

Dimensionality and construct validity of the Rosenberg self-esteem scale within a sample of recidivistic prisoners

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Abstract

Purpose – This study aims to examine the construct validity and factor structure of the Rosenberg self-esteem scale (RSES) using a sample ($n = 312$) of Polish prisoners incarcerated in Nowogard High Security Prison.

Design/methodology/approach – The number of confirmatory factor analysis (CFA) models under investigation was limited to two by virtue of employing a much stricter and more rigorously sound methodological procedure in which item errors were prevented from correlating, as suggested by Brown.

Findings – Confirmatory factor analyses indicated that the two-factor (positive and negative self-esteem) model provided a better fit for the RSES items than did the one-factor model.

Originality/value – The results provide some initial support for the two-dimensional model that could possibly be measuring substantively separate factors within a prison sample, thus calling into question the one-factor solution of the RSES.

Keywords Prisoners, Rosenberg self-esteem scale, Dimensionality, Construct validity, Confirmatory factor analysis, Imprisonment, Poland, Self esteem, Psychology

Paper type Research paper

Introduction

One of the most widely used instruments to measure self-esteem is the Rosenberg Self-esteem Scale (RSES; Rosenberg, 1989). Rosenberg considered self-esteem as a component of the self-concept and defined it as a set of positive or negative thoughts and feelings that individuals hold about themselves in terms of their worth and importance (Rosenberg, 1965). Although the RSES was introduced as a one-dimensional scale and one of the first CFA analysis has supported it (Shevlin *et al.*, 1995), further empirical findings from several studies have suggested a two factor solution for the RSES, with positive (typically labelled positive self-esteem) and negative (labelled either negative self-esteem or self-deprecation) items loading onto two distinct factors of self-esteem (Kaufman *et al.*, 1991; Goldsmith, 1986; Bachman and O’Malley, 1986; Carmines and Zeller, 1979; Dobson *et al.*, 1979; Hensley, 1977; Kaplan and Pokorny, 1969).

As a result of this series of contradictory findings, Marsh (1996) carried out a systematic assessment of the dimensionality structure of the RSES using student sample. In his research, Marsh performed a series of confirmatory factor analyses (CFAs), including a group of correlated uniqueness models. The results showed a single dimension underlying responses to RSES items, together with evident method effects – mostly associated with negatively worded RSES items. Marsh (1996) suggested that such an artefact might take place because younger and less verbally able students would have greater difficulty responding appropriately to negatively worded items. More recently, Tomás and Oliver (1999) evaluated nine alternative models of the RSES. The first six models were identical to those specified in Marsh’s (1996) earlier study, whereas the last three were CFA models with

Special thanks to the Polish Prison Service for providing the venue for this study, particularly to Warden of Nowogard High Security Prison Mr Jerzy Dudzik and Mr Jacek Pedziszczak for assistance in survey application.

correlated trait and method factors. The results obtained by Tomás and Oliver (1999) fully supported Marsh's (1996) findings suggesting that there is a RSES factor underlying the items of Rosenberg's scale. There is, also, method effects associated primarily with the negatively worded items. Further support was indicated by Greenberger *et al.* (2003) who tested the original version of the RSES and two alternative versions (ten positively worded or ten negatively worded 40 items). Greenberger and colleagues reported that the two-factor model is an artefact of the item wording. However, previous researchers (Kaufman *et al.*, 1991) suggested that the scale reflects a two-factor structure comprised of positive and negative aspects of the self, with each factor influenced by diverse experiences (Owens, 1994). Moreover, Dunbar *et al.* (2000) stated in their empirical investigation that the one-factor model with correlated errors for the negatively worded items had a better fit than the two-factor model. Correlation among some of the errors produced a superior fit to the data than the frequently suggested two-factor construct. Thus, it is important to notice that some scholars (see Brown, 2006) suggest that item errors should never be correlated in order to improve the model. However, the main reason for non-correlated errors in CFA model is that it indicates the presence of other factors. Additionally, random correlations among errors can cause serious problems with understanding and interpretation of the model and vastly decrease the probability of replication.

Despite the wide applicability of the RSES in a variety of populations, little evidence exists supporting the validity and factor structure of the RSES when used within forensic populations. In order to address these limitations, the current research will employ a confirmatory factor analysis method (with item errors uncorrelated) to investigate the factor structure of the RSES using a sample of presently incarcerated prisoners.

Method

Participants and procedure

Of the 845 incarcerated adult males in Nowogard High Security Prison, 362 prisoners (43 per cent) agreed to participate in the current research, however due to incomplete responses, only 312 (37 per cent) were included in the final analysis. The participants ranged in age from 20 to 66 ($M = 33.85$, $SD = 9.38$). The frequency of imprisonment reported by offenders ranged from 1 (mostly murderers) to 19 times ($M = 3.57$; $SD = 2.48$) and the number of reported police arrests from 1 to 20 ($M = 4.85$; $SD = 4.09$). The characteristics of the sample are presented in Table I. The Ethical approval for this research was obtained from the Polish Prison Service. Prisoners completed anonymous, self-administered, paper-and-pencil RSES, which were attached to a booklet that contained brief instructions for completion, and a consent form. Respondents were informed about the confidentiality of their participation and about their right to withdraw at any stage.

Measure

The Rosenberg Self-esteem Scale (Rosenberg, 1989) consists of ten Likert-type scale items designated to assess positive and negative evaluations of self. Respondents indicate their level of agreement ranging from 1 (strongly disagree) to 4 (strongly agree). Thus, the possible total score can range from a minimum of 10 to a maximum of 40, with higher scores reflecting more positive evaluations of self.

Results

Descriptive statistics and composite reliability of the RSES are reported in Table II. The main analysis was conducted using Mplus version 6.0 (Muthen and Muthen, 1998-2010). A covariance matrix was computed and the parameters were estimated using robust maximum likelihood. A sample of 362 prisoners participated in the current research, however due to incomplete responses, only 312 cases were included in the final analysis. The analysis involved comparing two alternative CFA models of the RSES. The two models included a one-factor model (Figure 1; all items in the RSES) and a two-factor model

Table I Characteristics of the prison sample

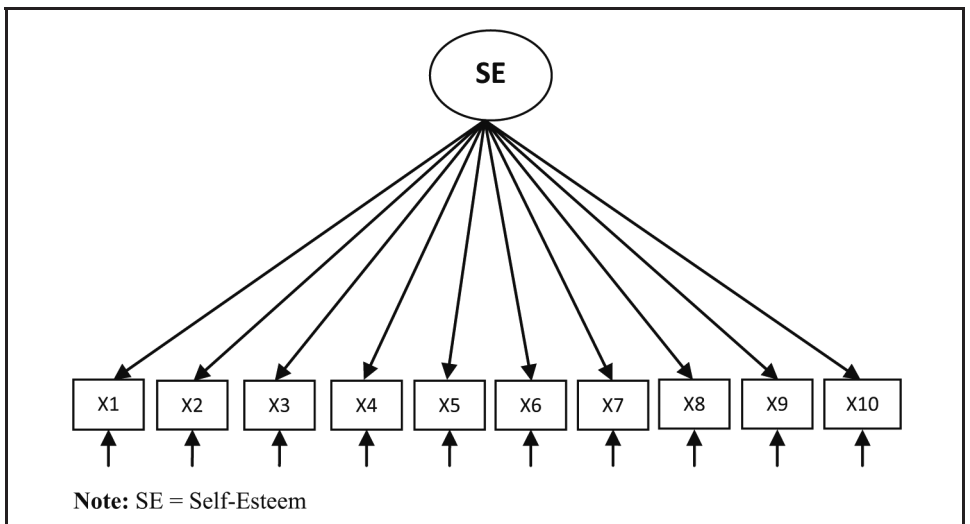
Variable	<i>n</i>	%
<i>Marital status</i>		
Single	213	68.3
Married	37	11.9
Divorced/Separated	58	18.6
Widower	4	1.3
<i>Education</i>		
Primary School	163	52.2
Secondary School	142	45.5
College/University	7	2.2
<i>Location</i>		
Urban	275	88.1
Rural	37	11.9
<i>Type of crime</i>		
Robbery	89	28.5
Drug trafficking	18	5.8
Robbery and drugs	7	2.2
Robbery and violence	37	11.9
Violent offences	29	9.3
Homicide	25	8
Sex offences	2	0.6
Vandalism	2	0.6
Multiple convictions	103	33

Note: *n* = 312

Table II Means (*M*), Standard deviations (*SD*), and composite reliability of the Rosenberg Self-esteem Scale in prison population

Scale	<i>M</i>	<i>SD</i>	Composite reliability
Positive self esteem	9.51	3.21	0.79
Negative self esteem	12.06	3.13	0.67

Note: *n* = 312

Figure 1 One factor model of Rosenberg Self-esteem Scale

(Figure 2; positive self-esteem comprising of items 1, 3, 4, 7, 10; and negative self-esteem comprising of items 2, 5, 6, 8, 9). The specified models in this study allowed items to load onto a single factor, with uncorrelated measurement error terms.

Table III presents both absolute and comparative fit indices for each model. The chi-square (χ^2) statistic investigates the difference between the empirical model and the actual model. Although the chi-squares is large in relation to the degrees of freedom, and statistically significant, Tanaka (1987) suggests that a model should not be rejected on this basis since large sample sizes amplify the power of test. The Comparative Fit Index (CFI; Bentler, 1990) and the Tucker Lewis Index (TLI; Tucker and Lewis, 1973) are measures of how much better the model fits the data compared to one where no relationships exists. For these indices, values above 0.9 indicate reasonable fit (Bentler, 1990; Hu and Bentler, 1999). In addition, two more absolute indices are presented; the standardized root mean-square residual (SRMSR – the average difference between the null and alternate models per element of the variance – covariance matrix) and the root mean-square error of approximation (RMSEA – estimates lack of fit compared to the saturated model). Ideally, these indices should be less than 0.05 however; values less than 0.08 also suggest adequate fit (Bentler, 1990; Hu and

Figure 2 Two factor model of Rosenberg Self-esteem Scale

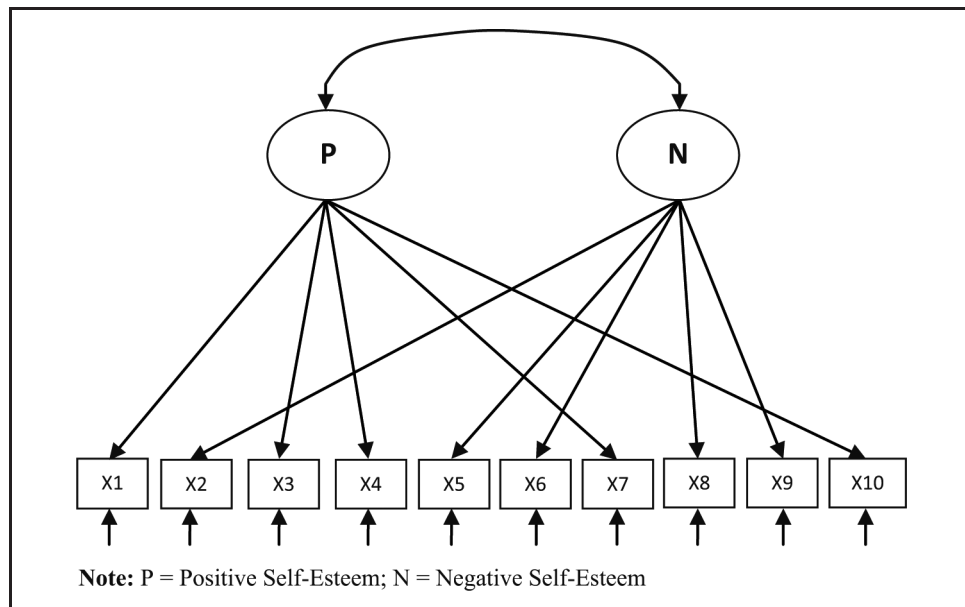


Table III Fit indices for the alternative models of the Rosenberg Self-esteem Scale in prison population

Item	1 Factor model	2 Factor model
χ^2	192.45	95.49
df	35	34
p	0.00	0.00
RMSEA	0.12	0.07
90% CI	0.11-0.14	0.05-0.09
SRMR	0.09	0.06
AIC	7,557.05	7,439.12
CFI	0.71	0.90
TLI	0.62	0.85

Notes: RMSEA = Root-Mean-Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; CFI = Comparative Fit Index; TLI = Tucker Lewis Index

Bentler, 1999). Furthermore, Akaike Information Criterion (AIC; Akaike, 1974) was used to evaluate two alternative models, with the smaller value demonstrating the best fitting model.

Findings suggest that the two-factor model provided a better fit for the RSES items than did the one-factor model. As can be seen in Table III, all indices show improvement in the two-factor model. A chi-squared difference test to examine if the one-factor model differed significantly from the two-factor model showed that the difference was significant ($\Delta\chi^2 = 64.25$, $\Delta df = 1$, $p < 0.01$). Although the χ^2 statistic was significant, the CFI, TLI, RMSEA and RMSR all indicated adequate fit. The AIC also shows that the two-factor model is a better model compared to the one-factor model. Table IV reports the standardized and unstandardized factor loadings for each item on their respective subscales. All of the item loadings were between 0.40 and 0.75 on the positive self-esteem factor and between 0.16 and 0.76 on negative self-esteem factor. The correlation between the two factors was 0.56 indicating a moderate to strong association.

Discussion

The purpose of the current study was to investigate the factor structure of the RSES within a forensic sample of incarcerated prisoners using confirmatory factor analysis. In order to do this, two distinct factor models were specified and tested that are most consistent with the theoretical foundations upon which the measure was constructed. Unlike many previous studies investigating the underlying factor structure of the RSES (e.g. Marsh, 1996; Tomás and Oliver, 1999; Greenberger *et al.*, 2003; Dunbar *et al.*, 2000), this current study limited the number of models under investigation to two by virtue of employing a much stricter and more rigorously sound methodological procedure in which item errors were prevented from correlating, as per the recommendations by Brown (2006). This provides a far greater degree of confidence in the validity of the identified factor structure than previous studies have thus far provided.

On the basis of the fit indices, the two-factor model consisting of both a positive and a negative latent variable was considered to be an adequate fitting model, and to provide a far superior fit of the data as compared to the one-factor model. The one-factor model, which is consistent with Rosenberg's construction of the scale, was rejected as a very poor fitting model of the data, with none of the respective fit-indices values meeting, or even approaching, the necessary cut-off criteria for an adequate or good fitting model. As a result, there is a strong empirical argument for the rejection of a one-factor conceptualization of the underlying factor structure of the RSES within a prison sample. The standardized factor loadings provide additional support for the two-factor model of the RSES. All items contained within the positive self-esteem factor exceeded the recommendation by Kline (1994) that

Table IV Standardized (β) and unstandardized (B) factor loadings (and standard errors) for the two-factor model of the Rosenberg Self-esteem Scale

Item	β	B	SE
<i>Factor 1 (Positive self-esteem)</i>			
1. On the whole, I am satisfied with myself	0.40	1.00	–
3. I feel that I have a number of good qualities	0.72	1.58	0.30
4. I am able to do things as well as most other people	0.72	1.75	0.33
7. I feel that I'm a person of worth, at least on an equal plane with others	0.63	1.35	0.28
10. I take a positive attitude toward myself	0.75	1.83	0.32
<i>Factor 2 (Negative self-esteem)</i>			
2. At times, I think I am no good at all	0.76	1.00	–
5. I feel I do not have much to be proud of	0.39	0.53	0.11
6. I certainly feel useless at times	0.74	1.06	0.09
8. I wish I could have more respect for myself	0.16	0.24	0.13
9. All in all, I am inclined to feel that I am a failure	0.53	0.74	0.10

Notes: All factor loadings are statistically significant ($p < 0.001$); relationship between factors = 0.56, $p < 0.001$

item factor loadings should be equal to or greater than 0.30 to indicate that a particular item is a good indicator for a given factor. Factor loadings for the five positive self-esteem items were all positive, moderate-to-high, and statistically significant, ranging from 0.40 to 0.75. Only one of the five items within the negative self-esteem factor fell below the 0.30 cut-off criteria (Item 8), yet all items were positive, statistically significant, and, with the exception of Item 8, moderate-to-high with factor loadings ranging from 0.39 to 0.76. Furthermore, the two factors were found to possess a moderately strong correlation of $r = 0.56$. The total ten-item Rosenberg Self-Esteem Scale, and the positive and negative subscales showed acceptable internal consistency. An important implication that arises from the current research findings is that negative and positive self-esteem are not bi-polar constructs; in other words a low score on negative self-esteem does not necessarily indicate a high score on positive self-esteem. This underscores the importance of considering both aspects when employing the RSES.

As with any research project, there are some limitations that need to be indicated. Future studies applying the current model of self-esteem should also determine whether the proposed model holds true for different types of offenders. Thus, it is suggested to consider more extensive and diverse samples of criminals, including female offenders. This project has focused entirely on prisoners from a high security prison for recidivists whereas future investigations would profit from also considering different categories of prisons or places of detention. Although the measures used in this study allowed researchers to collect a sufficient quantity of data in a short time, what is impossible to ascertain with any degree of certainty is the degree to which prisoners were capable of fully understanding the questions included in the survey. Additionally, because the instruments are based on prisoners' self-reports, some of the observed effects might be the consequence of response bias. However, this part of the study design could not be controlled by the researchers conducting such a project with recidivistic prisoners.

In conclusion, the RSES was found to measure two distinct underlying constructs, negative and positive self-esteem. The two-factor model yielded a superior model fit compared to the one-factor model and indicates that researchers had better considered both aspects of self-esteem when employing the RSES in future studies. The results of the current study provide important additional empirical support to previous findings signifying a two-factor solution to the RSES, due mainly to the rigorousness of the methodological standards employed and the uniqueness of the population group upon which the measure was tested.

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Further reading

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