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Psychometric Properties of the Chinese Rosenberg Self-esteem Scale-Revised Among High-School Students

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This study aimed to compare the psychometric properties of two revised Chinese versions of the RSES (RSES-F and RSES-T) for high-school students using the Rasch model. The 11-item RSES which consisted of two revised items of the original Item 8 and nine items in original version and the RSES-T were administrated to 1,500 high-school students. The rating scale model was used to investigate psychometric properties of the two scales, including unidimensionality and measurement precision. When the word "wish" was revised to "do not think" (RSES-T) and "do not feel" (RSES-F), the infit and outfit MNSQ indexes of the former were closer to the ideal value of one. Comparing to RSES-F, RSES-T had better indexes of measurement precision. It was found that both RSES-F and RSES-T fitted the Rasch model for high-school students. Each index of the RSES-T was superior to that of the RSES-F, and the word "wish" was better revised to "do not think".

Keywords: Rasch analysis, Chinese Rosenberg Self-esteem Scale-Revised, psychometric properties

Introduction

Self-esteem is an individual's overall evaluation of one's own value, usefulness, and importance from an emotional perspective (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). The Rosenberg Self-Esteem Scale (RSES), developed by Rosenberg, has been used to measure adolescents' global perceptions of their self-worth and self-acceptance and it is so widely used around the world that many countries have their own versions of RSES.

However, some studies in China showed that due to cultural differences, some items, such as Item 8, did not have good psychometric properties (Gao & Zhang, 2018). Considering this problem, Tian (2006) suggested that the Item 8 should be deleted or not be reverse-coded. Considering the above analyses, this study would revise the Chinese RSES version from two aspects. The statement of Item 8 was one aspect worth considering. The Rosenberg Self-Esteem Scale was written in English and the Item 8 was usually difficult for the people whose mother tongue was not English to understand. The main reason was that the use of "wish" in the subjunctive mood tended to express a negative meaning, which made Chinese people hardly know its true meaning. Therefore, a solution to the problem was a negative meaning conversion of the word "wish", which could ensure the integrity of the RSES without changing the original meaning or the way of scoring.

According to the above-mentioned analyses, the present study tended to revise the word "wish" to "don't think" or "don't feel". We tested their psychometric properties.

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Methods

Participants

In current study, the subjects were recruited from one province in China. The study consisted of two parts: An 11-item RSES (two revised items of Item 8 together with the other nine items) was administered to 1,400 high-school students. 1,288 questionnaires were valid and used to explore the psychometric properties of the two RSES revisions (RSES-T and RSES-F).

Instrument

The Rosenberg's Self-Esteem Scale consisted of 10 items and response categories are based on a four-point Likert type scale ranging from one (strongly disagree) to four (strongly agree). A higher score indicates a higher level of self-esteem (Ji & Yu, 1999). This study only revised the Item 8 in the original Chinese version and the word "wish" in Item 8 was revised to "don't think" or "don't feel". The two revisions together with the other nine items made up an 11-item RSES scale, which was administered to the high-school students. The Item 8 that the word "wish" was replaced by "don't think" was put in the bottom third and the other revised item was put in the third place in the original item sequence, which excluded position and sequence effects. In the data analysis, the two revised items were both placed in the bottom third respectively so as to have a comparison. In the current study, the 10-item scale that the word "wish" in the Item 8 was instead of "don't think" was named RSES-T, and the other 10-item scale was named RSES-F, which the word "wish" in the Item 8 was replaced by "don't feel".

Analytic Strategy

In this study, the Rating Scale Model (RSM) in Rasch model was used to conduct the statistical analyses. Epi Data 3.1 was used in the data entry and format conversion and descriptive statistics were analyzed by STATA/MP 13.1. Winstep 3.74 was used to perform the RSM analysis, including unidimensionality, infit and outfit MNSQ indexes.

Results

Overall Performance of the RSES-F in High-School Students

The ratio of the first largest eigenvalue to the second largest eigenvalue of PCAR of RSES-F was 2.1/1.4 = 1.5, which was in the range of 1.4 to 2.1. Moreover, the second largest eigenvalue was 1.4, which was below the unidimensional threshold value 2.0. Furthermore, infit or outfit MNSQ values of the items all ranged from 0.7 to 1.3 (see Table 1). In addition, all point measure correlation coefficients were above the set value 0.3. All the above analyses indicated that the structure of RSES-F was unidimensional. The items reliability, ISR, person reliability, and PSR were 0.99 (> 0.8), 9.98 (> 6), 0.83 (> 0.8), and 2.18 (> 0.8), respectively (see Table 2).

Table 1

The Item Fit Statistics and Point-Measurement Correlations

Item	RSES-F			RSES-T		
	Infit MNSQ	Outfit MNSQ	PT. Corr.	Infit MNSQ	Outfit MNSQ	PT. Corr.
SES01	0.91	0.90	0.64	0.92	0.92	0.64
SES02	1.24	1.26	0.56	1.25	1.27	0.56
SES03	1.05	1.04	0.69	1.07	1.06	0.69
SES04	0.82	0.86	0.63	0.83	0.87	0.64
SES05	1.03	1.05	0.64	1.07	1.09	0.63

Table 1 to be continued

SES06	0.85	0.85	0.68	0.85	0.84	0.69
SES07	1.04	1.07	0.68	0.89	0.91	0.68
SES08	0.88	0.90	0.57	1.04	1.07	0.62
SES09	1.00	1.00	0.70	1.00	1.00	0.70
SES10	1.08	1.04	0.71	1.08	1.05	0.71

Notes. MNSQ = mean squares, PT. corr. = point measure correlation.

Overall Performance of the RSES-T in High-School Students

The ratio of the first largest eigenvalue to the second largest eigenvalue of the PCAR of RSES-F was 2.2/1.3 = 1.69, in which the value was between 1.4 and 2.1 indicating it was acceptable. The second largest eigenvalue was 1.4, which was less than the unidimensional threshold value 2.0. Moreover, infit or outfit MNSQ values of the items all ranged from 0.7 to 1.3 (see Table 1). In addition, all point measure correlation coefficients were above the set value 0.3. All the above indices showed that the RSES-F was a single structure. The item reliability, ISR, person reliability, and PSR were 0.99 (> 0.8), 10.36 (> 6), 0.83 (> 0.8), and 2.21 (> 0.8), respectively (see Table 2).

Table 2

Indexes of Measurement Precision

Reliability index	RSES-F	RSES-T
Item reliability	0.99	0.99
Item separation reliability	9.98	10.36
Person reliability	0.83	0.83
Person separation reliability	2.18	2.21

Comparison of Item 8 of the RSES-F and the RSES-T

Both the RSES-F and the RSES-T fitted the Rasch model. However, the indices of the Item 8 of the RSES-T were superior to those of the RSES-F, which mainly reflected in the following aspects. The first was the infit and outfit values, in which the Item 8 of RSES-T was closer to ideal value 1.0 than the Item 8 of RSES-F. The second was that the point-measure correlations of Item 8 of RSES-T were larger than those of RSES-F. The third was that the Item 8 of RSES-T was higher than the Item 8 of RSES-F in ISR. The last, considering the DIF effect, the Item 8 of RSES-F was more likely to have a DIF effect than the Item 8 of RSES-T, in which the former had a higher DIF effect size. According to the above analyses, it indicates the overall psychometric properties of the RSES-T were considered better than those of the RSES-F.

Discussion

The Rasch model has many advantages in assessing the psychometric properties of a rating scale. In this study, the Andrich rating scale was used to evaluate the psychometric properties of the RSES-F and the RSES-T. The psychometric properties of the RSES-F and the RSES-T were compared among high school students through unidimensionality and measurement precision

In terms of unidimensionality, whether the ratio of the first largest eigenvalue to the second largest eigenvalue of PCAR or the infit and outfit MNSQ indices in the Rasch analysis, both of the scales showed a good unidimensional structure. The result was consistent with the original scale and the results of previous researches (Roth, Decker, Herzberg, & Brähler, 2008), indicating that both scales could be used to measure global self-

esteem. In terms of measurement precision, item reliability, ISR, person reliability, and PSR of both the RSES-T and the RSES-F, all met the requirements of the Rasch model. In terms of targeting, participants' ability was significantly higher than item difficulty, primarily due to the social approval. Some studies found that individuals' response pattern upon self-value assessment had an obvious difference in the background of individualism and collectivism. People who are individualists advocate freedom and individual rights and tend to answer questions honestly, whereas those who are collectivists tend to obtain a positive response in a testing situation.

In the Rasch model, the indexes of the RSES-T were all better than those of the RSES-F; hence, it was better to revise the word "wish" to "don't think". This conclusion was well founded. Theoretically, from the perspective of the linguistic difference between the Chinese and English, the word "wish" was only translated in this study without changing the original meaning and scoring, and the transformation had a theoretical basis. For it was inappropriately to change the original meaning without sufficient theoretical support. In terms of evidence, both the RSES-F and the RSES-T fitted the Rasch model well. Theoretically, comparing to the RSES-F, the RSES-T had a better balance between items from affective and cognitive perspective, and the RSES-T was better than the RSES-F in all indexes according to the results.

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