

# Review of: "Psychometric of the interpersonal communication skills scale: A confirmatory factor analysis"

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**Potential competing interests:** No potential competing interests to declare.

The research work is very interesting and necessary. For its publication, some adjustments need to be made. Below, I will indicate the items that need improvement.

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## **Abstract**

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“...The predictive power of the model using the Q2-index...

Qui<sup>2</sup> or c<sup>2</sup>.

“...acceptable value ( $\chi^2= 767.17$  ...”

.” c<sup>2</sup>.

“...and their desirability. ( $\chi^2= 797.24$ ...”

.” c<sup>2</sup>.

**Keywords:** ICSS, Psychometrics, Reliability, Validity, Importance Performance Map Analysis, CFA.

ICSS and CFA. Please write in full.

ICSS or ICS - interpersonal communication skills

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## **Methods**

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## **Study participants**

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“However, there has been no consensus on the sample size needed for conducting factor analysis and structural models”.

This statement is not true; I recommend that the authors of this manuscript read:

STREINER, D L; NORMAN, G R. *Health measurement scales: A practical guide to their development and use* 4<sup>th</sup>. Oxford: Oxford University Press, 2008.

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Collins, D. Pretesting survey instruments: An overview of cognitive methods. *Qual. Life Res.* 2003, 12, 229–238.

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Brown, T.A. *Confirmatory Factor Analysis for Applied Research*; the Guilford Press: New York, NY, USA, 2006.

In Exploratory Factor Analysis, all adjustment parameters must be presented, as described in this manuscript. However, Confirmatory Factor Analysis requires another sample with the same characteristics as Exploratory Factor Analysis. Please, I suggest the lecture of

Brown, T.A. *Confirmatory Factor Analysis for Applied Research*; the Guilford Press: New York, NY, USA, 2006.

Hair JF Jr, Black WC, Babin BJ, Anderson RE & Tatham RL. *Analyse multivariate de dados*. 6<sup>a</sup> ed. Porto Alegre: Bookman; 2009.

“...In CFA, the least sample size is determined based on latent rather than variables ...”

Authors must indicate reference.

### **Measurement data**

“The tool used in the study was a questionnaire measuring ICSS with 30 items. Vakili developed this questionnaire et al. in 2012 (16)”.

About Reference 16

*Vakili MM, Hidarnia AR, Niknami S. Development and psychometrics of an interpersonal communication skills scale (ASMA) among Zanjan health volunteers. Hayat. 2012; 18(1):5-19.*

Zanjan – Iran

[https://hayat.tums.ac.ir/browse.php?a\\_id=34&sid=1&slc\\_lang=en](https://hayat.tums.ac.ir/browse.php?a_id=34&sid=1&slc_lang=en)

<https://pesquisa.bvsalud.org/portal/resource/pt/emr-165380>

Reference 16 showed that the CSS (Vakili MM, Hidarnia AR, Niknami S., 2012) started with 43 items and ended with 35

items, divided into two categories: general and specific communication skills. Reliability of the instrument was reported by Alpha Cronbach coefficient and used Exploratory Factor Analysis. The questionnaire presented in this manuscript has 30 items and seven factors. So it's a new instrument. In this sense, it would be more appropriate to carry out Exploratory Factor Analysis and, in a second moment, Confirmatory Factor Analysis.

As a contribution I translated part of the article written in Brazilian Portuguese.

Koury JC, José MER, Carvalho AB, Canella DS, Lanzillotti HS. HortEnsiA: cross-cultural adaptation of the Garden Resource, Education, and Environment Nexus and factorial validation study. *Cad Saúde Colet*, 2023; Ahead of Print. <https://doi.org/10.1590/1414-462X202331010159>.

## Abstract

## Background

School gardens as an educational environment, admittedly, have played important changes in the attitudes of students. However, despite the positive aspects of the implementation of school gardens are recognized, there is no instrument in Brazil to assess school adherence to the proposal.

## Objective

This study aimed to carry out the cross-cultural adaptation of the Garden Resource, Education, and Environment Nexus (“GREEN”) tool, and to validating it for the Brazilian reality.

## Method

The process of operationalizing of cross-cultural adaptation was based on the procedures suggested by the WHO. The psychometric study was carried out by exploratory factor analysis.

## Results

The translated and cross-culturally adapted tool was applied to 125 civil servant respondents from 93 schools in the city of Rio de Janeiro. Throughout the process of transcultural adaptation of the original English “GREEN” tool, the “HortEnsiA” construct was created and properly adapted to Brazilian Portuguese.

## Conclusion

The psychometric assessment points to a better organization of management and social activities related to the school garden at school. It was observed that the participation of agricultural technicians in the construction and application of the “HortEnsiA” tool can contribute to optimize the use of the school garden as an educational environment in the Brazilian reality.

### Keywords:

green garden; school; questionnaire; validation

Psychometric study p. 4/15.

Construct validity was performed using Explanatory Factor Analysis. The test Kaiser-Mayer-Olkin (KMO) was estimated to assess the adequacy of the sample for factor analysis, using the cut-off point  $\geq 0.50$ <sup>10</sup>, values  $> 0.80$ <sup>11</sup> being considered excellent.

The exploratory factorial structure of the “HortEnsiA” construct was verified through the Principal Components Analysis (PCA). In order to establish the number of components, we opted for the Kaiser-Guttman rule, which recommends eigenvalues  $>1$ . Once the number of components was defined, the analysis continued using the Principal Factor Analysis, using the likelihood ratio as an estimator ratio (LR). Analogously to the PCA, the Kaiser-Guttman rule was used, which, in this case, allows identify the possible number of dimensions of the construct. To the model restricted to  $n$  factors, Promax oblique rotation method was applied. The input matrix and the standard matrix (output) were generated and examined. In addition, the factor loadings were analysed according to the minimum level criterion for the interpretation of the factorial structure  $\geq 0.50$ , since they are taken as significant ( $\sigma = 0.05$ ) for samples of size equal to 120.<sup>12</sup> Factor loadings negative indicate inverse associations. Variables with cross loads were considered those with similar factor loadings on two or more factors in the same variable and whose difference between loads was  $< 0.10$ <sup>13</sup>. The variance of the error (uniqueness) ( $1 - \text{commonality}$ ) it was considered adequate when  $\leq 0.70$ <sup>11,12</sup>.

Commonality is a useful index for assessing how much variance in a given variable is explained by the factorial solution. Expressive commonalities values indicate that a large amount of variance in a variable was extracted by the factorial solution. The commonalities with smaller values show that a large part of the variance of a variable is not explained by the factor structure<sup>11</sup>. Communalities with values  $< 0.50$  have no explanation enough to represent the amount of variance explained by the factorial solution<sup>12</sup>. The convergent factorial validity was evaluated by the Mean Variance Extracted (MVE), which represents the average percentage of variation explained by the variables referring to the construct, varying between 0 and 1. MVE values  $\geq 0.50$  suggest that the items share a high variance in common<sup>12</sup>.

The discriminant factorial validity is given by comparing the square root of the MVE of the factor and the correlations with other factors of the system. If the square root of the MVE of a factor is greater than the correlations between this and the

other factors, said discriminant validity will be confirmed<sup>11,13</sup>. To check the internal consistency of each dimension, alpha was used Cronbach's and its confidence intervals (CI = 95%), being considered for research exploratory acceptable value of 0.60<sup>13</sup>. To calculate the confidence interval, we used the bootstrap method with 5000 replications.

Analyses were performed using the STATA/SE 12 software.

11. Hair JF Jr, Black WC, Babin BJ, Anderson RE & Tatham RL. *Multivariate data Analysis*. 6<sup>a</sup> ed. Porto Alegre: Bookman; 2009.

12. Bonfim CB, Santos DN, Menezes IG, Reichenheim ME, Barreto ML. Um estudo sobre a validade de constructo da Parent-Child Conflict Tactics Scale (CTSPC) em uma amostra populacional urbana do Nordeste brasileiro. *Cad Saude Publica*. 2011;27(11):2215-26. <http://dx.doi.org/10.1590/S0102-311X2011001100015>. PMID:22124499.

13. Maroco J. *Análise de equações estruturais: fundamentos teóricos, software & aplicações*. Pêro Pinheiro: Report Number; 2010.

“In this study, ICSS was considered along seven dimensions: general (6 items), oral (4 items), listening (4 items), asking questions (4 items), the ability to clarify public speaking (4 items), the ability to encourage and praise (4 items) and the ability to give feedback (4 items) based on a 5-point Likert scale (very high to very low).”

This is a new instrument. This text corresponds to the result of the study about this new instrument, which needed to be validated. However, it is necessary to respond. How many items did the initial questionnaire have? How many items remained and how many items were discarded? The most appropriate approach would be an Exploratory Factor Analysis that indicates the number of dimensions and the items of each dimension. And then, must be calculate the convergent factorial validity, the discriminant factorial validity and the adjustment parameters. I suggest it be read:

Maria Luiza Barreto Medeiros da Silva, Haydée Serrão Lanzillotti, Roseane Moreira Sampaio Barbosa, Maria Elisa Barros. Questionnaire to Identify FOOD BELIEVES: Evidence of Validity and Reliability. *International Journal of Scientific and Management Research* Volume 4 Issue 8 (Dec) 2021. DOI-

<http://doi.org/10.37502/IJSMR.2021.4802>.

“In this study, ICSS was considered along seven dimensions: general (6 items), oral (4 items), listening (4 items), asking questions (4 items), the ability to clarify public speaking (4 items), the ability to encourage and praise (4 items) and the ability to give feedback (4 items) based on a 5-point Likert scale (very high to very low).”

The study by Vakili et al., 2012 presented 35 items divided into two categories. The present study used a questionnaire based on the study by Vakili with 30 items divided into seven dimensions: general (6 items), oral (4 items), listening (4 items), asking questions (4 items), the ability to clarify public speaking (4 items), the ability to encourage and praise (4 items) and the ability to give feedback (4 items) based on a 5-point Likert scale (very high to very low).”

So the question that arises is: What is the reference of this study used in the present manuscript. Has it been validated?

What are the values of your fit indices?

“Subsequently, the **components** were extracted by maximum likelihood estimation using the goodness-of-fit indices of the CFA in Lisrel 8.8 and Smartpls 3.2.8 software.”

If it is about components, Principal Components Analysis should be used, an analysis suitable for exploratory studies. The goodness-of-fit indices are relevant to the CFA. Sorry, but it seems that the application was used without a closer study of the statistical conceptualization that supports the validation of measurement instruments using psychometrics.

Unlike AFE, AFC requires conceptual and empirical foundations to guide the specification and evaluation of the factorial model. EFA is typically used earlier in a scale development and construct validation process, while AFC is used at later stages after the underlying framework has been established earlier on theoretical and empirical grounds.

“In this study, first- and second-order CFA was used to validate the ICSS.”

It is known that unlike first-order CFA, higher-order CFA tests a theory-based account for the patterns of relationships among the first-order factors. These specifications assert that higher order factors have direct effects on lower-order factors; these direct effects and the correlations among higher-order factors are responsible for the co variation of the lower-order factors.

And more, the general sequence of CFA-based higher-order factor analysis is as follows:

- (1) Develop a well-behaved (e.g., good-fitting, conceptually valid) first-order CFA solution;
- (2) Examine the magnitude and pattern of correlations among factors in the first-order solution; and
- (3) Fit the second order factor model, as justified on conceptual and empirical grounds.

I believe that this must be clear to the readers, otherwise the text appears unclear.

For this part of the method I suggest indicating a reference from

Brown. TA. Other Types of CFA Models: Higher-Order Factor Analysis, Scale Reliability Evaluation, and Formative Indicators. In: *Confirmatory Factor Analysis for Applied Research*. New York, London: Guilford Press. 2006. Chapter 8.

... and the relative chi-square statistic ( $\chi^2/DF$ )[18].  $c^2$

“It’s important to use them in conjunction with other criteria, and not to interpret them in a rigid, yes/no Fashion.”

What would be the other criteria? It is necessary to make explicit.

“According to this criterion, to determine discriminant validity, we should compare the AVE value with corresponding correlation values with other variables.”

Text is confusing, please read

Two factorial validities were presented, the convergent, given by the Average Variance Extracted (AVE) and the discriminant, by comparing the square root of the factor's AVE and the values of the correlations with other factors in the system. The first ranges from 0 to 1 and values equal to or greater than 0.50 suggest that the items share a common variance [17] and the second is corroborated if the square root of the AVE of a factor is greater than the correlations between this and the other factors [14].

14. Brown TA. *Confirmatory Factor Analysis for Applied Research* New York, London: The Guilford Press; 2006. Doi: 10.5860/choice.44-2769.

"...Also, a correlation coefficient that is meaningfully higher between the item and one of its components is also considered satisfactory with the other component."

Text is confusing. The concept is commonality, which can be defined as the "total amount of variance that an original variable shares with all other variables included in the analysis" (Hair et al., 2005, p. 90). In other words, commonality is the proportion of common variance present in a given variable. Thus, a variable that does not present specific variance or error variance would have a commonality of 1, while a variable that does not share variance with any other variable would have a commonality of 0. The literature generally indicates a minimum value of 0.5 for commonality to be considered satisfactory.

Hair J.F. et al. *Multivariate Data Analysis*. Cengage Learning EMEA; 8th edition, 2018.

Field A.; Miles J.; Field Z. *Discovering statistics using R*. Sage Publications, 2012.

"Cronbach's alpha, construct reliability (CR) and intra-cluster correlation coefficients (ICC) were implemented to measure the internal credibility of ICSS."

Please indicate reference

## Results

"In this study, 170 health staff took part in the Ahvaz health center. They were in the age group of 22 to 61 years with an average age of 68.36 years and a standard deviation of 52.7 years. Table 1 shows the distribution of health staff in terms of gender, level of education, marital status, history of job, and place of residence (Table 1)."

Table 1 was not attached to the manuscript.

"The value of the critical ratio of the normalized kurtosis coefficient (Mardia) was less than 5"

(Mardia). It is not included in the list of references.

"...fit of the model. ( $\chi^2= 767.17$ ;  $DF=375$ ;  $P<0.001$ ;  $CFI=0.98$ ;  $GFI=0.82$ ;  $AGFI=0.80$ ;  $NFI=0.97$ ;  $SRMR=0.22$ ;  $CN= 127.83$ ;  $RMSEA=0.068$ )."

c2.

Statistical parameters and their critical values must be included in the method item.

“The first-order CFA results showed all indicators had an acceptable t-value and factor loading to measure these abilities (Table 3-a).”

Table 3-a was not attached to the manuscript.

“CR and ICC coefficients greater than 0.7 show confirmed. To discriminant validity of the model, the Fornell and Larcker matrix was used. Based on the extracted root values of AVE, as seen from the correlation of each component (latencies) with other components, this rather shows adequate divergent validity and confirmation of the first-order CFA model (Table 2-b).”

The text highlighted in red should be in the method.

Table 2-b was not attached to the manuscript.

“Next, the second-order CFA model was examined. On this basis, a second-order CFA was performed to test the relationship of seven confirmed first-order CFA model correlations with the ultimate factor. In this phase, the accuracy of the measurement of the subscales of the ICSS was determined. The result of Table3-b showed that the second-order CFA model was suitable for measuring the ICSS and that all parameters of the model had acceptable t-values and factor loadings and were significant at a significance level of less than 0.05. The values of the fit indices of the second-order measurement model showed the acceptability and adequacy of the fit indices and their desirability. ( $\chi^2= 797.24$ ;  $DF=381$ ;  $P<0.001$ ;  $CFI=0.98$ ;  $GFI=0.82$ ;  $AGFI=0.78$ ;  $NFI=0.97$ ;  $SRMR=0.059$ ;  $CN= 127.33$ ;  $RMSEA=0.068$ )”

Table3-b was not attached to the manuscript.

c2.

“The importance-performance map analysis (IPMA) examined the influence of constructs on the designed conceptual model....”

The importance-performance map analysis (IPMA) was not shown in the text.

## Discussion

“... misunderstandings and promote EC.”

EC. Please write in full.

...”The predictive power of current model using the Q2-index based on the blindfold test was equal to 44% (Figure 2)”

The Figure 2 was not attached to the manuscript.



