

Cross-Cultural Adaptation and Validation of the Emotional Intelligence Self-Perception Questionnaire

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Abstract: The assessment of emotional intelligence is limited by the lack of psychometrically valid instruments. The present study aimed at cross-culturally adapting and validating the Emotional Intelligence Self-perception Questionnaire (EIQ-SP) in samples of Brazilian and Portuguese university students. Within this scope, in a sample of 1,074 students, reliability, construct-related validity, and criterion-related validity were analyzed. Additionally, metric invariance between the two samples and between genders was assessed. EIQ-SP showed appropriate psychometric qualities in its validation for use in Brazil, maintaining Mayer and Salovey's four-branch model. With a short application time, simple and objective language, its small number of questions makes it an attractive and valuable instrument to investigate Emotional Intelligence.

Keywords: emotional intelligence, test validity, psychometrics

Adaptação e Validação Transcultural do Questionário de Autopercepção de Inteligência Emocional

Resumo: A avaliação da inteligência emocional apresenta-se limitada pela falta de instrumentos psicometricamente válidos. O presente estudo teve como objetivo adaptar e validar transculturalmente o Questionário de Autopercepção de Inteligência Emocional (QIE-AP) em amostras de estudantes universitários brasileiros e portugueses. Neste âmbito, em uma amostra de 1074 estudantes, foram analisadas a fiabilidade, a validade relacionada com o constructo e a validade relacionada com o critério. Adicionalmente, foi avaliada a invariância métrica entre as duas amostras e entre gêneros. O QIE-AP demonstrou qualidades psicométricas adequadas em sua validação para uso no Brasil, mantendo o modelo tetrafatorial de Mayer e Salovey. Com tempo de aplicação curto, linguagem simples e objetiva, seu número reduzido de questões o torna um instrumento atrativo e valioso na investigação da Inteligência Emocional.

Palavras-chave: inteligência emocional, validade do teste, psicometria

Adaptación y Validación Transcultural del Cuestionario de Autopercepción de Inteligencia Emocional

Resumen: La evaluación de la inteligencia emocional se ve limitada por la falta de instrumentos psicométricamente válidos. El presente estudio tiene el objetivo de adaptar culturalmente y validar el Cuestionario de Autopercepción de Inteligencia Emocional (CIE-AP) en muestras de estudiantes universitarios brasileños y portugueses. En este ámbito, en una muestra con 1074 estudiantes, se analizaron la fiabilidad, la validez relacionada con el constructo y la validez relacionada con el criterio. Adicionalmente, se evaluó la invariación métrica entre las dos muestras y entre géneros. El Cuestionario de Inteligencia Emocional – Autopercepción (CIE-AP) demostró calidad psicométrica adecuada en su validación para uso en Brasil, manteniendo el modelo tetrafatorial de Mayer y Salovey. Con tiempo de aplicación corto, lenguaje simple y objetivo, su número reducido de cuestiones lo convierte en un instrumento atractivo y valioso en la investigación de la Inteligencia Emocional.

Palabras clave: inteligencia emocional, validación de test, psicometría

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Emotional intelligence (EI) has proven to be a construct of great scientific interest for over 30 years, being associated with positive psychology and representing a success booster in multiple dimensions, such as in health and overall well-being (Velazquez Vega & Sonda de La Rosa, 2021).

In 1990, Peter Salovey and John Mayer conceived a new type of intelligence, which was acknowledged as being responsible for a successful life: EI, as the ability to monitor one's own emotions, discern between them and use such information to guide one's thoughts and actions. In 1995, that concept reached popularity with Goleman, when he considered that type of intelligence to be a set involving four abilities, and not just an IQ measure.

Despite the increasing dissemination of the construct, there was no consensus as to whether EI could be learned or whether it resembled more or less constant personality traits. In this regard, IE was an incredibly popular and controversial construct for a long time due to its lack of empirical evidence to explain human behavior or because such little credibility was related to the blending of psychological variables in order to understand the EI general construct, such as intelligence, personality, temperament, emotion regulation, information processing (Fiori & Vesely-Maillefer, 2018).

Currently, there are two different main models that predominate in understanding EI. One that considers EI to be a type of intelligence or ability used in processing emotionally driven information (Salovey & Mayer, 1990), and one that considers it to be personality traits and abilities (e.g., Bar-On, 1997; Goleman, 1995). The trait approach conceives EI as dispositional tendencies, such as personality traits or self-efficacy beliefs. It is also frequently referred to in the literature as "mixed" models, although such models are conceptually distinct from EI conceptualizations as personality, because they consider EI to be a mixture of traits, competencies, and abilities. However, both the trait approach and the "mixed" models share the same EI measurement methods, i.e., self-reporting or self-completion questionnaires. In turn, the ability approach conceptualizes EI as a cognitive skill that is based on emotional information processing and assesses it by means of performance tests (Fiori & Vesely-Maillefer, 2018).

This divergence was equally noticeable in EI inventories, as it was difficult to define the construct, and consequently, its operationalization and assessment (Mancini et al., 2022). However, over three decades, much-needed psychometric efforts have been made to advance knowledge in this field. The current inventories, which are extensively applied in academic or organizational contexts, constitute foundations of knowledge in EI. There remain, however, essential issues that need to be addressed in order to facilitate its widespread use, especially in Brazil (Boyatzis, 2018).

This increase in research has simultaneously produced a new paradigm in the conceptualization of EI, as it can be identified as multifaceted and studied from different perspectives, with several attempts to integrate skill and trait perspectives of EI coexisting. For example, there is the recent contribution that addresses such a gap in the literature, which introduces emotional information processing as a new component of EI (Fiori et al., 2021). It is within this framework that different EI perspectives often predict the same outcomes, albeit by different paths. The utility of integrating the two paradigms has been acknowledged for

some time, as the two components of EI can capture related but qualitatively distinct constructs (Fiori et al., 2021).

As for its measurement, among the main inventories used nowadays, four are particularly noteworthy: the Emotional Competence Inventory (Boyatzis et al., 2000), the Bar-On Emotional Quotient Inventory (Bar-On, 1997), the Trait Emotional Intelligence Questionnaire (Petrides, 2009), all in a self-completion format, and the Mayer Salovey Caruso Emotional Intelligence Test (Mayer et al., 2002), in a performance test format.

In 2015, a Brazilian instrument was validated by Bueno et al. (2015). It was called *Inventário de Competências Emocionais - ICE* (Emotional Competence Inventory - ECI) and consisted of 76 items. Although the five factors found are not exactly the same, they are compatible, with the four-branch model by Mayer and Salovey (1997). The authors attempted to create a short version (ECI-R) (Bueno et al., 2021). In turn, and according to the new EI paradigm, the Online Battery of Emotional Intelligence (BOLIE) was developed in a computerized manner to assess both cognitive and personality aspects related to emotional intelligence, focusing on the assessment of the ability to perceive emotions, integrating the two theoretical models of EI, ability, and trait.

According to Pereira-Teques et al. (2015), the literature seems to agree that Mayer and Salovey's 1997 model is acknowledged as a consistent model for assessing and understanding EI, in terms of definition and measurement. Such credibility has been postulated, with the development of performance-based measures to assess these skills, which show expected associations with reasoning tests as small to medium correlations and near-zero correlations with self-reported personality traits (Olderbak et al., 2019). Being considered a cognitive ability, the construct is currently being studied as a factor of the second intelligence stratum from the perspective of the Cattell-Horn-Carroll (CHC) theory. Nevertheless, few EI inventories based on this model are available for use in Brazil.

In this regard, an instrument based on Mayer and Salovey's explanatory model of EI was developed by Pereira-Teques et al. (2015). The authors were concerned with the development and evaluation of the psychometric characteristics of the Emotional Intelligence Self-Perception Questionnaire (EIQ-SP). And, indeed, the results showed that the factor structure and composition of EIQ-SP indicate the four factors of Mayer and Salovey's (1997) Emotional Intelligence Model. The study suggests that EIQ-SP is a measurement by which each item measures a single latent construct, and the results of the confirmatory factor analysis confirmed a good fit of the data, showing an appropriate four-factor structure to achieve self-perception of EI abilities. This EI measure was found to be positively associated with positive psychology variables that promote well-being, such as life satisfaction and meaning of life (Pereira-Teques et al., 2015, 2016).

In view of the above, the purpose of this study was to adapt and validate the EIQ-SP (Pereira-Teques et al., 2015)

cross-culturally in samples of Brazilian and Portuguese university students. Within this scope, reliability (composite reliability and test-retest reliability), construct-related validity (factor, convergent, and discriminant validity), and criterion-related validity (concurrent and divergent validity) were analyzed. Additionally, metric invariance between the two samples and between genders was assessed. The present study aimed at cross-culturally adapting and validating the Emotional Intelligence Self-Perception Questionnaire (EIQ-SP) in samples of Brazilian and Portuguese university students.

Method

Participants

A total of 1,074 university students ($F = 539$, $M = 294$) aged 17 to 46 years ($M = 22.36$, $SD = 3.68$) participated in the study; 448 were Brazilian, from the Northeastern region

of Brazil, and 385 were Portuguese, from the Northern and Central regions of Portugal. The participants from both countries were mostly social sciences, humanities, and health sciences students, and the sample was randomly collected in the universities. The study had a large number of participants, a ratio of approximately 46 respondents per inventory question. Such a number is larger than the required minimum of 30-40 participants (Van de Vijver, 2018).

Depending on the procedures for the cross-cultural validation of EIQ-SP, the total sample includes four independent subsamples. Thus, construct-related validity, composite reliability, and metric invariance across samples and across genders were examined with two samples of 448 Brazilian and 385 Portuguese university students. Test-retest reliability was analyzed in 32 Brazilian undergraduate medical students. Finally, criterion-related validity was tested with a sample of 209 Portuguese university students. Table 1 shows the demographic information and sampling characteristics between Portugal and Brazil.

Table 1
Sampling characteristics between Brazil and Portugal

| Item | Country | | Total |
|--------------------------------|--------------|--------------|--------------|
| | Brazil | Portugal | |
| Age | | | |
| Mean (Standard deviation) | 22.09 (3.33) | 22.58 (4.12) | 22.36 (3.68) |
| Max. - Min. | 17 – 36 | 17 – 46 | 17 – 46 |
| Gender | | | |
| Male | 136 | 158 | 294 |
| Female | 312 | 227 | 539 |
| Program area (%) | | | |
| Sports Sciences | - | 19.4 | 19.4 |
| Health Sciences | 44.7 | 23.2 | 67.9 |
| Social Sciences and Humanities | - | 12.7 | 12.6 |
| Validation Procedures | | | |
| Construct validity | 448 | 385 | 833 |
| Test-retest reliability | 32 | - | 32 |
| Criterion validity | - | 209 | 209 |

Instruments

Emotional Intelligence Self-Perception Questionnaire (EIQ-SP). EIQ-SP (Pereira-Teques et al., 2015) consists of 18 items subdivided into four dimensions: (a) emotional perception, assessment and expression contains four items (e.g., “From the tone of voice and gestures of others, I can tell if they are sad or angry”); (b) emotional facilitation of thinking consists of five items (e.g., “I am happy to think about the good things I have”); (c) emotional understanding and analysis consists of six items (e.g., “Losing someone that I care about makes me sad”); and (d) emotional regulation, consisting of three items (e.g., “I try to do what gives me the

most pleasure”). The items are answered using a five-point Likert scale (1 - I strongly disagree to 5 - I strongly agree).

In the study by Pereira-Teques et al. (2015), the instrument was applied to 401 Portuguese citizens aged 16-75 years, showing a good fit of the data to the four-factor structure. The factors showed reliability as well as convergent and discriminant validity. In parallel, the results presented metric invariance between genders. Originally, the scale was developed according to the Orthographic Agreement that came into force in 2009 and includes common standards for the official orthography of all Portuguese-speaking countries.

However, in this study, the proposal by Davidov et al. (2018) for the cross-cultural adaptation of measures was followed, and the items were reviewed for semantic, idiomatic, and cultural equivalences by an expert Brazilian committee, consisting of three health experts. And, subsequently, it was applied to a group of 30 university students in order to assess clarity, terminology, and comprehension of items. As a result of this process, there were no changes in the items in the original scale.

Wong and Law's Emotional Intelligence Scale (Wong & Lau, 2002). Concurrent validity was assessed through the correlation with the dimensions in the Portuguese version of WLEIS (Rodrigues et al., 2011), which consists of 16 items divided into 4 EI dimensions: Self-emotion appraisal, Appraisal of others' emotions, Use of emotions, and Regulation of emotions. Each of the dimensions consists of four items composed of a five-point Likert scale, with 1- *Strongly Disagree* and 5- *Strongly Agree*. In this study, Cronbach's alpha coefficients for the four dimensions ranged from .72 for the Appraisal of others' emotions dimension to .86 for the Regulation of emotions dimension.

Positive and Negative Affect Scale (Watson et al., 1988). In order to analyze divergent validity, we used the Portuguese short version of PANAS (Galinha et al., 2014), consisting of 10 items, five of which refer to the positive affect subscale (PA) and five to the negative affect subscale (NA). The Portuguese short version of PANAS showed its two-dimensional nature of affect (positive and negative) to be equivalent to the original version. Additionally, the two-factor model showed excellent psychometric properties and temporal stability over a 2-month interval (Galinha et al., 2014). The alpha coefficients were .86 and .88 for the PA and NA subscales, respectively.

Procedures

Data collection. The students were personally informed by the researchers that completion of the questionnaire was voluntary, and they had the right to withdraw from the study at any time. To avoid social desirability effects, the students were instructed that the items aimed to ascertain only their personal opinion for a set of situations and that there were no right or wrong answers. The students completed the questionnaires in a classroom setting under supervision by a researcher. Additionally, anonymity and confidentiality of the study data were ensured.

Data analysis. Construct validity. Construct-related validity was assessed by Confirmatory Factor Analysis (CFA) and maximum likelihood estimation using the IBM SPSS AMOS 28 software. Model fit was considered to be appropriate when the chi-square and its degrees of freedom (χ^2/df) were less than 3.0, the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) were greater than .9, and the Root Mean Square Error of Approximation (RMSEA) was less than .05. Convergent validity was analyzed using the Average Variance Extracted (AVE), and values above .5 were considered adequate. Discriminant validity was considered

when the AVE of each construct was greater than the square of the correlation between the factors (Davidov et al., 2018).

Reliability was analyzed by composite reliability and test-retest. For composite reliability, values equal to or greater than .70 were considered to be appropriate for factor reliability (Davidov et al., 2018). In turn, test-retest reliability for each factor was calculated using the intraclass correlation coefficient for a 95% CI obtained from a bivariate model (ICC). ICC values range from 0 to 1, where values between .40 and .75 are considered to be satisfactory and values above .75 indicate good reliability (Davidov et al., 2018).

Criterion-related validity was examined by considering its variants of concurrent validity and divergent validity. Concurrent validity was analyzed by correlating it with the dimensions of the Portuguese version of WLEIS (Rodrigues et al., 2011; Wong & Law, 2002). Thus, it is expected that the WLEIS dimensions would relate to those of EIQ-SP. Divergent validity was assessed by correlating it with the two-dimensional structure of the Portuguese short version of PANAS (Galinha et al., 2014; Watson et al., 1988). Considering that individuals with high EI tend to perceive more life satisfaction (e.g., Blasco-Belled et al., 2020; Pereira-Teques et al., 2015), we expected that the NA subscale would show weak and negative correlations with the EIQ-SP dimensions, and, in turn, the PA subscale would show positive correlations with the same dimensions.

The metric invariance between samples and between genders was analyzed by considering the test of χ^2 significance and the difference of CFI values (ΔCFI) (Davidov et al., 2018). If χ^2 is not significant ($p > 0.05$) when comparing the models, the model is considered to be invariant. However, there may be χ^2 variations with sample sizes. In this regard, it proposes that differences of CFI (ΔCFI) less than or equal to .01 is an indicator of model invariance. To assess invariance between the two groups, a set of nested models was tested sequentially in the following order: Model 1, unconstrained; Model 2, factor weights; Model 3, variance-covariances.

Ethical Considerations

Ethical approval of the study was obtained from the Ethics Committee of *Faculdade Pernambucana de Saúde - AECISA* (No. 30730614.2.0000.5569). The questionnaires were applied only after the participants had received and signed the informed consent form on paper. The term informed the participants of the procedure and data confidentiality, and that the results would be treated anonymously, with the possibility of withdrawing from the study at any time.

Results

Preliminary Analyses

The first data analysis showed that the non-responses covered .6% of the cells, but without a specific pattern.

Thus, the data were imputed by considering the Expectation-Maximization (EM) algorithm. Twelve outliers were found both univariate ($z > 3.00$) and multivariate (Mahalanobis distance = $p1 < .001$, $p2 < .001$). These participants were

removed before running the following analyses. Asymmetry values ranged from -2.91 to -.09, and kurtosis values ranged from -.23 to 6.74, not representing severe deviations from normality (Table 2).

Table 2

Factor weights (B), standardized errors (SE), standardized factor weights (β), and square of correlations (R²) related to the items of EIQ-SP (n = 833)

| Factors | Items | B | SE | β | R ² |
|--|---|------|------|------|----------------|
| Perception, assessment, and emotional expression | | | | | |
| EIQ5 | There are people who make themselves look (...) | 1.00 | – | 0.76 | 0.58 |
| EIQ 8 | Through the tone of voice and gestures of others (...) | 0.82 | 0.11 | 0.63 | 0.53 |
| EIQ 10 | Some people can pretend to be sad (...) | 0.89 | 0.13 | 0.65 | 0.65 |
| EIQ 18 | Pets can make us feel (...) | 1.02 | 0.11 | 0.55 | 0.51 |
| Emotional thought facilitation | | | | | |
| EIQ 1 | It makes me happy to think about the good things I have | 1.00 | – | 0.66 | 0.62 |
| EIQ 3inv | When I feel happy, I feel less (...) | 0.92 | 0.06 | 0.72 | 0.63 |
| EIQ 4 | When I am sadder, I get less (...) | 1.01 | 0.08 | 0.62 | 0.78 |
| EIQ 7 | When I am happy, I do more things. | 0.98 | 0.05 | 0.68 | 0.69 |
| EIQ 16inv | When I am sad, I have thoughts (...)* | | | | |
| Emotional understanding and analysis | | | | | |
| EIQ 2 | Losing someone that I care about makes me sad. | 1.00 | – | 0.66 | 0.65 |
| EIQ 6 | There are people that I care for and others that (...) | 0.92 | 0.11 | 0.59 | 0.86 |
| EIQ 9 | In a bad moment, one can feel several (...) | 0.93 | 0.11 | 0.69 | 0.62 |
| EIQ 12 | When someone compliments me, I feel happy and proud (...) | 0.98 | 0.09 | 0.53 | 0.65 |
| EIQ 14 | Negative thoughts make me sad or (...) | 1.07 | 0.12 | 0.65 | 0.62 |
| EIQ 17 | When I take my feelings into account (...) | 0.89 | 0.09 | 0.69 | 0.78 |
| Emotional regulation | | | | | |
| EIQ 11 | I try to do what gives me the most pleasure. | 1.00 | – | 0.71 | 0.80 |
| EIQ 13 | I try to do activities that I and others enjoy. | 0.95 | 0.05 | 0.78 | 0.81 |
| EIQ 15 | I socialize as much as I can with the people I (...) | 0.94 | 0.06 | 0.77 | 0.76 |

Note. Items with “inv” are reversed. * Item deleted due to individual unreliability.

Construct Validity

The initial CFA results for the EIQ’s four-factor structure in the overall sample indicated a poor fit to the data [$\chi^2(129) = 389.74$, CFI = .883, TLI = .874, RMSEA = .067 (CI = .060, .075), SRMR = .075]. However, as shown in Table 2, the factor weight of item 16 in connection with the Understanding and emotional analysis factor was shown to be below the cut-off criterion ($\geq .50$) (Davidov et al., 2018). The model was re-specified without this item. After deletion of the item, the measurement model of EIQ-SP showed an appropriate fit to the data [$\chi^2(113) = 298.26$,

CFI = .936, TLI = .929, RMSEA = .054 (CI = .051, .062), SRMR = .044]. Factor weights ranged from moderate to strong (Table 2), and statistical criteria showed an adequate fit of the model to the data.

The AVE values showed that only the emotion regulation factor presented convergent validity (.57). Discriminant validity was denoted in all dimensions, since the AVE values exceeded the square of the correlations associated with each of these constructs (Table 3). Considering the theoretical fundamentals of the scales, and the overall results, no readjustments were made to the measurement model.

Table 3

Correlations (R^2), means, standard deviations, and mean extracted variance among the EIQ's factors ($n = 833$)

| Constructs | Correlation matrix | | | |
|----------------------------|--------------------|-------|-------|------|
| | 1 | 2 | 3 | 4 |
| Perception | 0.77 | | | |
| Facilitation | 0.22* | 0.74 | | |
| Understanding | 0.20* | 0.18* | 0.80 | |
| Regulation | 0.27* | 0.21* | 0.20* | 0.79 |
| Mean | 4.10 | 3.91 | 4.18 | 4.20 |
| Standard deviation | 0.67 | 0.69 | 0.59 | 0.82 |
| Average variance extracted | 0.43 | 0.45 | 0.41 | 0.57 |

Note. The square of the highest correlation is lower than the AVE values, showing discriminant validity across all factors; composite reliability values are shown on the main diagonal; * $p < .01$.

Reliability

The four factors in EIQ-SP showed appropriate internal consistency coefficients, with composite reliability values between .74 and .80 (Table 3). In turn, test-retest reliability was examined with an independent sample of 32 Brazilian university students, aged 19 to 34 years ($M = 22.19$, $SD = 3.09$), who completed the 18-item version of EIQ-SP at two separate times, one month apart. The intraclass correlation

coefficients for the four factors were as follows: Perception ($M1 = 4.25$, $SD1 = .38$; $M2 = 4.30$, $SD2 = .41$) $r = .83$, Facilitation ($M1 = 3.68$, $SD1 = .33$; $M2 = 3.63$, $SD2 = .30$) $r = .51$, Comprehension ($M1 = 4.25$, $SD1 = .34$; $M2 = 4.23$, $SD2 = .41$) $r = .76$, and Regulation ($M1 = 4.21$, $SD1 = .48$; $M2 = 4.26$, $SD2 = .43$) $r = .67$, showing reliability values between satisfactory and good.

Criterion Validity

Table 4 shows the descriptive statistics and the correlations between the factors of EIQ-SP, WLEIS, and PANAS. Moderate to high positive associations between the EIQ-SP factors and the WLEIS factors as well as the Positive Affect dimension were evident. Correlations were negative and low to moderate between the EIQ-SP factors and the Negative Affect dimension. These results support convergent and divergent criterion-related validity. Although WLEIS does not comply with Mayer and Salovey's (1997) original EI theoretical design, by featuring only three of the model's four subscales, it has shown validity and reliability in applications developed primarily in the organizational context (Bano et al., 2021). Similarly to our results, other studies have concluded that higher levels of Perceived Emotional Intelligence (PEI) are associated with a higher level of Positive Affect (PA) (MacCann et al., 2020), even in a study including Portuguese and Brazilian individuals (Barbosa et al., 2020).

Table 4

Pearson's correlation matrix between the EIQ-SP Factors and the WLEIS and PANAS factors ($n = 209$)

| EIQ Factors | WLEIS Factors | | | | PANAS Factors | |
|---------------|---------------|-------|-------|-------|---------------|--------|
| | SEAE | AAOE | UE | RE | PA | NA |
| Perception | .58** | .56** | .33** | .29** | .38** | -.23* |
| Facilitation | .33** | .32** | .42** | .38** | .22* | -.03 |
| Understanding | .31** | .38** | .46** | .41** | .33** | -.34** |
| Regulation | .39** | .46** | .49** | .71** | .54** | -.36** |

Note. SEAE = Self-emotion appraisal and expression; AAOE = Appraisal and acknowledgement of others' emotions; UE = Use of emotions; RE = Regulation of emotions; AP = Positive affect; AN = Negative affect; * $p < .05$, ** $p < .01$.

Invariance Between the two Samples and Between Genders

Firstly, a CFA was run for each of the samples of Brazilian ($n = 448$) and Portuguese students ($n = 385$). Subsequently, a sequential model testing approach was applied through multigroup CFAs to examine the invariance of the EIQ's four-factor model between the two samples (Brazil and Portugal), and between genders. Regarding the test for between-sample invariance, a multigroup CFA was run simultaneously for the samples of Brazilian students and Portuguese students. The unconstrained model [Model 1: $\chi^2(226) = 305.19$, $p < .001$, TLI = .934, CFI = .942, RMSEA = .044] showed a satisfactory fit, as did the constrained model of the factor weights [Model 2: $\chi^2(239) = 325.21$,

$p < .001$, TLI = .931, CFI = .941, RMSEA = .048]. However, Model 3, constrained to the variance-covariances, showed a poor fit [Model 3: $\chi^2(249) = 495.32$, $p < .001$, TLI = .898, CFI = .901, RMSEA = .067]. The chi-square difference test ($\Delta\chi^2$) and the CFI difference (ΔCFI) showed no differences when comparing Model 1 to Model 2 [$\Delta\chi^2(13) = 20.02$, $p = .526$, $\Delta CFI \leq .01$], but there were differences when comparing Model 1 to Model 3 [$\Delta\chi^2(23) = 190.13$, $p < .001$, $\Delta CFI \geq .01$]. These results indicate that the EIQ's four-factor model has partial invariance between Brazil and Portugal.

To test for gender invariance, the two samples were considered together ($n = 833$). This was followed by a multigroup CFA for female ($n = 539$) and male ($n = 294$) students. The unconstrained model

[Model 1: $\chi^2(226) = 289.63, p < .001, TLI = .944, CFI = .951, RMSEA = .038$] as well as the model for constrained factor weights [Model 2: $\chi^2(239) = 331.26, p < .001, TLI = .943, CFI = .950, RMSEA = .037$] and constrained variances-covariances [Model 3: $\chi^2(249) = 351.89, p < .001, TLI = .936, CFI = .948, RMSEA = .040$] showed acceptable fit. The chi-square difference test ($\Delta\chi^2$) and the CFI difference (ΔCFI) showed no differences when comparing Model 1 to Model 2 [$\Delta\chi^2(13) = 41.63, p = .412, \Delta CFI \leq .01$] and between Model 1 and Model 3 [$\Delta\chi^2(23) = 62.26, p = .236, \Delta CFI \leq .01$]. These results provide support for the invariance of the four-factor model of EIQ-SP across genders.

Discussion

Emotional Intelligence (EI) has aroused great interest in the scientific community, which has gradually found valid and reliable ways to assess it and proved it to be a possible predictor for functioning in various aspects of human life (Velázquez Vega & Sonda de La Rosa, 2021). In this regard, Barbosa et al. (2020), consider the EI construct as a set of skills that enable the contextual adaptation of human beings. In agreement with the view by the authors of the present study, they highlight the model by Mayer and Salovey (1997), for its interpretative potential and scientific rigor, as an explanatory and operationalized EI reference.

The use of EIQ-SP in other studies has shown the association of the underlying EI skills with a greater perception of life satisfaction and greater meaning in life, both in the general population and with people in borderline situations of oncological disease (Pereira-Teques et al., 2016). From this perspective, EI represents an essential factor, since it enhances the adaptive and functional capacity of individuals, related to health (physical and mental), emotional functioning (e.g., adequate coping strategies, resilience, life satisfaction, happiness) and social functioning for context adaptation. In this line of research, there has been increasing interest in analyzing the potential influence of EI on well-being through studies concluding that a higher level of emotional competence (assessed by performance scales) or perceived emotional competence (assessed by self-report instruments) increases well-being levels (Barbosa et al., 2020; Mancini et al., 2022). This reinforces all the research gains over the past 30 years to conceptualize and measure EI, as studies using both self-reporting and performance measures highlight its potential to promote human achievement and well-being.

In turn, the cross-cultural adaptation of an inventory is a complex procedure because simple translation is not enough to consider cultural and language differences associated with the preservation of content validity (Davidov et al., 2018). The present study found positive evidence regarding the validation and cross-cultural adaptation into Brazilian Portuguese of the Portuguese version of EIQ-SP.

EIQ-SP had a short application time (less than 10 minutes). Despite the presence of the researchers, who were available

to solve any doubts, no questions regarding the completion or discernment of the questionnaire were reported. Only 0.6% of the inventories showed flawed answers, and 12 contained outliers, which were excluded from the analysis. This suggests that the questionnaire is well understood, clear and simple to complete, indicating good responsiveness.

The semantic, idiomatic, and conceptual evaluation showed no need for any adjustments, despite the geographic distance between the countries, which is probably justified by the 2006 Orthographic Agreement that unified the spelling of part of the Portuguese-speaking nations. Thus, it was unnecessary to translate and back-translate the instrument. The evaluation of the questions by the experts, prior to the application of the inventory in both countries, showed good apparent and content validity, with an agreement percentage among the experts of 100%, whereas the adequate minimum is 89%.

The invariance analysis of the four-factor model, however, showed partial invariance between Brazil and Portugal. This may indicate that Brazilian and Portuguese respondents understood some of the questions differently. While not invalidating the result, this points out that future adjustments may be desirable (Van de Vijver, 2018). Gender invariance, on the other hand, was completely satisfactory.

Reliability was not high for any of the four dimensions, being good for Perception ($r = .83$), acceptable for Understanding and Regulation ($r = .76$ and $.67$, respectively), and unsatisfactory for Facilitation ($r = .51$). Internal consistency showed good values, ranging from $.74$ to $.80$, ruling out the possibility of redundant items. Therefore, the instrument applied in Brazil retained most of the original characteristics, showing, however, moderate temporal stability in the Facilitation dimension. This fact may be related to intra-individual differences in the development of emotional intelligence skills between the test and retest periods, which can be confirmed in the future by means of longitudinal analyses.

Among the limitations in this study, it is important to highlight that the sample consisted only of university students, from specific areas of Brazilian regions, and the inventory may not include the specificities of other groups with different profiles. As Vieira-Santos et al. (2018) point out, it is necessary to investigate groups of children under 10 years old and adults over 60 years old. It is also suggested that future research could explore the determination of discriminant validity, checking how EIQ-SP performs in relation to other instruments with similar constructs. However, EIQ-SP proved to be a quick and easy-to-use inventory, with the maintenance of Mayer and Salovey's (1997) four-factor model, and it can be used in the Brazilian context. The instrument contributes both to the self-perception of emotional intelligence and to provide important data related to the people's mental health and the context in which they are located, thus contributing to interventions that can help in personal and professional development, considering what was previously exposed regarding the fact that EI skills are predictors of optimal functioning. At this point,

it is indeed crucial to study the creation and implementation of intervention programs, aimed at developing EI in different audiences (Vieira-Santos et al., 2018). The question about the perfect EI measure persists, as it is a complex construct, and a “perfect” measure is unlikely to capture all the different EI components. It seems more realistic to aim for “several good EI measures”, each capturing key aspects of this construct with satisfactory reliability and validity. In this scenario of continuous development, the challenging opportunity for its innovation remains open (Fiori & Vesely-Maillefer, 2018).

Finally, EIQ-SP showed appropriate psychometric quality in its validation for use in Brazil, which makes it an attractive and valuable instrument in the investigation of Emotional Intelligence. In order to continue improving this inventory, the development of future adaptations that will increase the reliability of the questions in the Brazilian cultural context is welcome.

References

- Bano, U., Ahmed, A., Aziz, S., Tassadaq, N., Ahsan, O., & Wasim, M. (2021). Emotional intelligence and job satisfaction among medical teaching faculty. *Pakistan Armed Forces Medical Journal*, 71(2), 512-516. <https://doi.org/10.51253/pafmj.v71i2.6615>
- Barbosa, M., Monteiro, S., Pereira, H., Esgalhado, G., Afonso, R., & Loureiro, M. (2020). Perceived emotional intelligence: What is its influence in subjective well-being? *Estudos de Psicologia (Natal)*, 25(3), 347-357. http://pepsic.bvsalud.org/scielo.php?pid=S1413-294X2020000300012&script=sci_abstract&tlng=en
- Bar-On, R. (1997). *The bar-on emotional quotient inventory (EQ-i): A test of emotional intelligence*. Multi-Health Systems.
- Blasco-Belled, A., Rogoza, R., Torrelles-Nadal, C., & Alsinet, C. (2020). Emotional intelligence structure and its relationship with life satisfaction and happiness: New findings from the bifactor model. *Journal of Happiness Studies*, 21, 2031–2049. <https://doi.org/10.1007/s10902-019-00167-x>
- Boyatzis, R., Goleman, D., & Rhee, K. (2000). Clustering competence in emotional intelligence: Insights from the Emotional Competence Inventory (ECI). In R. Bar-On & J. D. A. Parker (Eds.), *Handbook of emotional intelligence: Theory, development, assessment, and application at home, school, and in the workplace* (pp. 343-362). Jossey-Bass.
- Boyatzis, R. (2018). The behavioral level of emotional intelligence and its measurement. *Frontiers in Psychology*, 13(9), 1438. <https://doi.org/10.3389/fpsyg.2018.01438>
- Bueno, J. M. H., Correia, F. M. L., Abacar, M., Gomes, Y. A., & Pereira, F. S., Jr. (2015). Competências emocionais: Estudo de validação de um instrumento de medida [Emotional competences: Study of the validity of a measurement instrument]. *Revista Avaliação Psicológica*, 14(1), 153-163. <https://doi.org/10.15689/ap.2015.1401.17>
- Bueno, J. M. H., Correia, F. M. L., & Peixoto, E. M. (2021). Psychometric properties of the emotional competence inventory – short revised version (ECI-R). *Psico-USF*, 26(3), 519-532. <https://doi.org/10.1590/1413-82712021260310>
- Davidov, P., Schmidt, P., Billiet, J., & Meulemen, B. (2018). *Cross-cultural analysis: Methods and applications* (2nd ed.). Routledge.
- Fiori, M., & Vesely-Maillefer, A. (2018). Emotional intelligence as an ability: Theory, challenges, and new directions. In K. V. Keefer, J. D. A. Parker, & D. H. Saklofke (Eds.), *Emotional intelligence in education* (pp. 23-47). Springer.
- Fiori, M., Udayar, S., & Vesely-Maillefer, A. (2021). Emotion information processing as a new component of emotional intelligence: Theoretical framework and empirical evidence. *European Journal of Personality*, 36(2), 245–264. <https://doi.org/10.1177/08902070211007672>
- Galinha, I. C., Pereira, C. R., & Esteves, F. (2014). Versão reduzida da escala portuguesa de afeto positivo e negativo - PANAS-VRP: Análise fatorial confirmatória e invariância temporal [Short-form of the Portuguese version of the positive and negative affect schedule - PANAS-Port-VRP: Confirmatory factorial analysis and temporal invariance]. *Psicologia*, 28(1), 53-65. <http://hdl.handle.net/10451/11477>
- Goleman, D. (1995). *Emotional intelligence*. Bantam Books.
- MacCann, C., Erbas, Y., Dejonckheere, E., Minbashian, A., Kuppens, P., & Fayn, K. (2020). Emotional intelligence relates to emotions, emotion dynamics, and emotion complexity: A meta-analysis and experience sampling study. *European Journal of Psychological Assessment*, 36(3), 460–470. <https://doi.org/10.1027/1015-5759/a000588>
- Mancini, G., Biolcati, R., Joseph, D., Trombini, E., & Andrei, F. (2022). Editorial: Emotional intelligence: Current research and future perspectives on mental health and individual differences. *Frontiers in Psychology*, 13, 104943. <https://doi.org/10.3389/fpsyg.2022.1049431>
- Mayer, J. D., & Salovey, P. (1997). *Emotional development and emotional intelligence: Implications for educators*. Basic Books.

- Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *Mayer-Salovey-Caruso emotional intelligence test (MSCEIT): User's manual*. MHS Assessments.
- Olderbak, S., Semmler, M., & Doebler, P. (2019). Four-branch model of ability emotional intelligence with fluid and crystallized intelligence: A meta-analysis of relations. *Emotion Review*, *11*(2), 166–183. <https://doi.org/10.1177/1754073918776776>
- Pereira-Teques, A., Llorca-Ramón, G., Carrera, G. B., Pais-Ribeiro, J., & Teques, P. (2015). Desenvolvimento e avaliação das características psicométricas do questionário de Auto-Percepção de Inteligência Emocional (QIE-AP) [Development and evaluation of the psychometric properties of the Self-Perception of Emotional Intelligence Questionnaire (EIQ-SP)]. *Psicologia: Reflexão e Crítica*, *28*(2), 270–279. <https://doi.org/10.1590/1678-7153.201528207>
- Pereira-Teques, A., Carrera, G. B., Pais-Ribeiro, J., Teques, P., & Llorca-Ramón, G. (2016). The importance of emotional intelligence and meaning in life in psychoncology. *Psychooncology*, *25*(3), 324–331. <https://doi.org/10.1002/pon.3921>
- Petrides, K. V. (2009). Psychometric properties of the trait emotional intelligence questionnaire. In J. D. Parker, D. H. Saklofske, & C. Stough (Eds.), *Advances in the assessment of emotional intelligence* (pp. 21–33). Springer.
- Rodrigues, N., Rebelo, T., & Coelho, J. V. (2011). Adaptação da Escala de Inteligência Emocional de Wong e Law (WLEIS) e análise da sua estrutura factorial e fiabilidade numa amostra portuguesa [Adaptation of the Wong and Law Emotional Intelligence Scale (WLEIS) and analysis of factorial structure and reliability in a Portuguese sample]. *Psychologica*, *(55)*, 189–207. https://doi.org/10.14195/1647-8606_55_10
- Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality*, *9*(3), 185–221. <https://doi.org/10.2190/DUGG-P24E-52WK-6CDG>
- Van de Vijver, F. (2018). Capturing bias in structural equation modeling. In P. Davidov, P. Schmidt, J. Billiet, & B. Meuleman, *Cross-cultural analysis: Methods and applications* (2nd ed., pp. 3–34). Routledge.
- Velázquez Vega, C. O., & Sonda de La Rosa, R. (2021). Desarrollo sostenible en los negocios turísticos desde la óptica de la inteligencia emocional. *Estudios de Administración*, *28*(1), 61–80. <https://doi.org/10.5354/0719-0816.2021.58614>
- Vieira-Santos, J., Lima, D. C., Sartori, R. M., Schelini, P. W., & Muniz, M. (2018). Inteligência emocional: Revisão internacional da literatura. *Estudos Interdisciplinares em Psicologia*, *9*(2), 78–99. http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S2236-64072018000200006
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Wong, C.-S., & Law, K. S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *The Leadership Quarterly*, *13*(3), 243–274. [https://doi.org/10.1016/S1048-9843\(02\)00099-1](https://doi.org/10.1016/S1048-9843(02)00099-1)
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