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Psychometrics of the RSES Scale in Pakistan

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Abstract: *The Rosenberg Self-Esteem (RSES) was developed in 1965 to measure self-esteem, and it has been used and translated into different languages to be applied to different samples. A quantitative instrumental research design, looking for the psychometric properties of the RSES scale, was conducted in Pakistan with University students (N= 455) enrolled in different public and private institutions. A single-factor model that included all the items was determined with the Dependent Weighted Least of Squares (DWLS) estimator and pairwise missing data handling because the distribution was not normal and identified missing values, considering that some items' response options were significantly underrepresented. This instrument may not be adequate for the psychosocial characteristics of Pakistan university students, and future research must be done to analyze the psychometric properties of the RSES.*

Key Words: Rosenberg Self-Esteem (RSES), Weighted Least of Squares (DWLS), Psychometrics, Pakistan, University Students, Private Institutions, Education

Introduction

High positive self-esteem is considered a positive state that can produce well-being for an individual and positively impact society (Avila & Cañas, 2023; Alejandra & Alexandra, 2023).

A historical review of self-esteem and the use of this instrument is presented to generate a more profound understanding of the relevance, use, and theoretical relations of the concept and the instrument.

(Flynn, 2007)states that William James used the concept of self-esteem in the 19th century based on the theories of self. The Rosenberg idea about self-esteem is how a person sees himself/herself compared to how they consider significant people see them (Flynn, 2007)

Self-esteem has been studied and conceptualized in different ways through time. For example, we can mention Gecas & Schwalbe (1983), who proposed two dimensions of self-esteem explanation: competence and self-worth.

The Rosenberg Self-Esteem (RSES) was developed in 1965 to measure self-esteem (Swenson, 2003). Initially, it was developed for adolescents, but researchers have used it for different samples.

For many years, researchers have had favourable opinions about the RSES. For example, Gray-Little et al. (1997) have stated that The RSES is easy to administer and takes a few minutes to complete. The RSES has five positive and five negative statements mixed to minimize respondents' bias. Negatively worded items are reverse-scored for meaningful interpretation. The greater the score on the RSES shows, the greater the person's self-esteem level and vice versa.

It is the most famous scale and has been extensively used in past studies at a vast scale. A review study found that nearly 1,285 self-esteem studies used RSES (Blascovich & Tomaka, 1993). Around the globe, the

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RSES has been used and translated into different languages. This scale has also assessed the self-esteem of samples such as adolescents (Avila & Cañas, 2023; Alejandra & Alexandra, 2023) or patients with different conditions such as cancer (Adriana et al., 2023) or cleft lip and palate (Glaeser et al., 2018) having disorders in various areas of their life. It also explored elite and high achievers' self-esteem (Alhumaid & Ahmed, 2023; Fekih-Romdhane et al., 2023).

The past literature has shown that self-esteem has been linked with different variables, for example, self-esteem and social support and life satisfaction (Avila & Cañas, 2023), social skills ((Alejandra & Alexandra, 2023), with depression, anxiety, and hostility (Cast & Burke, 2002), suicidal ideation Wang & Qiao, 2022; Vélez-Grau & Lindsey, 2022), drug use (Wang et al., 2001) academic performance (Lopes et al., 2013); and the acceptance in sports classes (Estévez et al., 2015).

The RSES scale has shown reliability for all age groups, as proven by past literature. In 1965, RSES was established (Swenson, 2003) for high school adolescents (N=5024) in New York State (Bracken & Mills, 1994). Since the scale is not restricted to specific age groups, therefore the scale has been used for diverse age groups (Bracken & Mills, 1994). High levels of reliabilities through internal consistency and test-retest have been reported (Swenson, 2003) for adolescents. Studies have shown different reliabilities, but most were in the acceptable range. So, RESE can be used for any age group of students and other people.

Here, we will give evidence of the reliability of the RSES scale in two directions (internal consistency reliability and test-retest reliability method) from previous literature regarding age-wise.

From the 10 to 19 years sample, the RSES showed an internal consistency of .76 to .90 Cronbach alpha reliability in different studies (Bagley et al., 1997; Lane et al., 2002; Vaughan & Halpern, 2010; Verkuyten, 2003; Yarcheski et al., 2003).

Grade-wise, from fifth to grade 11, the RSES showed an internal consistency of .83 to .84 Cronbach alpha reliability (Feather, 1991; Hagborg, 1996). For undergraduate students and adults, the RSES showed an internal consistency of .62 to .91 Cronbach alpha reliability (Brems & Lloyd, 1995; Feather, 1998; Gray-Little et al., 1997; Henriques & Calhoun, 1999; Hojat & Lyons, 1998; Pullman & Allik, 2000; Robins et al., 2001; Salmela-Aro & Nurmi, 1997; Salyers et al., 2001). For adults, the RSES showed an internal consistency of .84 to .96 Cronbach Alpha reliability (Billa et al., 2023; Henriques & Calhoun, 1999; Monteiro et al., 2022; Park & Park, 2019; Robins et al., 2001; Salyers et al., 2001; Vispoel et al., 2001).

From a previous discussion about the reliability of the RSES scale (internal consistency and test-retest reliability), it was proved with the past literature references that the RSES scale had shown a greater range of Cronbach Alpha reliability values (.76 to .96), which strongly proves that RSES scale is reliable for any age group. So, it could be used for people of all ages after evidence of its reliability. One of the important studies that were carried out was the comparative study of the factorial structure of the Whiteside-Mansell & Corwyn (2003); they compared adolescents (aged 12-17 years; N=414) to adults (aged 18-82; N=900), and both groups revealed that the factorial structure of the RSES was the same regarding mean scores having no significant differences (Whiteside-Mansell & Corwyn, 2003), showing that the scale could be used for all different age groups.

Factor analysis (exploratory and confirmatory) supports the unidimensional model of the RSES scale, according to past research studies (Bagley et al., 1997; Góngora & Casullo, 2009; Pullman & Allik, 2000; Shevlin et al., 1995; Tomas & Oliver, 1999). Hence, RSES measures the single characteristic of the person because high correlations among the items of the RSES prove the uni-dimensionality of the RSES (Crocker & Algina, 1986).

Ceballos-Ospino et al. (2017) propose the bi-factorial model of the RSES, with direct items in one factor and inverse items in the other. Some studies even tried to test the bi-factorial design with a general factor and reported excellent psychometric properties of the RSES.

Recent research has proposed different factorial models, including three factorial designs, a uni-factorial, bi-factorial, and bi-factorial with a general factor (Valdés García et al., 2022).

Strong positive correlations have been found between the scores of RSES and other measures examining the self-esteem construct, proving correlations between RSES scores and scores of other

instruments examining self-esteem, which proves the convergent validity of the RSES (Brems & Lloyd, 1995; Brumfitt & Sheeran, 1999; Francis & Wilcox, 1995; Griffiths et al., 1999; Silber & Tippett, 1965).

Convergent validity evidence of the RSES was also shown by comparing the scores of RSES to the scores of other scales, for example, the think worthy of self-scale, which measures a similar construct finding positive correlations; therefore, it can be inferred that RSES has proven convergent validity in essence (Cheng & Furnham, 2003; Hale et al., 1992; Hojat & Lyons, 1998; Lorr & Wunderlich, 1986; Schimmack & Diener, 2003; Yaniko & Lu, 2000).

Contrary to this, to prove the convergent validity of the RSES, it was compared to dissimilar scales (e.g., depression scale). Strong negative correlations were found between the scores of RSES and other scales (Brumfitt & Sheeran, 1999; Griffiths et al., 1999; Hojat & Lyons, 1998; Schimmack & Diener, 2003; Thompson et al., 1995; Westaway & Walmarans, 1992; Wilson & Lavelle, 1989; Yaniko & Lu, 2000).

RSES has shown scores regarding gender differences, finding that male and female respondents' scores do not vary (Abu-Saad, 1999; Banos & Gullen, 2000; Hagborg, 1996; McCurdy & Kelly, 1997; Pullmann & Allik, 2000; Swanson & Lease, 1990; White & Schweitzer, 2000).

Other studies reported that when males and females were compared in the scores of RSES, males were found to score higher than females (Moksnes & Reidunsdatter, 2019).

In the analysis regarding age, correlations have been reported between self-esteem and mental health in adolescents–level and stability during a school year, considering the age as the main reason for the variation, and other reasons were differences in cultures (Kawabata et al., 1999; Harper & Marshall, 1991; Moran & Eckemode, 1991; Dukes & Martinez, 1994; Kingree, 1995; Bagley et al., 1997; Kendler et al., 1998; Leonardi et al., 1998; Henriques & Calhoun, 1999; Kawabata et al., 1999; Vaughan & Halpern, 2010; Verkuyken, 2003).

Different versions of the original RSES have been adapted, retested, and revalidated in more than 50 countries by different researchers to ensure its usability and applicability (Flynn, 2007; Ceballos-Ospino et al., 2017). In the original version of the RSES, all ten items have only one dimension in which a single score represents the low or high self-esteem score.

Based on the literature review, we extracted various gaps from the previous studies, based on which we aimed many objectives. The previous studies were mainly conducted in contexts other than Pakistani context. For example, the previous studies had shown strong reliability, but all those studies were out of Pakistani context. Similarly, the previous studies also showed construct validity by running the confirmatory factor analysis, which revealed that the RSES had one-dimensionality.

We also aim to do the same in the Pakistani context by bringing the phenomenon under research. Previous studies mainly compared the gender scores on the RSES and showed that males and females had no significant differences in RSES scores; in some studies, the males had higher scores than females. We compared the gender analysis and other demographic variables (area, marital status, etc.) to see if the same case happened in Pakistan.

Methodology

Design

The study adopted the instrumental design because we have to examine whether the RSES scale shows validity and reliability in Pakistan. Such a type of design has already been reported and supported in the research literature by different researchers (Valdés García et al., 2022). In such a design, the authors have to critically review the papers about the specific phenomenon (e.g., RSES scale) and then collect primary data from the respondents and run the psychometric analysis. We used this type because it was deemed better for achieving the objective we designed for our study.

Participants

The sample was composed of 455 university students from Pakistan; 178 were men and 277 women enrolled in different public and private institutions.

The age of the sample was classified as 18 to 22, with most participants in this range (43.7%), followed by 23 to 26 years (34.5%), 27 to 30 years (11.4%), and over 30 years (10.3%). The majority had a single marital status (79.8%), the rest were married, and the majority resided in an urban area (64.2%) compared to residents in rural areas.

Instrument

RSES is a ten-item self-administered instrument intended to measure global self-esteem. The RSES includes five positively worded items and five negatively worded items. Positive and negative items are mixed to minimize respondent sets. For this study, items were administered in the order presented in Figure 1. Each item had four possible response choices: (1) strongly agree, (2) agree, (3) disagree, and (4) strongly disagree. For each item, respondents were asked to choose the one response most closely resembling themselves.

Data Analysis

The data were analyzed from the JASP 0.17.3 platform (Intel) with the original idea of contrasting three fit models; however, it was not possible due to the data distribution, and only a single-factor model that included all the items was determined; this was done with the Dependent Weighted Least of Squares (DWLS) estimator and with Pairwise missing data handling because the distribution was not normal and identified missing values, considering that some items' response options were significantly underrepresented.

To determine the model fit, X^2 and the indices (CFI) and Tucker Lewis (TLI) were used; the residuals were analyzed through the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) (Kline, 2015).

Results

The results were first analyzed by considering the descriptive statistics per item and reviewing the mean, standard deviation, skewness, Shapiro-Wilk kurtosis, and probability. The data showed no normal distribution in the responses (Curran et al., 1996), as seen in Table 1.

Table 1

Descriptive statistics by reagent

	It_1	It_2	It_3	It_4	It_5	It_6	It_7	It_8	It_9	It_10
Mean	1.681	2.360	2.640	1.736	2.510	2.527	1.958	2.473	3.169	2.119
Std. Deviation	0.610	0.787	0.787	0.620	0.820	0.820	0.623	0.820	0.751	0.807
Skewness	0.362	0.086	-0.086	0.523	0.063	-0.161	0.303	0.161	-0.665	0.539
Kurtosis	-0.327	-0.419	-0.419	0.770	-0.537	-0.497	0.546	-0.497	0.173	0.014
Shapiro-Wilk	0.756	0.859	0.859	0.750	0.868	0.864	0.774	0.864	0.809	0.837
P-value of Shapiro-Wilk	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001

Note: It= item. Own elaboration

Levene's test of equality of variances was used to identify differences between men and women, finding that only three items showed significant differences between the responses of both groups. However, in the analysis of the total result of the scale, there were no differences by sex. The items with differences show that men report higher scores on the item, and *I certainly feel useless at times* (men. $\tilde{X}$= 2.58, women $\tilde{X}$= 2.49), and *I take a positive attitude toward myself* (men $\tilde{X}$= 2.18, women $\tilde{X}$= 2.08); women had higher on the item. *I wish I could have more respect for myself* (men. $\tilde{X}$= 2.41, women $\tilde{X}$= 2.50). These data can be reviewed in Table 2.

Table 2

Levene's test of equality of variances by item and total between men and women

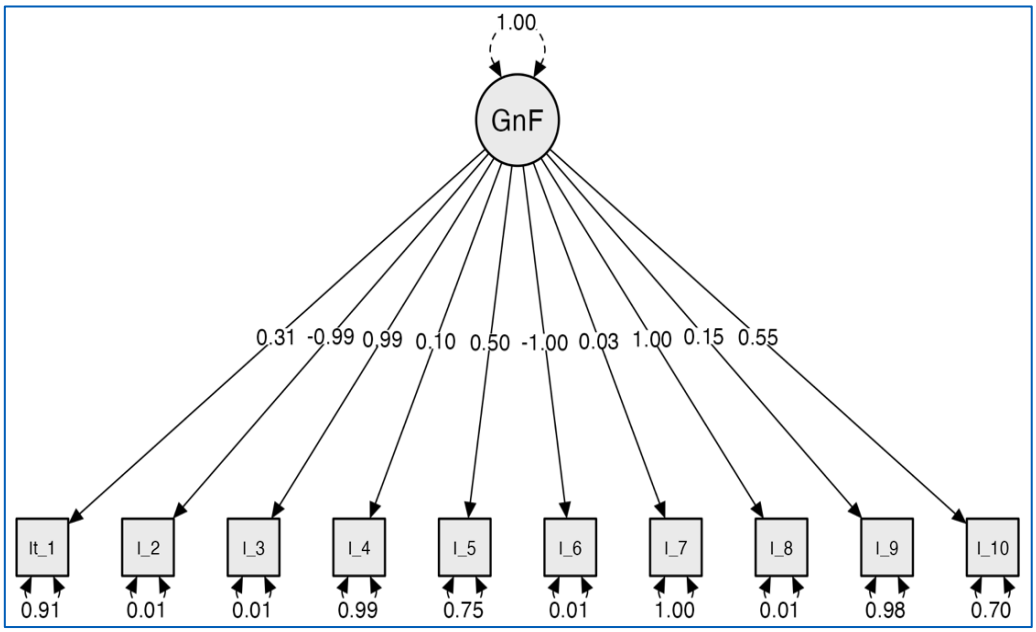
Item	F	Sig.	t
1. On the whole, I am satisfied with myself	1.250	.264	-1.463
2. At times, I think I am no good at all	.244	.621	1.325
3. I feel that I have a number of good qualities	.244	.621	-1.325
4. I am able to do things as well as most other people	.077	.781	-.163
5. I feel I do not have much to be proud of	3.268	.071	.260
6. I certainly feel useless at times	4.189	.041	1.185
7. I feel that I'm a person of worth, at least on an equal plane with others	2.116	.146	-.550
8. I wish I could have more respect for myself	4.189	.041	-1.185
9. All in all, I am inclined to feel that I am a failure	3.533	.061	-.783
10. I take a positive attitude toward myself	5.350	.021	1.296
Total Scale	1.713	.191	-.294

Note: Own elaboration

The instrument's internal consistency was obtained using Cronbach's alpha since the data distribution did not allow the use of another more robust estimator (Hayes & Coutts, 2020), which was -0.119, with a range in its confidence interval from -.264 to 0.013. which generates inappropriate values for determining internal consistency (Abad et al., 2011). We proceeded to analyze a general model with a single factor that integrated the ten items of the scale, finding acceptable indicators to determine the proposed factorial structure (X2 (1105.419), p = <.001) (see Figure 1).

Figure 1

General factor model plot



Note: GNF = General Factor. Source: Author's elaboration using JASP.

This model was generated using the DWLS estimator and with Pairwise missing data handling, as the data distribution required. Regarding the Fit indices, the model presented acceptable data; the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) presented adjustments close to 1 (Moral, 2006). On the other hand, other adjustment indicators, such as the Root mean square error of approximation (RMSEA) and the Standardizes root mean square residual (SRMR), were not adequate since their values were higher than 0.08 and 0.05 respectively, which indicates that the level of error is too high. The Parsimony Normed Fit Index (PNFI) was adequate since its value was greater than .050 (Fábregas et al., 2018). These indicators can be seen in Table 2.

Table 3

Model fit indices

Model	General Factor
X^2	1105.419
Df	35
p	<.001
CFI	0.994
TLI	0.992
RMSEA	0.260
SRMR	0.164
PNFI	0.773
GFI	0.994

Note: Author´s elaboration

Discussion and Conclusions

The use of instruments widely used in the world, and for many years, is not enough to guarantee that they adapt to the current needs and characteristics that allow measuring a specific variable.

Having valid and reliable instruments to measure self-esteem is relevant since this concept has been related to well-being, life satisfaction, and adequate academic performance (Avila & Cañas, 2023; Cast & Burke, 2002; Alejandra & Alexandra, 2023), as well as it has been negatively correlated with variables such as anxiety, depression and suicidal ideation (Wang & Qiao, 2022; Vélez-Grau & Lindsey, 2022). To this day, its psychometric properties continue to be studied (Billa et al., 2023; Monteiro et al., 2022; Park & Park, 2019). Therefore, measuring it can favour the development of interventions and actions to promote people's health and well-being.

In the sample studied, the instrument did not report adequate internal consistency, and in the generation of models, only a general model could be found with the ten items and had high error indicators; to use this instrument in the Pakistan university population, the analysis found need to be more robust.

Although some significant differences were found in three items between men and women, due to the lack of adequate psychometric criteria, it is not considered correct to analyze these differences, which, if taken in a general way, could indicate cultural differences between men and women and those most relevant aspects of the self-esteem for both sexes.

Although the scale has been adapted and studied in more than 50 countries (Ceballos-Ospino et al., 2017), there was no recent study for the university population of Pakistan. This study found that This instrument may not be adequate for the psychosocial characteristics of Pakistan university students. Future research must be done to analyze the psychometric properties of the RSES.

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