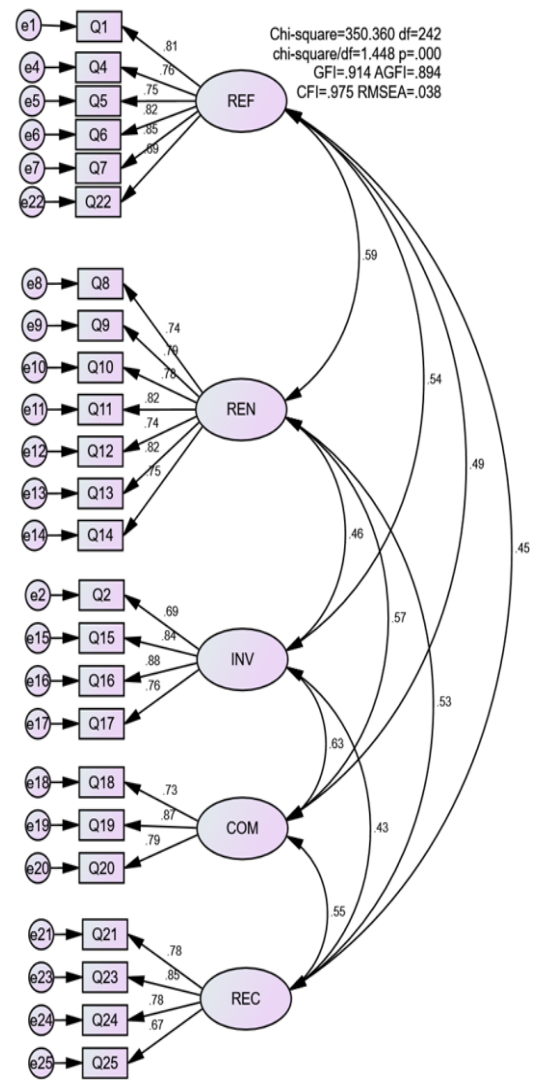Table 2: Results of KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.933
Bartlett's Test of Sphericity	Approx. Chi-Square	4745.865
	df	276
	Sig.	.000

Table 3: Rotated Component Matrix

constructs	items	Rescaled Component				
		1	*2*	*3*	*4*	*5*
REN	Q9	.757				
	Q8	.754				
	Q12	.748				
	Q13	.747				
	Q11	.731				
	Q10	.708				
	Q14	.691				
REF	Q6		.809			
	Q5		.804			
	Q4		.769			
	Q1		.749			
	Q7		.745			
	Q22		.675			
INV	Q16			.892		
	Q15			.824		
	Q17			.823		
	Q2			.779		
REC	Q23				.812	
	Q24				.803	
	Q21				.748	
	Q25				.670	
COM	Q20					.817
	Q19					.802
	Q18					.761

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

B. Confirmatory Factor Analysis k

a)   After the dimension reduction, the confirmatory factor analysis was conducted in Amos 24. Figure 2 shows the standardized estimation model. In the model testing process, p =.000<0.05 was significant, indicating an unconformity between the sample data and the model. It cannot be concluded as a close model (Kenny, 2011). The reason may be due to the big sample data (Zhang et al., 2020). However, as shown in Table 4, most of the indexes supported an acceptable model (CMIN/DF=1.448, GFI=.914, AGFI=.894, RMSEA=.038, SRMR=.041, IFI=.975, CFI=.975) (Jackson et al., 2009).

b)   The composite reliability (shown in Table 5) for the five constructs are .904, .914, .872, .842 and .853, exceeding

c)

Fig.2. The Standardized Estimation Model

Table 4: CFA Model Fitting Index

CMIN	350.360
DF	242.000
CMIN/DF	1.448
P	.000
GFI	.914
AGFI	.894
IFI	.975
TLI	.972
CFI	.975
RMSEA	.038
SRMR	.041

Table 5: CFA Parameters Estimation Results

	item	UFL	S.E.	t value	P	SFL	SMC	CR	AVE
REF	Q1	1.000				.810	.656	.904	.612
	Q4	.917	.062	14.713	***	.760	.578		
	Q5	.897	.062	14.453	***	.750	.563		
	Q6	1.003	.062	16.165	***	.816	.665		
	Q7	1.056	.061	17.213	***	.854	.730		
	Q22	.800	.061	13.058	***	.693	.480		
REN	Q8	1.000				.737	.543	.914	.604
	Q9	1.085	.079	13.762	***	.786	.618		
	Q10	1.056	.078	13.596	***	.777	.604		
	Q11	1.069	.074	14.430	***	.822	.675		
	Q12	.989	.076	12.980	***	.744	.554		
	Q13	1.135	.079	14.321	***	.816	.665		
	Q14	.950	.072	13.104	***	.751	.564		
INV	Q2	1.000				.691	.477	.872	.633
	Q15	1.261	.096	13.170	***	.838	.703		
	Q16	1.297	.095	13.668	***	.883	.780		
	Q17	1.121	.093	12.052	***	.757	.573		
COM	Q18	1.000				.732	.536	.842	.642
	Q19	1.297	.093	13.901	***	.871	.758		
	Q20	1.164	.089	13.071	***	.794	.631		
REC	Q21	1.000				.775	.601	.853	.595
	Q23	1.076	.073	14.809	***	.850	.722		
	Q24	1.017	.074	13.662	***	.778	.606		
	Q25	.871	.075	11.590	***	.670	.449		

Note. UFL=unstandardized factor loading
SFL=standardized factor loading
CR=composite reliability

Table 6: Discriminant Validity

	AVE	REF	REN	INV	COM	REC
REF	.612	**.782**				
REN	.604	.528	**.777**			
INV	.633	.504	.416	**.796**		
COM	.642	.433	.486	.535	**.801**	
REC	.595	.404	.482	.385	.456	**.771**

Note. The square root of AVE is in bold on diagonals. Off diagonals are Pearson correlation of constructs.

C. Gender Difference

All the 627 data were used to do the independent-samples t-test with 307 males and 327 females. The results in table 7 showed that REF, REN, INV and COM were not significant in gender, which meant that there was no significant difference between genders. However, the p-value of REC=049, was slightly under the significant value.

Table 7: The Independent Sample t-test in Gender

	Sig. (2-tailed)	MD	Std. Error Difference	95% Confidence Interval of the Difference	
				Lower	*Upper*
REF	.073	-.103	.057	-.215	.010
REN	.112	-.085	.053	-.190	.020
INV	.562	-.033	.057	-.144	.078
COM	.194	-.080	.062	-.201	.041
REC	.049	-.111	.056	-.221	-.001

Note. MD= mean difference

II. CONCLUSIONS AND LIMITATIONS

This study determines the validity of RMQ-EFL developed by Wang and Gan (2021) in vocational college students in China. The EFA was first conducted and a five-factor model version was achieved, which was not precisely identical to the results of Wang and Gan (2021). The five factors were still named after RMQ-EFL. The parameters of CFA estimation results also indicated that the model had a suitable fit, composite reliability, convergent validity and discriminant validity. Therefore, the results of CFA in AMOS demonstrated that this model was acceptable with the most satisfactory indexes. The independent-sample t-test was done and the differences did not reach a significant level to identify whether there were significant differences between males and females.

However, this study was not without limitations. Firstly, due to the convenient sampling in two schools, the number of samples was too small to represent the whole population of vocational college students in China. Secondly, this questionnaire was based on the 25 items of EFA achieved by Wang and Gan (2021) rather than the very original pool of questions, forming a weak point of this study. Furthermore, although a five-factor model was achieved, it was different

from the original version of RMQ-EFL by Wang and Gan (2021). Though most of the parameters were acceptable, the model was still not a close one due to the significance of the p value. Last but not least, in the t-test to identify the gender differences, the dimension of REC was insufficient to reject the differences. Therefore, the results of this study were not valid to be generalized and further studies with different groups of learners and in various contexts are required.

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