

# Psychometric Analysis of Rosenberg's Self-Esteem Scale. A Specific Application of the Scale on Adolescents Aged 11-19

Michal Čerešník<sup>1</sup>, Martin Dolejš<sup>1</sup>, Miroslava Čerešníková<sup>2</sup>, Robert Tomšík<sup>3</sup>

<sup>1</sup>*Department of Psychology, Faculty of Arts, Palacký University Olomouc, Křížkovského 10, 779 00 Olomouc, Czech Republic,*

<sup>2</sup>*Department of Roma Studies, Faculty of Social Sciences and Health Care, Constantine the Philosopher University in Nitra, Kraskova 1, 949 74 Nitra, Slovakia*

<sup>3</sup>*Research Institute of Children's Psychology and Pathopsychology, Cyprichova 42, Bratislava, Slovakia*

**Abstract** – The paper presents a psychometric analysis of Rosenberg's Self-Esteem Scale and its interpretation in the context of a population sample of Czech adolescents. The theoretical background includes a description of a general model of self-concept with a focus on the component of self-esteem. We point out the link between personal and social variables in the establishment of one's self-esteem and the relationship between its establishment and school performance in the period of adolescence. Research data were collected from 7,733 adolescents aged 11-19 in the Czech Republic attending elementary schools, general secondary schools, and specialized secondary schools (ISCED 2 and 3). Their average age was 14.75 year (SD = 2.22). The psychometric analysis used a confirmatory factor analysis and the Item Response Theory (IRT) method. The results of analysis pointed out that during the period of adolescence, the score in Rosenberg's Self-Esteem Scale may be interpreted as a unidimensional construct.

**Keywords** – self-esteem, adolescence, Rosenberg, confirmatory factor analysis, item response theory.

## 1. Introduction

Adolescence is an ontogenetic stage involving many developmental changes. One of such changes is the establishment of one's own representation of self, i.e. who the individual is and where he/she is heading. Self-concept is part of personality systems and is related to definition, quality, and assessment of one's performance.

Over the course of adolescence, a young individual creates his/her self-image and has a collection of self-evaluations that subsequently influence the fulfilment of performance tasks (e.g. in the area of academic education). Kuhl [1] builds on the assumption that self-regulation as a uniquely human capability [2] and manifestation of personality requires representation of an objective (i.e. what an individual intends to achieve) as well as representation of one's self (i.e. what role is played by the individual in the process of achievement of the objective). According to Baumeister [3], self-concept is a set of one's beliefs about himself/herself, including his/her attributes regarding who or what the self is. Multiple authors [4] [5] agree that self-concept is a mental representation of one's self that is relatively stable and is established in the social context within the process of social perception, or self-perception.

If one accepts the characteristics of self-concept as a mental representation, we naturally come to the conclusion that it is based on one's desire and ability to discover and explore himself/herself. The individual's self-exploration activity, according to Baumeister [3], may be initiated by three dominant motives: (1) the desire to obtain accurate information about himself/herself, (2) the desire to confirm what a person knows or believes about himself/herself, and (3) the desire to learn something positive about

DOI: 10.18421/TEM114-39

<https://doi.org/10.18421/TEM114-39>

**Corresponding author:** Michal Čerešník,  
*Department of Psychology, Faculty of Arts, Palacký University Olomouc, Křížkovského 10, 779 00 Olomouc, CR.*

**Email:** [michal.ceresnik@upol.cz](mailto:michal.ceresnik@upol.cz)

*Received: 08 August 2022.*

*Revised: 25 September 2022.*

*Accepted: 18 October 2022.*

*Published: 25 November 2022.*

 © 2022 Michal Čerešník et al; published by UIKTEN. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 License.

The article is published with Open Access at <https://www.temjournal.com/>

himself/herself. He calls these motives self-assessment, self-verification and self-enhancement. Baumeister [3] presumes that these motives are ordered hierarchically: the strongest motive is self-assessment, as it manifests self-knowledge (being part of metacognition defined in accordance with Flavell [6]). A weaker, although still very important, motive is self-verification, as it is a prerequisite for a relatively stable perception of oneself and the world (and therefore even mental health). Self-enhancement is considered by Baumeister [3] to be the weakest motive because it is based on emotional states which, if positive, are important for a person, but if they are not based on accurate information about himself/herself, they are practically irrelevant.

It appears that these motives also bring along distortions that are reflected in self-concept as a summary of beliefs about oneself. The first distortion is overestimating one's positive qualities (e.g. conscientiousness), the second one is overestimating the control a person has over his/her life (a belief that success or failure are a mere consequence of one's own behaviour, disregarding external sources), and the third one is unrealistic optimism (overestimating the likelihood of good things happening and, in contrast, underestimating the likelihood of bad things happening) [3].

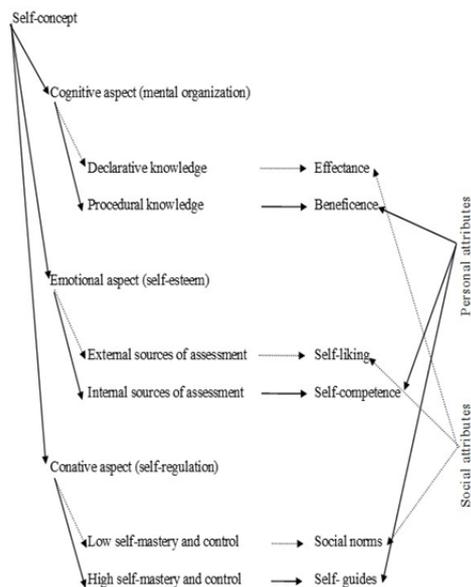


Figure 1. Schema of aspects of self-concept

### 1.1. Schema of Self-Concept

The above-described motives and the related distortions point out that an individual needs to control his/her life, enter it as an active actor, react to external events (which may seem uncontrollable), i.e. control himself/herself. Based on this perspective, we perceive our ability to manage, control, and regulate our behaviour as a key component of self-concept,

which has a strong relationship to the desire for freedom, adoption of responsibility, and self-creation [7]. This ability is, however, not isolated, so we believe it is important to present it in the entire complex of self-concept, as illustrated by the scheme in Figure 1.

The delimitation of individual aspects of self-concept within the scheme (the cognitive, the emotional, and the conative aspect) [8] has a significant overlap with Baumeister's [3] view of self-exploration. The scheme also shows another (dichotomic) internal division of individual aspects of self-concept. They demonstrate that self-concept is influenced by social context (especially by persons important for a particular individual, their opinions, attitudes, and construction of the world), as well as personal variables (individual experience, predispositions, etc.). At the same time, these two groups of attributes (social and personal) cannot be practically separated from one another, since they constitute an interlinked complex of factors affecting the establishment of self-concept. This approach has been presented already in classic sources addressing research into self-concept, in particular Cooley's [9] concept of the looking-glass self, representing opinions and assessments of other individuals reflected in one's own self-idea.

#### 1.1.1. Cognitive aspect of self-concept

When delimiting the cognitive aspect, we build on Greenwald [10] and his concept of benefectance, and from the computer metaphor of self-concept by Greenwald & Pratkanis [8]. The computer metaphor accepts the classic division of self-concept by James into the knowing ("I") and the known ("Me"), i.e. the self is presented as both the subject and the object of (self)knowledge. The self as the subject is characterized by attributes such as unconsciousness, memory, program and procedural knowledge. The self as the object is characterized by consciousness, self-image, the input-output system of information processing and declarative knowledge. The self as the subject therefore typically focuses on processes (i.e. how to be functional) and expresses the individual's beneficence, while the self as the object focuses on content (i.e. what should be functional) and expresses effectance. In Greenwald's interpretation [10], both words – beneficence and effectance are merged into the term benefectance, which expresses the one's tendency to perceive oneself as (socially) efficient and (personally) beneficial.

The cognitive aspect of self-concept also involves various representations of self, such as the ought self, the undesired self, the ideal self and the possible self.

According to Higgins [11], the ought self also represents the qualities the individual believes he/she should have. A discrepancy between the actual and the ought self is manifested in the feeling of distress. In terms of Rogers's terminology, we may speak about a conditional positive regard that is manifested in deprivation of positive feedback (self-enhancement) in case the demanded expectations are not fulfilled. An individual manifesting a discrepancy between the actual and the ought self avoids the execution of undesired behaviour (momentarily disregarding the noncongruent self) and is confronted with the undesired self [12] which represents negative ideals. These stand in contrast to positive ideals in the form of the ideal self, i.e. the idea of what an individual wants to be like [13]. The possible selves [14] present a challenge for the self-concept particularly in the earliest stages of personality development: at these stages, the individual forming his/her personality does not build only on experience acquired in the family environment (or from norms set within small social groups), but also from the personal view of what he/she shall be like.

The variation in representations of self points out an important feature of self-concept: its multifaceted nature. It is true that throughout his/her life, every individual takes multiple roles in which individual representations of self are employed in different ways, so there occurs a necessary differentiation that is inevitable in relation to the social contexts in which the individual takes part. Various authors [15] [2] have pointed out, however, that this does not mean fragmentation of self into the form of dissociation (conversion disorder), but rather an integrated self that actively chooses procedures (regulates itself) in order to achieve the desired results (and accomplish a feeling of personal control or freedom).

### 1.1.2. Emotional aspect of self-concept

The emotional aspect of self-concept means a mental representation of a global generalized relationship to oneself – this is called self-esteem [16]. As illustrated by Figure 1, the sources of self-esteem are divided into external and internal. The external sources of self-esteem are of a various nature and may be identified in members of small social groups (primary and secondary). The key requirement is the subjective importance of other people for the individual himself/herself [17], e.g. parents, peers, friends, a partner and colleagues. The assessment of the relationship to oneself undergoes a fundamental change in the period of prepubescence, i.e. at the age of 9-11 when, according to Higgins [18], there occurs a significant shift from identification to internalization and where external norms become self-guides. These enable an

individual to assess the world and himself/herself relatively independently from the opinions of others.

Accepting that self-concept has two sources logically implies that the global self-concept may be decomposed into pieces that would reflect personal competence and socially defined values [19]. In Figure 1, these components are labelled as self-competence and self-liking, in accordance with Tafarodi & Swann [20]. Self-competence represents one's personal belief of the ability to produce desired results through one's own abilities. Self-liking is a circular construct based on implementation of the individual's acceptance of himself/herself based on perception by other people and the extent to which the individual fulfils the expectations set by his/her social environment. This conditions the individual's self-liking. There are other important features of self-concept that may be derived from the above-described variables, such as polarity (positivity and negativity) [21] and stability [22].

In relation to self-control, the emotional aspect of self-concept is a superstructure built over the cognitive aspect that may be verbalized as follows: "I am able to perform well and be successful. I like myself."

### 1.1.3. Conative aspect of self-concept

The conative aspect of self-concept directly expresses the self-regulatory aspect of self-concept and the fact that over the course of the development, self-representation becomes the primary factor in regulation of one's behaviour [9].

Bandura [2] defines the self-regulation ability as a mean of self-realisation through personal standards. Bandura is known for his concept of self-efficacy, which is defined as the belief that an individual can influence what happens to him/her and around him/her (i.e. controls his/her life). This belief is saturated particularly by the feeling of self-mastery, i.e. one's own competence in particular situations. In relation to the conative aspect of self-concept, low self-mastery is related to orientation towards social norms and their fulfilment. In contrast, high self-mastery represents orientation to self-guides or standards and the relative independence of social expectations.

The concept of self-guides, which is described by Higgins [18] as life standards, are part of the ideal self and the ought self. Personal standards represent motives that initiate and focus on one's behaviour and associate it with emotional content. The consequence of such emotionally motivated behaviour is a comparison of the present state and the desired state, with the result being either a "match" or similarity, or "mismatch" or discrepancy. In case of discrepancy, regulatory processes are activated and behaviour is modified in order to achieve the desired outcome.

## 1.2. Self-Esteem

Self-esteem represents the emotional aspect of self-concept and is related especially to the link between personal and social content. Higgins [18] describes it as the individual's standpoints on himself/herself (coming from the domains of self) and other's standpoints on themselves (coming from standpoints on self). When assessing oneself in social situations, the personal content and the social content are interlinked. If the individual is successful, his/her self-esteem increases; if he/she is unsuccessful, his/her self-esteem decreases. In relation to self-concept, the individual sets his/her expectations regarding the future performance. High self-esteem and the individual's positive feelings about his/her self result in expectation of success. Low self-esteem and the individual's negative feelings about his/her self result in expectation of failure, or a feeling of helplessness in a tense situation.

Shavelson, Hubner & Stanton [17] characterize self-concept and its aspects in the following way: (1) Self-concept is organized and structured (because people categorize information about themselves and relate them to themselves). (2) Self-concept is multifaceted (the individual facets reflect a system of categories linked to the self that have been adopted by the individual or shared within a group). (3) Self-concept is hierarchically ordered (perception of behaviour in specific situations constitutes the basis of the hierarchy, followed by perception in wider contexts, and the top is constituted by generalized self-conception). (4) The generalized self-concept is rather stable (in the top-down direction, self-concepts become more and more situation-dependent and less stable). (5) From the developmental perspective, the content of self-concept is characterized by the gradual extension of information on the self, as well as gradual differentiation and integration. (6) The self-concept involves a descriptive and an evaluative aspect (the assessment depends on a relative standard determined through a comparison with peers, the ideal self, and expectations of important individuals). (7) The self-concept may be differentiated from other constructs to which it is theoretically related.

Self-concept in adolescence is linked to adolescents' interactions, performance, and assessment in the academic or educational environment. They compare their performance with that of others (i.e. external comparison), and they also compare their own performance in different areas (i.e. internal comparison). These processes are called the internal/external reference model of self-concept development [23]. Matějček & Vágnerová [24] address the personal and social elements of self-esteem. The personality element is based on a comparison of the individual's own competences with one another. The social element is based on a

comparison of one's own competences with those of others (who are similar to the individual with regard to age, gender, etc.). Another specific category of formative influences are reactions of reference persons: in the period of adolescence, this group involves parents and teachers. Their tendency to identify the causes of success/failure at school, satisfaction/dissatisfaction with school results, emotional reactions related to school performance, and possible disagreements and conflicts between parents and teachers significantly influence the adolescent's self-constructs and thus even his/her self-esteem, which results from interpretation of causes of school success or failure.

A characteristic feature of self-concept in adolescence is that adolescents develop their ability to coordinate self-representations that were previously separated and to integrate those that were contradictory. In addition, school age involves a shift in the principles according to which cognitive content and experience related to one's self are organized and integrated. The deeper embeddedness of one's self in time results in an awareness of the higher stability of one's own personality and relatively high and stable self-esteem [25].

Social comparison, conditioned with development of cognitions, leads to deepening of perceived individual differences and specifics in self-concept. With increasing age, adolescents focus more and more on mental qualities (compared to physical characteristics). Development in meta-cognition results in new levels of self-reflection. Adolescents are able to reflect on their own cognition and evaluate their knowledge and competences (self-esteem). They have a good understanding of success in areas where they yearn to excel as well as failure in areas where they do not yearn to succeed. Higgins [11] confirms that lack of success in areas that are considered unimportant does not decrease overall self-esteem.

Self-esteem is an inherent aspect of self-concept. Its exploration at the adolescent age should be part of personality development in adolescents, as well as development of social relationships at school. As pointed out by multiple studies [26] [27] [28], one of the most frequently used diagnostic tools for assessment of the level of self-esteem, that may easily be employed by professionals working with adolescents, is Rosenberg's Self-Esteem Scale. With regard to the size and time needed for administration, this scale may be considered a suitable screening tool. The present research study presents its psychometric analysis. The topic of interest was whether, in the context of specifics of the adolescent population in the Czech Republic, we may consider self-esteem a unidimensional construct as presumed by Rosenberg [29], or whether the evidence supports a two-factor structure, as presented for instance by Halama & Bieščad [30] as well as by Tafarodi & Milne [31].

## 2. Method

Rosenberg's Self-Esteem Scale (hereafter RSS) was published by Rosenberg in 1965. The scale is designed as a unidimensional construct providing information on global self-esteem. Kaplan & Pokorny [32] determined that factor rotation enables the observation of two factors constituted by a group of positively and negatively formulated items. In their terminology, the positively saturated factor is called self-worth; the negative factor is called self-derogation. Subsequent studies confirmed the above-described two-factor structure of the scale [30] [33] [34]. They also regard the scale as the coherent unified structure of the factor of global self-esteem. By decomposing the global self-esteem factor, Tafarodi & Milne [31] identified the factors of self-competence and self-liking, and formulated the conclusion that these factors may be observed even within RSS. The decomposed factor of global self-esteem has been used in studies verifying the psychometric characteristics of RSS in relation to the cultural dimensions of collectivism and individualism [27] as well as various demographic factors [28] [35].

RSS consists of ten items; these are assessed by participants on a four-point scale: strongly disagree, disagree, agree, strongly agree. The Czech version was designed by Blatný & Osecká [36]. According to Halama & Bieščad [30], it is possible to identify: (1) A subscale of self-worth, which represents positive self-esteem; an example of an item within the scale: "I feel that I have a number of good qualities." (2) A subscale of self-derogation, which represents negative self-esteem; an example or an item within the scale: "At times I think I am no good at all." (3) The total RSS score which represents one's opinions on himself/herself and his/her own value.

The reliability of RSS is  $\alpha = 0.81$  [37].

The score range in each scale is 0-20 points; the total score range is 0-40 points.

Questionnaires were run in the paper form. In relation to the adolescent population, it might be beneficial to also use the electronic form which is regarded, according to Vispoel, Boo, & Bleiler [38], as more attractive by adolescents compared to the paper form because it is easier to read, answers may be recorded more easily, and the form is less tiring and more comfortable.

The research involved 7,733 adolescents aged 11-19 ( $M = 14.57$ ;  $SD = 2.22$ ) from the Czech Republic: 3,700 boys and 4,033 girls (Table 1). Out of the total amount, 2,976 adolescents attended an elementary school (lower secondary education), 4,070 attended a general secondary school (higher secondary education), and 687 attended a specialized secondary school (all three type of schools belong to ISCED 2

and 3) (Table 2). The distribution of the research sample was as follows:  $N_{age\ 11} = 600$  (7.8 % of the research sample),  $N_{age\ 12} = 1044$  (13.5 %),  $N_{age\ 13} = 1155$  (14.9 %),  $N_{age\ 14} = 1227$  (15.9 %),  $N_{age\ 15} = 944$  (12.2 %),  $N_{age\ 16} = 947$  (12.2 %),  $N_{age\ 17} = 865$  (11.2 %),  $N_{age\ 18} = 719$  (9.3 %),  $N_{age\ 19} = 232$  (3.0 %). Adolescents attended an elementary school were aged 11-16 ( $M = 13.12$ ,  $SD = 1.27$ ), adolescents attended a general secondary school were aged 11-19 ( $M = 15.30$ ,  $SD = 2.28$ ), adolescents attended a specialized secondary school were aged 15-19 ( $M = 16.53$ ,  $SD = 1.24$ ).

The count of the research sample responds to the confidence level 99 % and the accuracy level 2.5 % [39].

The descriptive characteristics of the self-esteem according to type of school and gender are provided in Tables 1 and 2. Questionnaires where two or more items were unanswered were excluded from analysis. For questionnaires where one item was missing, the item was filled in using the method of data imputation by average values.

Table 1. Descriptive values of RSS in relation to gender

Gender	N	M	SEM	SD	Min	Max
Boys	3,700	25.96	0.04	2.19	17	35
Girls	4,033	25.68	0.03	2.05	16	34
Total	7,733	25.81	0.02	2.12	16	35

Table 2. Descriptive values of RSS in relation to type of school

Type of school	N	M	SEM	SD	Min	Max
Elementary school	2,976	25.51	0.04	2.14	17	34
General secondary school	4,070	25.99	0.03	2.08	16	35
Specialized secondary school	687	26.03	0.08	2.16	19	33
Total	7,733	25.81	0.02	2.12	16	35

## 3. Results

For testing of hypothesis about the two-dimensional construction of RSS [30] we used confirmatory factor analysis and the method of Item Response Theory.

Table 3 presents the descriptive indicators of the individual items. The correlation of items with the total score, as well as the correction of Cronbach's  $\alpha$  after exclusion of an item indicate the lower quality of items 1 and 8. The reliability of the whole scale, regarding internal coherence, reached a satisfactory value of 0.815.

Table 3. Descriptive characteristics of individual items in relation to the internal consistence of the scale

Item	M	SD	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. I feel that I'm a person of worth, at least on an equal plane with others. (OT1)	3.02	0.665	25.000	19.475	0.235	0.822
1. I feel that I have a number of good qualities. (OT2)	3.06	0.633	24.958	18.236	0.491	0.799
2. I am able to do things as well as most other people. (OT3)	3.06	0.650	24.960	18.256	0.471	0.801
3. I take a positive attitude toward myself. (OT4)	3.00	0.711	25.015	17.158	0.616	0.786
4. On the whole, I am satisfied with myself. (OT5)	2.91	0.730	25.103	17.089	0.608	0.786
5. All in all, I am inclined to feel that I am a failure. (OT6)	2.76	0.764	25.250	17.539	0.495	0.798
6. I feel I do not have much to be proud of. (OT7)	2.93	0.815	25.087	16.848	0.565	0.790
7. I wish I could have more respect for myself. (OT8)	2.37	0.793	25.648	18.216	0.362	0.813
8. I certainly feel useless at times. (OT9)	2.53	0.832	25.487	16.676	0.578	0.789
9. At times I think I am no good at all. (OT10)	2.39	0.898	25.627	16.535	0.541	0.793

\*overall Cronbach's  $\alpha = 0.815$

A confirmatory two-factor analysis pointed out, however, that the two-factor model of self-esteem is, in relation to the collected data and the research sample, unsatisfactory. The single-factor model showed parameters of better quality. We employed the Maximum Likelihood (ML) method, using the program JASP 0.14.1.0. The following data have been acquired:  $\chi^2(35) = 3,104.133$ ,  $p < 0.001$ ; CFI = 0.850; TLI = 0.807; RMSEA = 0.106; SRMR = 0,061. the values of CFI (Comparative Fit Index), TLI (Tucker-Lewis Index), and SRMR (Standardized Root Mean Square Residual) are not sufficient [40]. Similarly, RMSEA (Root Mean Square Error of Approximation) reached a value above the required level of 0.05. The values of factor loading are presented in Figure 2. The opposite polarity of the first five items and the other five might support the single-factor model. Its parameters were, however, not acceptable, as already mentioned above.

For this reason, we investigated the covariances using Modification Indices (MI) and Residual Covariances. It has been determined that if creating a covariance between items 9 and 10,  $\chi^2$  decreases by MI = 1,129.802; in case of covariance between items 4 and 5 it decreases by MI = 793.891, and for covariance between items 2 and 3 it decreases by MI = 639.519.

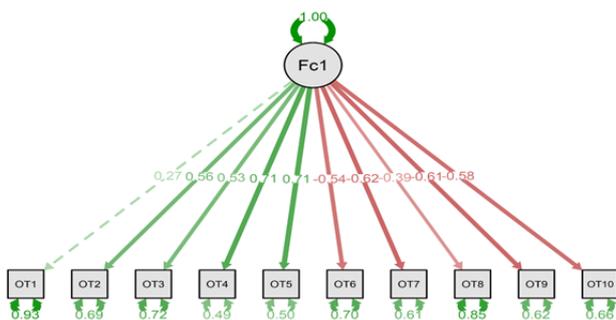


Figure 2. Sectional Diagram of the Unidimensional Model of Self-Esteem

For this reason, covariances were investigated using Modification Indices and Residual covariances, which indicated that when creating a covariance between items 9 and 10,  $\chi^2$  decreases by MI = 1129.802 (strength of covariance = 0.36); if creating a covariance between items 4 and 5, it decreases by MI = 793.891 (strength of covariance = 0.33); and if creating a covariance between items 2 and 3, it decreases by MI = 639.519 (strength of covariance = 0.28).

The model involving covariances indicated a sufficient fit:  $\chi^2(32) = 915.826$ ,  $p < 0.001$ ; CFI = 0.957; TLI = 0.939; RMSEA = 0.060; SRMR = 0.041. The values of chi-squared are still high, but these values are significantly influenced by the size of the research sample. The Figure 3 provides a diagram with added covariances. The Maximum Likelihood method was used once again. The values of the adjusted factor loadings are presented in Figure 3. The parameters are obviously better.

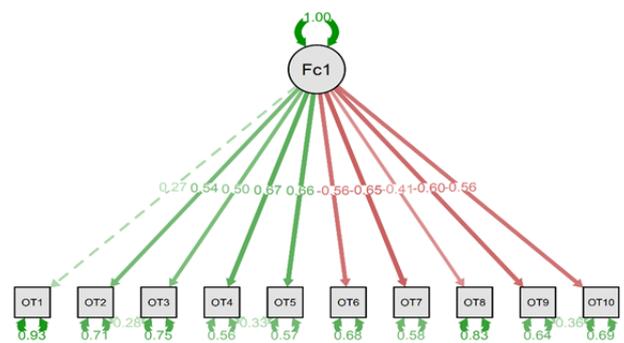


Figure 3. Sectional Diagram of the Unidimensional Model of Self-Esteem Adjusted with Covariances

The analysis of IRT was unidimensional. It was conducted in the program IRTPRO 4.2. We decided to apply the model GRM (Graded Response Model) [41] and the Bock-Aitkin method; the model fit was

assessed based on M2 statistics, which is more suitable for ordinal data [42]. We acquired various values of discriminatory power for individual items (Table 4). The measured values ranged from 0.46 (item 1) to 2.41 (item 4). Items 1 and 8 manifested the lowest discriminatory power, although threshold coefficients  $b_1$ ,  $b_2$ , and  $b_3$  reached the required values. The values of M2 statistics were as follows:  $-2\log\text{likelihood} = 19,639.16$ ;  $M2(395) = 2,262.44$ ,  $p < 0,001$ ;  $RMSEA = 0.07$ . The listed parameters did not reach the required values. We believe that this fact results from the lower discriminatory power of items 1 and 8.

Table 4. Discriminatory Power of Items According to GRM

Item	$a$	$s.e.$	$b_1$	$s.e.$	$b_2$	$s.e.$	$b_3$	$s.e.$
1	0.46	0.07	-7.30	1.17	-3.76	0.59	3.22	0.51
2	1.46	0.11	-3.36	0.24	-1.76	0.11	1.09	0.09
3	1.17	0.09	-4.17	0.35	-1.97	0.14	1.21	0.10
4	2.41	0.17	-2.48	0.13	-1.09	0.06	0.91	0.06
5	2.39	0.16	-2.27	0.12	-0.88	0.05	1.07	0.07
6	1.44	0.10	-2.56	0.16	-0.72	0.07	1.45	0.10
7	1.77	0.12	-2.38	0.14	-0.86	0.06	0.81	0.07
8	0.83	0.08	-2.53	0.23	0.32	0.09	3.02	0.27
9	1.84	0.12	-1.78	0.10	-0.03	0.05	1.46	0.09
10	1.64	0.11	-1.51	0.09	0.36	0.06	1.46	0.10

Figure 4 shows characteristic curves and information curves of individual items describing whether there is a difference between the individual answer options (four-point scale: strongly disagree, disagree, agree, strongly agree) and whether their values are distinctive (characteristic curves), and what information value the selection of a particular answer option has when the item is assessed by participants (information curves).

The shape of the curve once again indicates that items 1 and 8 are problematic. Their discriminatory power may be considered low, or very low [43].

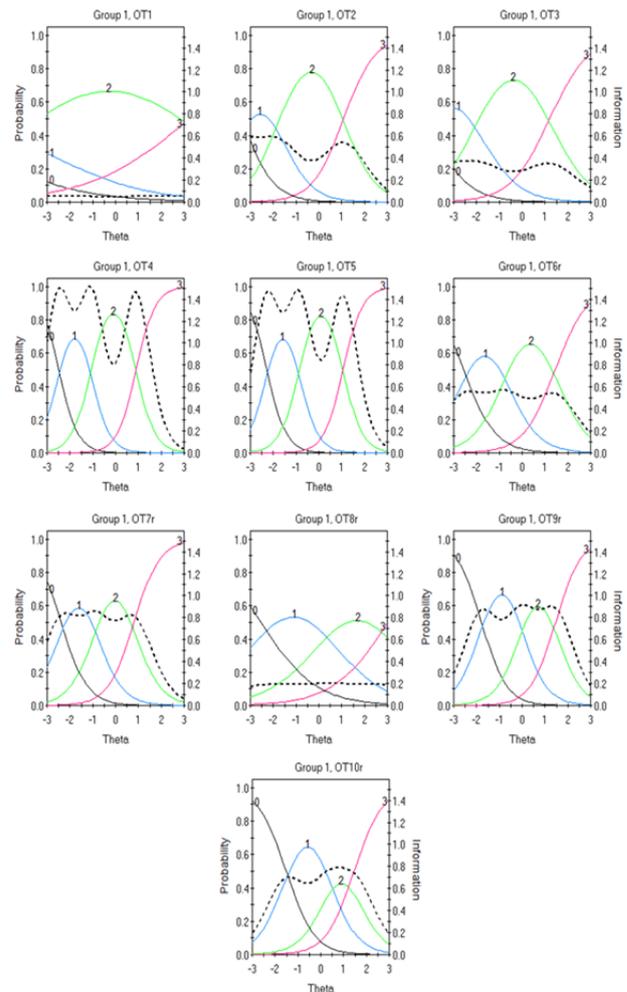


Figure 4. Characteristic Curves of Individual Self-Esteem Scale Items

Table 5. Information Function of Scale Items in Relation to Theta Values

Item	$\theta$ :														
	-2.8	-2.4	-2	-1.6	-1.2	-0.8	-0.4	0	0.4	0.8	1.2	1.6	2	2.4	2.8
1	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
2	0.59	0.59	0.59	0.56	0.49	0.42	0.38	0.4	0.46	0.53	0.54	0.47	0.35	0.24	0.15
3	0.37	0.37	0.37	0.35	0.32	0.29	0.28	0.29	0.31	0.34	0.35	0.33	0.28	0.22	0.16
4	1.27	1.51	1.35	1.34	1.51	1.34	0.94	0.82	1.11	1.45	1.29	0.78	0.37	0.15	0.06
5	0.98	1.42	1.43	1.28	1.41	1.46	1.14	0.85	0.97	1.33	1.4	0.98	0.5	0.22	0.09
6	0.52	0.56	0.55	0.55	0.56	0.57	0.55	0.51	0.49	0.51	0.54	0.53	0.45	0.34	0.23
7	0.69	0.82	0.83	0.82	0.85	0.86	0.81	0.77	0.8	0.82	0.7	0.5	0.3	0.17	0.09
8	0.18	0.19	0.19	0.19	0.19	0.19	0.2	0.2	0.2	0.2	0.2	0.19	0.19	0.19	0.19
9	0.39	0.62	0.82	0.88	0.81	0.79	0.86	0.92	0.89	0.87	0.9	0.86	0.67	0.44	0.25
10	0.26	0.41	0.58	0.69	0.7	0.66	0.66	0.72	0.77	0.79	0.78	0.71	0.57	0.39	0.24
Information value	6.31	7.54	7.77	7.71	7.89	7.62	6.85	6.52	7.06	7.89	7.74	6.39	4.75	3.41	2.51
Expected s.e.	0.4	0.36	0.36	0.36	0.36	0.36	0.38	0.39	0.38	0.36	0.36	0.4	0.46	0.54	0.63

An analysis of the information function of individual items (Table 5) shows that within the scale, the majority of information was acquired in the interval of theta values ranging from -2.4 to 1.2 with a drop between -0.4 and 0. This trend may also be observed in Figure 5. We argue that the error rate of the scale increases in the right-hand section of the curve, which suggests that the scale does not allow for a good discrimination of people with high self-esteem.

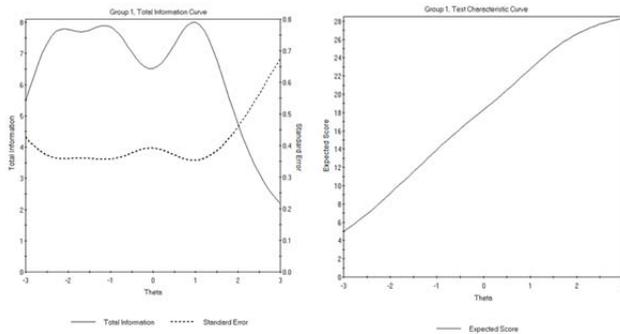


Figure 5. Characteristic Curve and Information Curve of the Entire Scale

#### 4. Discussion

The results of an analysis lead us to the conclusion that the unidimensional conception of self-esteem seems to be sufficient when using Rosenberg's Self-Esteem Scale in adolescent population. The results of our analysis suggest that the two-factor model of self-esteem measured with this scale is problematic in relation to the parameters identified in the analysis. Sub-scales of self-worth and self-derogation do not seem to be independent factors; in contrast, their identification is based on a formulation of the individual items (which either increase or decrease self-esteem). As shown in our analysis, and as confirmed by other studies [34] [44] [45], RSS may be perceived as a unidimensional construct.

The analysis provided us with results that allow us to form the conclusion that RSS contains two problematic items: item 1, i.e. "I feel that I'm a person of worth, at least on an equal plane with others." and item 8, i.e. "I wish I could have more respect for myself." (The items do not necessarily have the same number compared to the original scale. The numbers of some items were changed for the purpose of analysis and calculation of the score of inverted items. In our research sample, these items had the lowest discriminatory power. The total score of the scale was specific as to the fact that its mean values did not differentiate between people with different scores. As to high values, the discriminatory power of the scale significantly decreased and the error probability increased. It is possible that the problematic nature of these two items is linked to

cultural differences between Czech and Slovak society compared to American society. From the perspective of semantic interpretation, all the remaining items are partially related to evaluation of oneself in relation to the performative element of the personality. In contrast, items 1 and 8 are semantically linked to the element of dignity or respect. This area may be, particularly in early adolescence (age 11-14), more difficult to assess, as it is more abstract and general.

Diagnostics of self-esteem in adolescence is one of the key areas of psychological activity. Self-esteem depends on multiple factors: (1) performance and its quality, (2) the effort one has exerted in the performance, (3) subjective interpretation of the performance, (4) subjective importance of the area in which one shall perform, and (5) external feedback and sensitivity to it. At the same time, overall self-esteem is derived from experience in various areas of one's life and is general or specific to a different degree: more general areas are for instance school performance, close relationships, and interests; more specific areas involve, for example, performance in Maths, one's relationship to one's mother or the relation to success experience in the process of learning to play a musical instrument. In order to conduct a more detailed analysis of self-esteem in adolescents, we would need to modify the scale so as to relate it to particular areas and the experience of adolescents in these areas.

Based on the results of our research, we conclude that when diagnosing self-esteem in adolescents, it is important to take into account age. Our research sample involved a large age span, particularly 11-19, with the average age equalling 14.57 years. The average total score in general self-esteem is 25.81. In a study conducted by Halama & Bieščad [30], adolescents with an average age of 18.77 years reached the average score 29.93, which is more than four points higher. Our findings confirm that for research involving early adolescents it would be advisable to relate the scale to a specific area of self-esteem.

We have not identified any gender-based difference in the total score of RSS (the average total score was 25.96 for boys and 25.68 for girls). We have, however, observed a statistically significant difference in the proportion of adolescent boys and girls with low self-esteem. The score 21 points is accepted as the critical threshold of low self-esteem [46]. Our results point out that this score was reached by 5.7 % of boys and 10.0 % of girls. The difference is statistically significant at the level  $\alpha < 0.001$  ( $\chi^2 = 47.901$ ). This phenomenon was also observed by Baghly, Bolitho & Bertrand [46] when researching Canadian adolescents aged 12-19; they also identified that the majority of adolescents

manifesting low self-esteem are girls (7.5%), compared to boys (2.7%). The total score of Canadian adolescents was, however, higher in comparison with Czech adolescents (boys 31.36; girls 28.32). This fact might reflect the cultural specifications, which needs to be taken into account when using the Self-Esteem Scale with adolescents.

## 5. Conclusion

From the psychometric perspective, the use of RSS in the adolescent population differs from the use in the adult population. When interpreting the results, it is not necessary to consider the two-component structure of it. Self-esteem can be considered a global factor without internal division in this population.

## Acknowledgements

*The authors received the financial support for the research of this article from the project IGA FF\_2020\_002 - Hodnotový systém súčasných českých a slovenských adolescentov pod vplyvom internetu (in English: The value system of contemporary Czech and Slovak adolescents under the influence of the Internet).*

## References

- [1]. Kuhl, J. (1984). Volitional aspects of achievement motivation and learned helplessness: Toward a comprehensive theory of action control. In *Progress in experimental personality research* (Vol. 13, pp. 99-171). Elsevier.
- [2]. Bandura, A. (1999). Social cognitive theory of personality. *The coherence of personality: Social-cognitive bases of consistency, variability, and organization*, 185-241.
- [3]. Baumeister, R. F. (2005). Self-concept, self-esteem, and identity. In V. Derlega, B. Winstead, & W. Jones (Eds.), *Personality: Contemporary theory and research*, 3, 246-280. San Francisco, CA: Wadsworth
- [4]. Werff, J. V. D. (1990). The Problem of Self-Conceiving. In *Coping and Self-Concept in Adolescence* (pp. 13-33). Springer, Berlin, Heidelberg.
- [5]. Papica, J. (1985). Sebepojetí, jeho struktura a funkce. *J. Hudeček, J. Papica & kol.(Eds.) Autoregulační mechanismy osobnosti*, 16-27.
- [6]. Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American psychologist*, 34(10), 906-911.
- [7]. Yalom, I. D. (2020). *Existenciální psychoterapie*. PORTÁL sro.
- [8]. Greenwald, A. G., & Pratkanis, A. R. (1984). The self. In R. S. Wyer & TK Srull. *Handbook of social cognition*, 3(8), 129-178. Erlbaum.
- [9]. Blatný, M. et al. (2010). *Psychologie osobnosti: hlavní témata, současné přístupy*. Grada.
- [10]. Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American psychologist*, 35(7), 603-618.
- [11]. Higgins, E. T. (1987). Self-discrepancy: a theory relating self and affect. *Psychological review*, 94(3), 319-340.
- [12]. Ogilvie, D. M. (1987). The undesired self: A neglected variable in personality research. *Journal of personality and social psychology*, 52(2), 379-385.
- [13]. Rogers, C. R. (1951). *Client-centered therapy: Its current practice, implications, and theory, with chapters*. Boston, MA: Houghton Mifflin.
- [14]. Markus, H., & Nurius, P. (1986). Possible selves. *American psychologist*, 41(9), 954-969.
- [15]. Allport, G. W. (1961). Pattern and growth in personality. *Holt, Rinehart and Winston*.
- [16]. Rosenberg, M., Kaplan, H.B., (1982). *Social psychology of the self-concept*, 1-11. Harlan Davidson.
- [17]. Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of educational research*, 46(3), 407-441.
- [18]. Higgins, E.T. (1991). Development of self-regulatory and self-evaluative processes: Costs, benefits, and trade-offs. In M.R. Gunnar, & L.A. Sroufe (Eds.), *Self-processes in development: The Minnesota Symposium on Child Development*, 23, 125-165. Erlbaum.
- [19]. Harter, S. (1985). Competence as a dimension of self-evaluation: Toward a comprehensive model of self-worth. *The development of the self*, 2, 55-121.
- [20]. Tafarodi, R. W., & Swann Jr, W. B. (1995). Self-linking and self-competence as dimensions of global self-esteem: initial validation of a measure. *Journal of personality assessment*, 65(2), 322-342.
- [21]. Baumeister, R. F., Heatherston, T. F., & Tice, D. M. (1993). When ego threats lead to self-regulation failure: negative consequences of high self-esteem. *Journal of personality and social psychology*, 64(1), 141-156.
- [22]. Marsh, H. W. (1993). Self-esteem stability and responses to the stability of self scale. *Journal of Research in Personality*, 27(3), 253-269.
- [23]. Marsh, H. W. (1986). Verbal and math self-concepts: An internal/external frame of reference model. *American educational research journal*, 23(1), 129-149.
- [24]. Matějček, Z., & Vágnerová, M. (2006). *Sociální aspekty dyslexie*. Karolinum, Praha.
- [25]. Macek, P., Šulová, L., & Konečná, V. (2009). Proměny vztahu k sobě v průběhu dětství a dospívání. In I. Poledňová (Ed.), *Sebepojetí dětí a dospívajících v kontextu školy, I*, 7-25. Masarykova univerzita.
- [26]. Bagley, C., Bolitho, F., & Bertrand, L. (1997). Norms and construct validity of the Rosenberg Self-Esteem Scale in Canadian high school populations: Implications for counselling. *Canadian Journal of Counselling and Psychotherapy*, 31(1), 82-92.
- [27]. Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: exploring the universal and culture-specific features of global self-esteem. *Journal of personality and social psychology*, 89(4), 623-642.

- [28]. Sinclair, S. J., Blais, M. A., Gansler, D. A., Sandberg, E., Bistis, K., & LoCicero, A. (2010). Psychometric properties of the Rosenberg Self-Esteem Scale: Overall and across demographic groups living within the United States. *Evaluation & the health professions, 33*(1), 56-80.
- [29]. Rosenberg, M. (1965). Adolescent self-image. Princeton, NJ: Princeton University Press. Samedd, J.(1986). *Delinquent networks*. Stockholm: National Council for Crime Prevention. Swartz, F.(1981). *Supporting or subvertin learning: Peer group patterns in four tracked schools*. *Anthropology and Education Quarterly, 12*, 99-121.
- [30]. Halama, P., & Biescad, M. (2006). Psychometrická Analýza Rosenbergovej Skály Sebahodnotenia S Použitím Metód Klasickej Teórie Testov (CTT) A Teórie Odpovede Na Polozku (IRT) 1. *Ceskoslovenská psychologie, 50*(6), 569-583.
- [31]. Tafarodi, R. W., & Milne, A. B. (2002). Decomposing global self-esteem. *Journal of personality, 70*(4), 443-484.
- [32]. Kaplan, H. B., & Pokorny, A. D. (1976). Self-derogation and suicide—I: Self-derogation as an antecedent of suicidal responses. *Social Science & Medicine (1967), 10*(2), 113-118.
- [33]. Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). Global self-esteem as a correlate of work-related attitudes: A question of dimensionality. *Journal of personality assessment, 54*(1-2), 276-288.
- [34]. Vallieres, E. F., & Vallerand, R. J. (1990). Traduction et validation canadienne-française de l'échelle de l'estime de soi de Rosenberg. *International journal of psychology, 25*(2), 305-316.
- [35]. Westaway, M. S., Jordaan, E. R., & Tsai, J. (2015). Investigating the psychometric properties of the Rosenberg self-esteem scale for south African residents of greater Pretoria. *Evaluation & the health professions, 38*(2), 181-199.
- [36]. Blatný, M., & Osecká, L. (1994). Rosenbergova škála sebahodnocení: struktura globálního vztahu k sobě. *Československá psychologie, 38*(6), 481-488.
- [37]. Vaculík, M. (2000). Sebahodnocení hráčů počítačových her v adolescenci. *Československá psychologie, 44*(3), 279-286.
- [38]. Vispoel, W. P., Boo, J., & Bleiler, T. (2001). Computerized and paper-and-pencil versions of the Rosenberg Self-Esteem Scale: A comparison of psychometric features and respondent preferences. *Educational and psychological measurement, 61*(3), 461-474.
- [39]. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement, 30*(3), 607-610.
- [40]. Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal, 6*(1), 1-55.
- [41]. Samejima, F. (1969). Estimation of latent ability using a response pattern of graded score. *Psychometrika Monograph, 17*, 1-100.
- [42]. Maydeu-Olivares, A., & Joe, H. (2014). Assessing approximate fit in categorical data analysis. *Multivariate Behavioral Research, 49*(4), 305-328.
- [43]. Baker, F. (2001). *The basics of item response theory*. ERIC Clearinghouse on Assessment and Evaluation. University of Maryland College Park, MD.
- [44]. Lee, J. Y., Nam, S. K., Lee, M. K., Lee, J. H., & Lee, S. M. (2009). Rosenberg's self-esteem scale: analysis of item-level validity. *Korean J Couns Psychother, 21*(1), 173-189.
- [45]. Martín-Albo, J., Núñez, J. L., Navarro, J. G., & Grijalvo, F. (2007). The Rosenberg Self-Esteem Scale: translation and validation in university students. *The Spanish journal of psychology, 10*(2), 458-467.
- [46]. Bagley, C., Bolitho, F., & Bertrand, L. (1997). Norms and construct validity of the Rosenberg Self-Esteem Scale in Canadian high school populations: Implications for counselling. *Canadian Journal of Counselling and Psychotherapy, 31*(1), 82-92.