The Short Index of Self-Actualization: A factor analysis study in an Italian sample

El Short Index of Self-Actualization: un Análisis factorial en una Muestra Italiana

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ABSTRACT

The concept of self-actualization has been the subject of much theoretical speculation over the years. The essential meaning entails the discovery of the real self and its expression and development. As for the instruments available to measure the construct, there are currently several scales considered to be suitable to this end. However, many of these have been considered too long or presented problems with inadequate validation. This is the reason why a short index of self-actualization has been developed (Jones & Crandall, 1986). This index, best known as the Short Index of Self-Actualization or the Self-Actualization Scale (SAS), is now a widely used short form to measure self-actualization. The present study provides a psychometric analysis of the SAS, in order to highlight its strengths and weaknesses and to offer a starting point to a further and broaden investigation.

RESUMEN

A lo largo de los años, el concepto de autorrealización ha sido objeto de muchas especulaciones teóricas. El significado fundamental de este concepto implica el descubrimiento del auténtico yo, así como su expresión y desarrollo. Dentro de las herramientas para medir su validez, actualmente hay varios grados adecuados para este propósito. Sin embargo, se considera que la mayoría de estas herramientas conllevan un largo tiempo o presentan problemas al validar incorrectamente. Por estas razones, se ha desarrollado un breve índice de autorrealización (short Index of self-actualization by Jones & Crandall, 1986). Este índice, conocido como Índice de Autorrealización o Escala de Autorrealización, SAS (Short Index of Self-Actualization or Self-Actualization Scale, SAS), se usa ampliamente como modo breve de medir los indicadores de autorrealización. Este estudio proporciona un análisis psicométrico preciso de esta herramienta, recalcando sus ventajas e inconvenientes, para así brindar un punto de partida para análisis más extensos y amplios.

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1. INTRODUCTION

Self-actualization has been the subject of much theoretical speculation over the years (Fromm, 1941; Goldstein, 1939; Rogers, 1963). The essential meaning of the concept entails the discovery of the real self and its expression and development (Cofer & Appley, 1964).

Ellis (1991) noted that self-actualizing persons enjoy unconditional self-acceptance, i.e., "they can choose to accept 'themselves' whether or not they perform wed, are approved by significant others, or have deficits and handicaps". Descriptions of fulfillment, detachment (comfort with solitude), and unconditional self-acceptance imply that self-actualization is a model of optimal adaptation.

According to Maslow's motivational theory (1943, 1954, 1968), the self-actualizing person has basic needs satisfied, he/she is free from illness and he/she is using capacities to the fullest extent. In general, the self-actualizing person is in the process of maximizing his/her full potential. Sitting at the top of Maslow's "hierarchy of needs" (Maslow, 1943), self-actualizing people can be described as persons realizing their potential, "fulfilling themselves" and "doing the best they are capable of doing" (Maslow, 1954). Owing to this framework, this stage in the hierarchy can only be achieved when needs lower down in the hierarchy are satisfied: for example, if one is hungry then he/she will be devoting his/her efforts to finding food before self-actualizing can occur.

Maslow's hierarchy begins, at the bottom, with physiological needs and progresses to safety needs, love needs, self-esteem needs, and, finally, the need for self-actualization. Such an individual would then have some particular characteristics, such as more accurate judgment and perception, more self-acceptance, absence of unnecessary defense and anxiety, spontaneity. Furthermore, self-actualized individuals are described by Maslow (1943, 1954) to be free from societal influences (not bound by the expectations and opinions of others), autonomous and independent. Self-actualized also approaches life with an attitude of "newness or appreciation of old experiences as if they were new" (Wilson, 1969).

Nonetheless, self-actualization concept has been criticized. Wilson (1997), for instance, notes that Maslow does not specify what kind of society, culture or environment is ideal to harvest self-actualization in people. Many theorists suggest that modern culture plays a significant role in facilitating self-actualization, since it encourages autonomy (Hewitt, 1989; Giddens, 1991; Marks, 1979; Wilson, 1997). Such observations on the influence of "modern culture" on self-actualization have mainly focused on Western cultures (USA, UK).

Thus, researchers tried to verify if the concept of self-actualization is a culturally valid concept. Hofstede (1980) explains that although human beings are collective creatures with gregarious natures, "human societies show gregariousness to different degrees" (p. 209), highlighting the dimensions of individualism and collectivism in culture and society (Triandis, 1971, 1995).

Some research testing for cultural differences in self-concepts showed that people from an individualistic culture tended to use idiocentric sentences the most and group sentences the least, whereas people from a collectivistic culture showed the opposite trend (Gudykunst, Yang & Nishida, 1987; Bochner, 1994). Many agree that both the one's culture and the social system in which one has raised may affect motivation and behavior, and subsequently also the "need" for self-actualization (Markus & Kitayama, 1991; Bandura, 1995, 2002; Fromm, 1955; Nisbett, 2003; Nisbett, Peng, Choi & Norenzayan, 2001).

As for the instruments available to measure self-actualization, several scales are considered to be suitable to this end [the most known are the Personal Orientation Inventory (POI; Shostrom, 1964), and the Personal Orientation Dimensions (POD; Shostrom, 1975).

However, many of these have been considered too long or presented problems with inadequate validation (Crandall, McCown, Robb, 1988). That is why a short measure of self-actualization has been developed (Jones & Crandall, 1986). This scale, best known as the Short Index of Self-Actualization or the Self-Actualization Scale (SAS; Jones & Crandall, 1986), is now a widely used short form to measure Maslow's concept of self-actualization, "considered to be the highest level of well-being for humans" (Kasser & Ryan, 1993, p. 412).

The index, consisting of 15 items, presents a 4-point Likert-type scale with the following alternatives: 1 (disagree), 2 (somewhat disagree), 3 (somewhat agree), and 4 (agree). The items were derived from well established scales (POI, and POD). As it has been widely shown, this short index is particularly useful when there is not time to administer the longer scales or when the sub-aspects of self-actualization are not of concern.

Although there is general evidence that supports the use of the SAS, some concerns have been raised about the instrument's factor structure (Crandall & Jones, 1991; Ebersole & Humphreys, 1991; Flett,

Blankstein & Hewitt, 1991; Lefrançois, Leclerc, Dubé, Herbert & Gaulin, 1998; Richard & Jex, 1991; Tucker & Weber, 1988).

Initially, in the Jones and Crandall analysis, the SAS was subjected to a principle components analysis with a varimax rotation to simple structure. Those factors with eigenvalues greater than one were extracted. Salient loadings were considered to be .40 or greater. Based on these criteria, principal component analysis has found five factors emerging from the 15-item questionnaire: (a) autonomy or self-direction, (b) self-acceptance and self-esteem, (c) acceptance of emotions and freedom of expression of emotions, (d) trust and responsibility in interpersonal relations, and (e) ability to deal with undesirable aspects of life. The first four factors can be related to some important aspects of the functioning of the psychologically healthy or self-actualizing person, the fifth factor is not easily interpreted but appears to be related to the ability to deal with undesirable aspects of life, rather than avoiding them (Jones & Crandall, 1986, pag. 69). Alpha for the 15-item index was .65, indicating a generally weak internal consistency of the scale (Henson, 2001; Nunnally & Bernstein, 1994). The performed factor analysis lacks in their reporting in several ways (Henson & Roberts, 2006). Firstly, principal component analysis is not a true method of factor analysis and it can produce inflated values of variance accounted for by the components. Factor analysis should be used to accurately identify the structure underlying a set of variables (Gorsuch, 1990; Henson & Roberts, 2006). Secondly, according to the modern standards, the Guttman-Kaiser eigenvalue greater-than-one rule is not recommended for determining the number of factors to retain in exploratory factor analysis (Henson & Roberts, 2006; O'Connor, 2000; Zwick & Velicer, 1986). Methods such as parallel analysis and/or minimum average partial criteria should be employed. Thirdly, items exhibiting multiple loadings without a difference of at least .30 between loading on the primary factor and loading on other factors should be removed. Five items in the original study showed double loadings (specifically, item 1 "I do not feel ashamed of any of my emotions", item 6 "I don't accept my own weakness", item 10 "It is better to be yourself than to be popular", item 11 "I have no mission in life to which I feel especially dedicated", and item 13 "I do not feel responsible to help anybody"). Besides, item 2 "I feel I must do what others expect me to do" loaded simultaneously on three different factors. Fourthly, two of the reported factors consisted of only two indicators. Lastly, the percentage of the total variance explained by each principal component should be reported. The reliability values, in terms of internal consistency, for each indicated subscale should be reported, too. Given this, the emerging structure seems to some extent questionable in that it is unclear whether the same results would survive a parallel factor analysis and a confirmatory approach with different samples.

Tucker and Weber (1988) used confirmatory factor analysis to re-analyze the data from 332 students in the original study by Jones and Crandall. Despite the analysis confirmed the existence of five factors, they also observed that the obtained error estimates for the instrument were high and the item reliabilities were relatively low. They concluded that "The Instrument in its present form, consists of variables that may well have been inadequately conceptualized. Items that could define factors with greater clarity and reliability must be considered in future analysis" (Tucker and Weber, 1988, pag. 44).

Flett, Blankstein and Hewitt (1991) re-examined the factor structure of the SAS in a quite large sample of college students (799 students from an introductory psychology class). In contrast to previous research, the study by Flett, Blankstein and Hewitt was based on a six-point response format.

As expected, it was demonstrated that the SAS consists of more than one factor. The results of this study showed that three meaningful factors could be identified. However, it appeared that only the first factor (tolerance of failure) was assessed with an adequate degree of reliability. The authors concluded that "results with the other factors must be interpreted with extreme caution" (Flett, Blankstein and Hewitt, 1991, pag. 327).

A study on Romanian and American students' aspirations and well-being adopted the SAS among well-being measures. Internal consistency estimates showed poor reliability for both the American sample (α = .59) and the Romanian sample (α = .50). A factor analysis of the data converged on six factors for each sample, disconfirming outcomes from the original study. However, the coefficients of congruence between the two samples were quite low (Tucker's phi between .59 and .88), and a reduction in the number of factors for this scale did not lead to any improvement (Frost & Frost, 2000).

Moving from previous inconsistent results and from cross-cultural issues in psychological testing, the aim of the present study was to provide a contribution in assessing the psychometric properties of the SAS in a sample of Italian high school students. In particular, Study 1 is aimed to replicate Jones and Crandall's (1986) factor structure using a confirmatory analysis approach, and Study 2 is aimed to conduct a psychometric evaluation of the instrument, in terms of

content validity, construct validity (using both exploratory and factor analyses), and internal consistency reliability.

2. STUDY 1

2.1 Participants and procedure

Data were collected from 213 undergraduates students (17.7% males, 82.3% females) with a mean age of 22.83 years (DS = 4.33, range: 19-50 years). The SAS items were translated into Italian by a bilingual translator and then back-translated by a different bilingual translator. Participants were administered the Italian SAS items in one of two large group sessions.

2.2 Data analyses

A confirmatory factor analysis, using ML Maximum Likelihood robust estimation procedure, was performed using the EQS Structural Equation Program Version 6.1 (Bentler, 2006). To verify the closeness of the Jones and Crandall's (1986) factor structure model to the empirical data, multiple goodness-of-fit indexes were used, including the ratio of the chi-square to degrees of freedom (χ^2/df), the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). NNFI and CFI values of .95 or greater and SRMR and RMSEA values of .05 or less are interpreted as evidence of models that fit well (Hu & Bentler, 1999).

2.3 Results

The confirmatory factor analysis showed inadequate goodness-of-fit indices for the orthogonal original 5-factor model ($[chi]^2$(120, N = 213) = 555.494; p = .000; χ^2/df = 4.63; NNFI = .207; CFI = .346; SRMR = .143; RMSEA = .119; 90% confidence interval = .107–.132).

The first factor "Autonomy or self-direction", consisting of six items (item 2 "I feel I must do what others expect me to do", item 5 "It is always necessary that others approve of what I do", item 9 " I avoid attempts to analyze and simplify complex domains", item 10 " It is better to be yourself than to be popular", item 11 " I have no mission in life to which I feel especially dedicated", item 13 " I do not feel responsible to help anybody"), had a Cronbach's alpha of .399, which can be considered to be undesirable; the second factor "Autonomy or self-direction", involving three items (item 6 "I don't accept my own weaknesses", item 8 "I fear failure", item 14 "I am bothered by fears of being inadequate"), had a Cronbach's alpha of .570, which can be considered to be undesirable; the third

factor "Acceptance of emotions and freedom of expression of emotions", consisting of two items (item 1 "I do not feel ashamed of any of my emotions", item 4 "I feel free to be angry at those I love"), had a Pearson's r = .044 (p = .521); the fourth factor "Trust and responsibility in interpersonal relations", consisting of three items (item 3 "I believe that people are essentially good and can be trusted", item 13 "I do not feel responsible to help anybody", item 15 "I am loved because I give love"), had a Cronbach's alpha of .246, which can be considered to be undesirable; the fifth factor, comprising two items (item 7 "I can like people without having to approve of them", item 12 "I can express my feelings even when they may result in undesirable consequences"), had a Pearson's r = .018 (p = .792). These values are considered unacceptable and indicate poor internal consistency.

Cronbach's alpha for the overall instrument, comprising fifteen items, was also calculated. The result was α = .526. The deletion of any of the fifteen items could not increase the internal consistency to an acceptable level.

3. STUDY 2

3 1Participants and procedure

Data were collected from 799 adolescents (51.2% males, 48.8% females) with a mean age of 16.34 years (DS = 1.42, range: 14-19 years).

Exploratory factor analysis was conducted on a first random subsample of 396 participants, 49.2% males and 50.8% females, with a mean age of 16.39 years (SD = 1.43, range: 14-19 years).

Confirmatory factor analysis was conducted on a second randomly selected 432 participant subsample, 50% males and 50% females, with a mean age of 16.34 years (SD = 1.42, range: 14-19 years).

Data were collected in small groups during non-lesson time within several high schools in Sicily: scientific high school (13%), classical high school (18.3%), pedagogical high school (10.6%), technical high school (39%), and professional high school (19.2%).

3.2 Data analyses

Exploratory factor analysis was performed to determine the underlying dimensions of the questionnaire. Prior to exploratory factor analysis, data were inspected to ensure items were significantly correlated, using Bartlett's Test of Sphericity, and shared sufficient variance to justify factor extraction, using Kaiser-Meyer-Olkin Measure of Sampling Adequacy. Sampling adequacy values that are less

than .50 are considered unacceptable, values that are between .50 and .60 are considered marginally acceptable, and values greater than .80 and .90 are considered excellent (Hair, Anderson, Tatham, & Black, 1995; Kim & Mueller, 1978). Principal axis factoring was selected as the method of factor extraction. An orthogonal rotation method (varimax criterion) was selected to obtain a simple structure, since there was no theoretical assumption suggesting that the factors were related to each other.

The number of factors to be extracted was determined performing random data parallel analyses (Horn, 1965). The eigenvalues derived from the actual data were compared to the eigenvalues derived from the random data. Factors were retained as long as the *i*th eigenvalue from the actual data was greater than the *i*th eigenvalue from the random data (O' Connor, 2000). Both Kaiser's (1960) criterion and the scree test (Cattell, 1966) were checked for agreement. Salience was detected applying the following two criteria: (1) a factor loading of at least .30 on the primary factor, ensuring a high degree of association between the item and the factor, (2) a difference of .30 between loading on the primary factor and loading on other factors for double-loading items, ensuring that each item could be considered salient to one factor (Tabachnick & Fidell, 1996). The standard Pearson product moment correlation coefficient was used to investigate to what extent the factor scores were intercorrelated.

The reliability of the scale, in terms of internal consistency, was computed by coefficient alpha. Corrected item-scale correlations were examined for each of the revealed subscales. For item selection it was decided that adjusted item-total correlations for each item should exceed .40, recommended as the standard for supporting item-internal consistency (De Vellis, 2003).

A confirmatory factor analysis, using ML Maximum Likelihood robust estimation procedure, was performed to statistically evaluate the closeness of the hypothetical model to the empirical data.

3.3 Results

3.3.1 Content validity

Content validity was verified with a pilot study in which 30 experts were invited to judge whether or not each of the 15 SAS original items fitted the definition of self-actualization. Participants were also asked to judge whether or not the items were difficult to understand.

Only the items considered by at least 51% of our participants as representative of the self-actualization construct and not difficult to understand were factor analysed. Based on this content evaluation, item 4 "I feel free to be angry at those I love" and item 9 "I avoid attempts to analyze and simplify complex domains" were excluded from the following psychometric investigations.

3.3.2 Exploratory factor analysis

Data from the first random subsample were subjected to exploratory factor analysis to identify the likely factor structure of the questionnaire. With our 13-item scale, we were able to satisfy the minimum ten participants-per-item ratio, which is usually recommended for factor analysis (Gorsuch, 1983). A sample of 30.5 subjects per item ensured that reliable factors would emerge from the factor analysis.

Bartlett's Test of Sphericity (Chi-Square = 409.36; $df = 78$) was significant ($p<.001$), indicating that the correlation matrix is factorable based on a suitable level of variables interrelations, and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.61, demonstrating a sufficient proportion of common variance in our variables (Kaiser, 1974). Both results, thus, suggest that items were appropriate for proceeding with factor analysis.

Parallel analysis determined five factors to be extracted (see Table 1 and Figure 1).

To determine the number of factors to be extracted, both the scree plot and the eigenvalues were also examined. The Kaiser-Guttman's criterion is known to potentially inflate the number of factors to be extracted, because it is sensitive to the number of variables in the analysis. Hence, Cattell's (1966) scree test is considered a more reliable indicator of the number of factors to be extracted. In fact, it draws on the relative values of the eigenvalues; thus, it is not sensitive to the number of variables in the analysis (Zwick & Velicer, 1986). Cattell (1966) recommended that the number of factors to be extracted is the number of eigenvalues that lie well above the scree slope. This is a more reliable test in cases where there is a clear and easily interpretable scree slope. The eigenvalue greater than one criterion suggested extracting five factors. Inspection of the scree plot suggested a solution of up to four factors.

Table 1 *Raw Data Eigenvalues, Mean and Percentile Random Data Eigenvalues*

Root	Raw Data	Means	Percentiles
1	1.224844	.348024	.421878
2	.737367	.267777	.325798
3	.500704	.206288	.256234
4	.298744	.152698	.196648
5	.183238	.104617	.142431
6	.025228	.059146	.094882
7	-.075168	.016768	.050656
8	-.110613	-.023962	.008940
9	-.130038	-.062583	-.033928
10	-.169678	-.102271	-.072082
11	-.193798	-.143267	-.113421
12	-.225620	-.187883	-.155373
13	-.292930	-.239355	-.199606

Figure 1. *Raw Data Eigenvalues versus Mean and Percentile Random Data Eigenvalues*
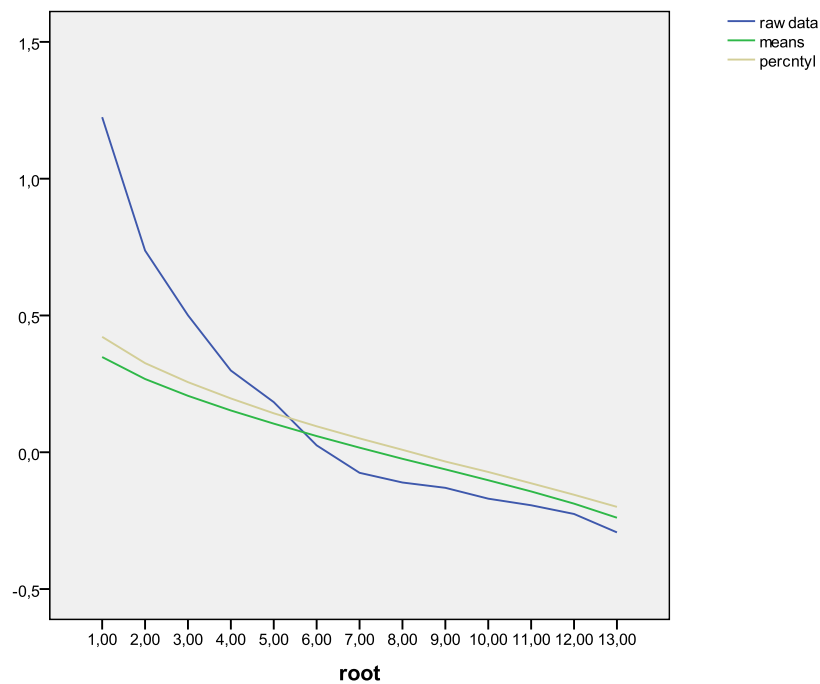
Based on parallel analysis, we extracted five factors explaining 28.98% of the total variance. The resulting number of factors is evidently over-defined, with several factors comprised by only two indicators, some items with loadings less than .30 on all factors, and a number of items loadings simultaneously on two factors, without a difference of at least .30 between loading on the primary factor and loading on other factors. Indeed, based on the resultant rotated factor matrix, item 11 "I have no mission in life to which I feel especially dedicated" (this item loaded: on F1 at .158, on F2 at <.10, on F3 at <.10, on F4 at .228, and on F5 at .194), item 7 "I can like people without having to approve of them" (this item loaded: on F1 at at <.10, on F2 at -.196, on F3 at <.10, and on F4 at <.10), and item 15 "I am loved because I give love" (this item loaded: on F1 at <.10, on F2 at <.10, on F3 at .244, and on F4 at <.10), which failed to load on either factor, was not

retained. Item 12 "I can express my feelings even when they my result in undesirable consequences", which loaded simultaneously on two factors without a difference of at least .30 between loading on the primary factor and loading on other factors (this item loaded: on F1 at <.10, on F2 at .425, on F3 at .202, and on F4 at .387), was also removed.

Factor 1, with an eigenvalue of 1.896 and responsible for 11.84% of the total variance for the questionnaire, included 2 items which loaded above .55. Factor 2, with 2 items loading above .41, had an eigenvalue of 1.318, and accounted for 7.60% of the total variance explained. Factor 3, with 3 items loadings above .39, had an eigenvalue of 1.264 and accounted for 7.56% of the total variance. Factor 4, with 2 items loading above 0.43, had an eigenvalue of 1.09, and accounted for 4.97% of the total variance. Items and factor loadings are presented in Table 2.

Table 2. *Factor loadings of the SAS items (rotated factor matrix)*

Item	F1	F2	F3	F4
8. I fear failure	.769			
14. I am bothered by fears of being inadequate	.559			
2. I feel I must do what others expect me to do		.593		
5. It is always necessary that others approve of what I do		.419		
1. I do not feel ashamed of any of my emotions			.550	
10. It is better to be yourself then to be popular			.445	
3. I believe that people are essentially good and can be trusted			.390	
13. I do not feel responsible to help anybody				.494
6. I do not accept my own weaknesses				.430
% explained variance	11.84	7.60	7.56	4.97

Note. F1 = Self-efficacy and self-esteem; F2 = Autonomy; F3 = Acceptance of emotions, self-direction and trust in interpersonal relations; F4 = Responsibility in interpersonal relations and self-acceptance.

The revealed dimensions not correlated significantly with each other, except for the significant (*p*<.05, two-tailed tests) but quite irrelevant correlation between factor 2 "Autonomy" and factor 4 "Responsibility in interpersonal relations and self-acceptance" (*r* = .120). Both the correlation between

factor 1 "Self-efficacy and self-esteem" and factor 2 "Autonomy" and the correlation between factor 1 "Self-efficacy and self-esteem" and factor 3 "Acceptance of emotions, self-direction and trust in interpersonal relations", although statistically significant (*p*<.01, two-

tailed tests), were very weak (*r* = .185 and *r* = .177, respectively) (see Table 3).

3.3.3 Confirmatory factor analysis

The confirmatory factor analysis performed on the second random subsample showed inadequate goodness-of-fit for the orthogonal 4-factor model ($[chi]^2(36, N = 432) = 290.627$; $p = .001$; $\chi^2/df = 8.07$; NNFI = .838; CFI = .896; SRMR = .106; RMSEA = .052; 90% confidence interval = .032–.071) (see Table 4). Figure 2 presents the standardized parameter estimates.

Table 3. Subscales intercorrelations

	F1	F2	F3	F4
F1	–			
F2	.185**	–		
F3	.177**	.055	–	
F4	.060	.120*	.059	–

Note: * p<.05; ** p<.01; F1 = Self-efficacy and self-esteem; F2 = Autonomy; F3 = Acceptance of emotions, self-direction and trust in interpersonal relations; F4 = Responsibility in interpersonal relations and self-acceptance.

Table 4. Fit indices for the SAS 4-factor model

χ^2	df	p	χ^2/df	NNFI	CFI	SRMR	RMSEA	90% CI
290.63	36	.001	8.07	.84	.90	.11	.05	.032–.071

Note: NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.
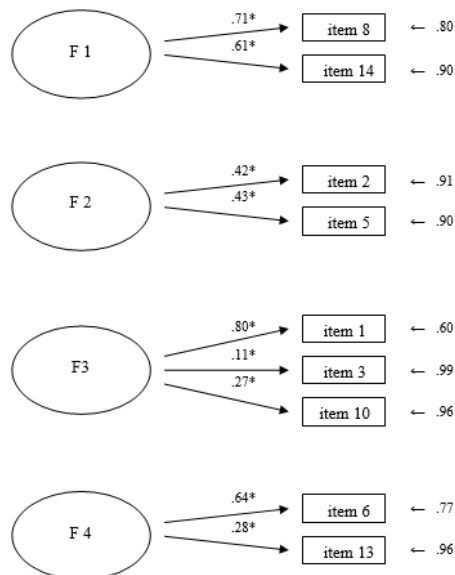
Figure 2. Empirical model (standardized solution)

Note: * p < .05; F1 = Self-efficacy and self-esteem; F2 = Autonomy; F3 = Acceptance of emotions, self-direction and trust in interpersonal relations; F4 = Responsibility in interpersonal relations and self-acceptance.

4. DISCUSSION

The present study examined the model of self-actualization as assessed by a widely used self-report measure, the Short Index of Self-Actualization or Self-Actualization Scale (SAS; Jones & Crandall, 1986). In line with many previous studies suggesting the need to test the psychometric properties across cultures and samples of commonly used instruments in several fields of psychological research (Hambleton, Merenda & Spielberger, 2006; Triscari, Faraci, D'Angelo & Urso, 2011; Manna, Faraci & Como, 2013; Faraci, Craparo, Messina & Severino, 2013), we sought to document the factorial validity and the internal reliability of the scale, with the final aim to enhance our understanding of the self-actualization construct.

Knowledge of the SAS structure and its consistency over cultures and languages can serve to gather a twofold purpose: (a) advance theory regarding the dimensionality of the construct, and (b) contribute to the development of accurate and valid assessment tools.

Although the SAS has been broadly used in many different context all around the world, some critical aspects have arisen both theoretically and methodologically. The short index is judged useful for screening candidates or in clinical assessment but has lacking validity and reliability for research use and its factor structure remains specifically questionable (Leclerc, Lefrancois, Dubè, Hérbert & Gaulin, 1999).

Jones and Crandall (1986) have reported initial psychometric data on the instrument. Included in their study was a principal components analysis. They also reported that the scale was characterized by four factors and a fifth not easily interpretable factor. A number of problems, which are common to several psychometrics studies, are evident in the original exploratory factor analysis (e.g., the extraction method; the procedure for determining the correct number of factors to be extracted). As the SAS is widely used to test theories, such issue is of relevant theoretical and applicative importance. Psychometric research will benefit the future testing of theoretical models. Hence, the current study strongly suggests the need of further research on the psychometric characteristics of the SAS.

The present study, stressing the importance of the SAS's dimensions, went beyond a mere principal component analysis and submitted the Jones-Crandall model to an exploratory factor analysis together with a confirmatory factors analysis. In particular, the original factor structure was verified using a confirmatory analysis approach resulting in inadequate goodness of fit statistics and unacceptable internal consistency reliability levels (Study 1). The results from Study 2 showed a questionable 9-items four factors structure, with the revealed dimensions not significantly correlated with each other, despite some weak exceptions. Although salience criteria for selection of items were fulfilled (factor loadings greater than .30 and non-simultaneous loadings), the suggested minimum of three items for each factor to ensure meaningful interpretation of stable factors was not observed (Tabachnich & Fidell, 1996).

Our sampling methodology did not permit us to know how representative our sample was of the population of high school students. Therefore, we caution that we cannot be sure that our results generalize.

Outcomes from the current study need to be replicated and extended. Additional research is obviously required, including comparison with other wide and representative samples. It might be, for example, that some items are less representative and relevant to the construct with samples that present more or less self-actualization levels. Thereby, we recommend further investigation of the SAS structure with more heterogeneous samples of participants to better establish the construct validity of the instrument. Further empirical attention is required for the psychometric evaluation of the scale and for clarifying the nature of the self-actualization construct itself. Such a type of contribution may be useful in order to better support research purposes addressed to investigate the relationships between self-actualization measure and other constructs, such as boredom proneness (Craparo, Faraci, Fasciano, Carrubba & Gori, 2013), depression (Faraci & Tirrito, 2013), leadership (Faraci, Lock & Wheeler, 2013), and emotional intelligence (Craparo, Magnano & Faraci, 2014).

In conclusion, our findings do not confirm the instrument initial theoretical structure because a different factorial solution which is significantly distinct from those five dimensions proposed by the authors has been found. These differences may be related to the type of sample and population used and/or to the applied methodological procedures.

Based on our outcomes and given the weakness of previous results it seems apparent that researchers should be aware of these psychometric issues and exercise caution when using the SAS. Additional research examining the structural validity and cross-cultural stability of factor solutions is clearly still needed.

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