Validation of Emotional Intelligence Measure (MIE) for the Portuguese population

Ana Andrade*, Rosa Martins, João Duarte, António Madureira

Escola Superior de Saúde de Viseu, Instituto Politécnico de Viseu, Viseu, Portugal

KEYWORDS
Emotional intelligence; Senior citizens; Validation; Confirmatory factor analysis

Abstract

Objective: To describe the process of validating Emotional Intelligence Measurement (MIE) Scale for Portuguese senior citizens.

Design: Observational, cross-sectional quantitative study.

Framework: Senior citizens attending senior universities and from the community in the district of Viseu.

Participants: 1084 subjects participated with a mean age of 72.98 years, residing in the district of Viseu, no longer involved in formal activities (retired) and participating voluntarily in study.

Main measurements: the Emotional Intelligence Measuring (MIE) Scale, socio-demographic characteristics (age, gender, marital status, residence). An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) of the MIE scale were performed.

Results: The MIE showed very good internal consistency (Cronbach’s alpha = 0.952). The main component and rotation factor analysis varimax extracted 36 items and five factors which explain 54.78% of the total variance. After confirmatory factor analysis and re-specification of the model, the global indicator values of the adjustment model for the MIE revealed a quality of good fit ($X^2/df = 3.46$; $RMR = 0.025$). The final version of the MIE was composed of 33 items and five factors that represent emotional intelligence skills: Factor 1 - Empathy (12 items); Factor 2 - Self-motivation (10 items); Factor 3 - Self-awareness (4 items); Factor 4 - Self-control (4 items); Factor 5 - Sociability (3 items).

Conclusion: The MIE scale is shown to be suitable to assess emotional intelligence in Portuguese senior citizens.

© 2014 Elsevier España, S.L. All rights reserved.
Framework

Emotional Intelligence (EI) was defined as the ability to identify and understand one’s own feelings and those of others, to serve as motivation and to manage one’s emotions well within oneself and in relationships with others.\textsuperscript{1, 2}

EI is based on basic emotional skills, such as the ability to recognize one’s own feelings (Self-awareness); the ability to control one’s emotions (Self-control); the ability to utilize one’s existing potential (Self-motivation); the capacity for empathy and the ability to create social relations (Sociability).\textsuperscript{3, 4} The first two capabilities refer to the individual and what they do with their feelings and are designated “intrapersonal.” The other two are directed outwardly and seek others’ feelings and social interactions and are “interpersonal.”

Emotional Intelligence acquires great importance in “providing tools” for the elderly, so that they will be able to identify and deal with emotional changes effectively. This depends on the ability of the older person to use a series of emotional strategies, a skill that remains almost intact when the person ages.\textsuperscript{5}

Research indicates that emotionally intelligent individuals can perceive and better control their emotions facilitating the resolution of everyday problems, as well as promoting adaptive mechanisms.

Awareness of one’s emotions, acceptance, motivation and autonomy are some characteristics that promote a more active aging process.

In this sense, the aim of this study is to validate the Emotional Intelligence Measurement Scale (MIE) for Portuguese senior citizens.

Original version of the scale

The Emotional Intelligence Measurement Scale (MIE) was constructed based on five emotional intelligence skills, as Goleman proposed (1995/1996) with the aim of “creating a valid and reliable instrument to measure psychological information processing about emotions and feelings experienced or observed in social interactions.”\textsuperscript{6} The items are on a scale Likert type with four response alternatives (1 = never, 2 = rarely, 3 = often; 4 = always) indicating how often those behaviours occur.

After validation for the Brazilian population, the final version was composed of 59 items and five factors:

- Factor 1 – Empathy (“The ability to identify feelings, desires, intentions, interests and problems in others through reading and understanding non-verbal communication behaviours”) – 14 items.
- Factor 2 – Sociability (“The ability to initiate and maintain friendships, get along, be accepted by people, feel good among them and treat them with warmth even if they are strangers”) – 13 items.
- Factor 3 – Motivation (“Persistence, courage, strength, optimism and enthusiasm with which the individual manages objectives and plans for life”) – 12 items.
- Factor 4 – Self-control (“The capacity to deliberate, caution and control with which the individual acts facing unpleasant facts, provocations, aggression, affronts, insults, conflicts, disturbing feelings and impulses”) – 10 items.
- Factor 5 – Self-awareness (“Introspective actions of recognizing, evaluating and reflecting, naming and identifying one’s own feelings”) – 10 items.

Scoring should be carried out by adding the assigned values in the response divided by the number of items for each factor. The higher the total score, the higher is one’s emotional intelligence.

This scale was applied to Brazilian individuals aged between 13 and 59. A version for Portuguese senior citizens is unknown until now.

Methods

Observational, cross-sectional study

1084 individuals participated aged between 56 and 96 (72.98 ± 8.039), of whom 60.2% are female and 39.8% male. The majority (54.3%) lives in rural areas and 53.5% are married while 33% are widowed.

Inclusion criteria: a) individuals who no longer perform formal professional activities (retired seniors); b) residents in the district of Viseu (central region of Portugal); c) without cognitive impairment; d) voluntary consent to participate in the study.

The authors of the original scale were contacted requesting authorization for this validation. After authorization was granted, we proceeded to adapt the language (change some terms) for the Portuguese population. It was subsequently evaluated by the spoken reflection method (thinking aloud) with individuals who attended the Senior University and senior citizens in the community. No comprehension difficulties were detected with regards to how to fill in the form or in terms of the meaning of the items on the scale. The instrument can be self-administered or in interview form.

Statistical validation for the MIE procedures were mean, standard deviation, exploratory factor analysis, Cronbach’s alpha coefficient and confirmatory factor analysis.

The statistical software used was the Statistical Package for Social Sciences (SPSS - version 22) and Analysis of Moment Structures (AMOS - version 22).

Results

To study the validity of the Emotional Intelligence Measurement Scale (MIE), an exploratory factor analysis was performed to examine construct validity, i.e., to check whether the variables that constitute the factors measure the same concepts or not.\textsuperscript{7}

To study the homogeneity of the items, descriptive statistics (mean and SD) and correlations between each item and the overall value were used (Table 1). It was defined as a criterion that items with lower correlations with the overall value of 0.20 would be eliminated. Thus, some items were removed from the original scale which was composed of 53 items that were numbered in sequential order.

The mean values and respective standard deviations of the items allow us say whether they are well centred.

The correlation values range from 0.208 for item 50 “I have an answer to an insult on the tip of my tongue,” and
| No. | Items                                                                 | $\bar{X}$ | SD  | 5th item corrected correlation total | Cronbach's $\alpha$ without item |
|-----|-----------------------------------------------------------------------|----------|-----|--------------------------------------|----------------------------------|
| 1   | I execute my projects optimistically                                  | 2.64     | 0.820 | 0.317                                | 0.949                            |
| 2   | I increase the number of people in my circle of friends               | 2.57     | 0.682 | 0.459                                | 0.948                            |
| 3   | I evaluate my feelings to understand what I feel                      | 2.73     | 0.725 | 0.588                                | 0.947                            |
| 4   | I can enliven any environment                                         | 2.67     | 0.750 | 0.569                                | 0.948                            |
| 5   | I can identify the feelings of the closest people                     | 2.75     | 0.661 | 0.607                                | 0.947                            |
| 6   | I recognize feelings of joy and sadness in myself                     | 3.00     | 0.647 | 0.467                                | 0.948                            |
| 7   | I count to ten before responding to provocation                       | 2.43     | 0.969 | 0.341                                | 0.949                            |
| 8   | I have a lively conversation with a stranger                          | 2.39     | 0.862 | 0.377                                | 0.949                            |
| 9   | I identify the interests of people I spend time with                  | 2.80     | 0.646 | 0.558                                | 0.948                            |
| 10  | I make people around me feel at ease                                  | 3.11     | 0.703 | 0.528                                | 0.948                            |
| 11  | I discover a person's intentions by how they act                       | 2.71     | 0.661 | 0.538                                | 0.948                            |
| 12  | I use my feelings to act wisely                                       | 2.91     | 0.699 | 0.594                                | 0.947                            |
| 13  | I control the feelings that disturb me                                | 2.76     | 0.725 | 0.626                                | 0.947                            |
| 14  | I'm not sure about accomplishing my future projects                   | 2.41     | 0.747 | 0.229                                | 0.949                            |
| 15  | I can name the feelings that mark my life                             | 2.95     | 0.744 | 0.566                                | 0.948                            |
| 16  | I work with enthusiasm on a personal project                          | 2.80     | 0.799 | 0.628                                | 0.947                            |
| 17  | I meet someone I know in most places I go to                          | 2.81     | 0.722 | 0.467                                | 0.948                            |
| 18  | I achieve the goals I set out for my life                             | 2.67     | 0.645 | 0.626                                | 0.947                            |
| 19  | I face any obstacle to get what I want in life                        | 2.68     | 0.718 | 0.583                                | 0.947                            |
| 20  | I understand what a person wants with it being mentioned              | 2.61     | 0.650 | 0.551                                | 0.948                            |
| 21  | I avoid analysing what I feel                                        | 2.44     | 0.784 | 0.243                                | 0.949                            |
| 22  | I make people who are around me feel good                             | 3.17     | 0.694 | 0.580                                | 0.948                            |
| 23  | I insist on achieving my goals when facing strong obstacles           | 2.75     | 0.758 | 0.648                                | 0.947                            |
| 24  | I talk to myself about my feelings                                   | 2.75     | 0.779 | 0.445                                | 0.948                            |
| 25  | I recognise when someone is in trouble                               | 2.81     | 0.603 | 0.629                                | 0.947                            |
| 26  | I feel at ease around people I’ve just met                            | 2.64     | 0.755 | 0.502                                | 0.948                            |
| 27  | I focus on the plans I set forth for my life                         | 2.76     | 0.717 | 0.606                                | 0.947                            |
| 28  | I easily identify other people’s feelings                             | 2.72     | 0.619 | 0.643                                | 0.947                            |
| 29  | I control my impulses in conflict situations                         | 2.75     | 0.772 | 0.508                                | 0.948                            |
| 30  | I identify a person’s intentions as soon as they begin talking        | 2.60     | 0.667 | 0.546                                | 0.948                            |
| 31  | I identify all of my feelings                                       | 2.89     | 0.683 | 0.612                                | 0.947                            |
| 32  | I guide my present actions in accordance with the plans I’ve made for the future | 2.72     | 0.715 | 0.560                                | 0.948                            |
| 33  | I plan situations to achieve my goals                                 | 2.69     | 0.734 | 0.622                                | 0.947                            |
| 34  | I can identify it when someone I know is in trouble                  | 2.81     | 0.637 | 0.604                                | 0.947                            |
| 35  | I worry about how I feel                                             | 2.87     | 0.726 | 0.463                                | 0.948                            |
| 36  | I know when a friend needs my help                                   | 2.90     | 0.622 | 0.622                                | 0.947                            |
| 37  | I try to react carefully when facing provocations                    | 2.94     | 0.762 | 0.480                                | 0.948                            |
| 38  | I react immediately to aggression                                    | 2.34     | 0.917 | 0.233                                | 0.950                            |
| 39  | I recognise how a friend feels through their gestures                | 2.68     | 0.670 | 0.560                                | 0.948                            |
| 40  | I recognise my feelings very easily                                  | 2.92     | 0.685 | 0.631                                | 0.947                            |
| 41  | I prefer to stay quiet in conversations with strangers               | 2.55     | 0.923 | 0.216                                | 0.950                            |
| 42  | I recognise my contradictory feelings                                | 2.75     | 0.699 | 0.540                                | 0.948                            |
| 43  | I try to think before responding to something I didn’t like          | 2.87     | 0.721 | 0.526                                | 0.948                            |
| 44  | I recognise a person’s feeling by the way they are speaking          | 2.77     | 0.639 | 0.557                                | 0.948                            |
| 45  | I avoid reflecting on something I’m thinking about                    | 2.47     | 0.799 | 0.266                                | 0.949                            |
| 46  | I get on well with anyone                                            | 3.03     | 0.705 | 0.567                                | 0.948                            |
| 47  | I know when someone is in trouble even if they don’t say anything    | 2.74     | 0.657 | 0.594                                | 0.947                            |
| 48  | I feel enthusiastic about my life                                    | 2.85     | 0.804 | 0.642                                | 0.947                            |
| 49  | I easily find out what a friend is feeling                            | 2.72     | 0.636 | 0.599                                | 0.947                            |
| 50  | I have an answer to an insult on the tip of my tongue                | 2.38     | 0.928 | 0.208                                | 0.950                            |
| 51  | I have a lot of friends                                              | 2.99     | 0.771 | 0.446                                | 0.948                            |
| 52  | I make decisions according to my impulses                            | 2.55     | 0.788 | 0.329                                | 0.949                            |
| 53  | I recognise whether someone is ok or not by their tone of voice      | 2.78     | 0.671 | 0.552                                | 0.948                            |

Overall Cronbach's alpha 0.952

Split-half coefficient
First half = 0.913  Second half = 0.903
The Cronbach’s alpha coefficient indicates a very good consistency (0.952) and the values for the items ranged from 0.947 and 0.950. The reliability index by the split-half halves method yielded a value of 0.913 for the first half and 0.903 for the second half revealing very good internal consistency (Table 1). These Cronbach’s alpha values are below the value of Alpha for the overall scale, since this index tends to produce lower reliability values as it considers a smaller number of items.8,9

The values obtained by the Kaiser-Meyer-Olkin test (KMO = 0.961) and the Bartlett test ($X^2 = 25491.863; gl = 1378; P = .000$) show a significant correlation between the items, suggesting an excellent index of sampling adequacy and a favourable matrix to proceed with the factor analysis. Factor extraction by the varimax rotation method revealed nine factors with eigenvalues greater than 1, which together explained 56.10% of the total variance.

Based on the original scale and the theoretical construct, a new factor analysis was conducted forcing five factors. Of the 53 items some were eliminated due to the values of the factor weights and the commonalities.

Factor weights for each item and for each of the five factors ranged from 0.449 (item 5, factor 2) and 0.824 (item 25, factor 5) (Table 2).

### Table 2: Factor weights after varimax rotation, communalities, percentage of explained variance and Cronbach’s alpha in all 5 MIE factors

| No. | Items                                                                 | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | h²  |
|-----|----------------------------------------------------------------------|----------|----------|----------|----------|----------|-----|
| 31  | I know when someone is in trouble even if they don’t say anything   | 0.716    |          |          |          |          | 0.590|
| 33  | I easily find out what a friend is feeling                           | 0.714    |          |          |          |          | 0.593|
| 26  | I recognise how a friend feels through their gestures               | 0.668    |          |          |          |          | 0.522|
| 21  | I recognise when someone is in trouble                              | 0.664    |          |          |          |          | 0.572|
| 36  | I recognise whether someone is ok or not by their tone of voice     | 0.660    |          |          |          |          | 0.515|
| 15  | I easily identify other people’s feelings                           | 0.645    |          |          |          |          | 0.561|
| 10  | I understand what a person wants with it being mentioned             | 0.642    |          |          |          |          | 0.526|
| 23  | I know when a friend needs my help                                  | 0.632    |          |          |          |          | 0.582|
| 17  | I identify a person’s intentions as soon as they begin talking      | 0.614    |          |          |          |          | 0.488|
| 30  | I recognise a person’s feeling by the way they are speaking         | 0.610    |          |          |          |          | 0.500|
| 13  | I recognise when someone is in trouble                              | 0.609    |          |          |          |          | 0.532|
| 3   | I can identify the feelings of the closest people                    | 0.543    |          |          |          |          | 0.473|
| 32  | I achieve the goals I set out for my life                           | 0.718    |          |          |          |          | 0.592|
| 7   | I work with enthusiasm on a personal project                        | 0.696    |          |          |          |          | 0.572|
| 19  | I guide my present actions in accordance with the plans I've made for the future | 0.672    |          |          |          |          | 0.538|
| 12  | I insist on achieving my goals when facing strong obstacles         | 0.672    |          |          |          |          | 0.593|
| 20  | I plan situations to achieve my goals                               | 0.670    |          |          |          |          | 0.568|
| 14  | I focus on the plans I set forth for my life                        | 0.666    |          |          |          |          | 0.563|
| 9   | I face any obstacle to get what I want in life                      | 0.665    |          |          |          |          | 0.530|
| 32  | I feel enthusiastic about my life                                   | 0.609    |          |          |          |          | 0.532|
| 2   | I can enliven any environment                                       | 0.558    |          |          |          |          | 0.432|
| 6   | I control the feelings that disturb me                              | 0.476    |          |          |          |          | 0.494|
| 1   | I execute my projects optimistically                               | 0.466    |          |          |          |          | 0.442|
| 5   | I use my feelings to act wisely                                     | 0.449    |          |          |          |          | 0.406|
| 22  | I worry about how I feel                                           | 0.652    |          |          |          |          | 0.505|
| 27  | I recognise my feelings very easily                                 | 0.617    |          |          |          |          | 0.609|
| 18  | I identify all of my feelings                                      | 0.607    |          |          |          |          | 0.578|
| 28  | I recognise my contradictory feelings                               | 0.578    |          |          |          |          | 0.503|
| 11  | I make people who are around me feel good                           | 0.501    |          |          |          |          | 0.476|
| 16  | I control my impulses in conflict situations                        | 0.704    |          |          |          |          | 0.634|
| 4   | I count to ten before responding to provocation                     | 0.690    |          |          |          |          | 0.563|
| 29  | I try to think before responding to something I didn’t like         | 0.641    |          |          |          |          | 0.640|
| 24  | I try to react carefully when facing provocations                   | 0.636    |          |          |          |          | 0.581|
| 25  | I react immediately to aggression                                   |          |          |          |          | 0.824    | 0.701|
| 34  | I have an answer to an insult on the tip of my tongue               |          |          |          | 0.818    | 0.687   |
| 35  | I make decisions according to my impulses                           |          |          |          | 0.679    | 0.528   |

Number of items: 12 12 5 4 3
Cronbach’s alpha: 0.913 0.889 0.766 0.752 0.736
Eigenvalues: 12.552 2.201 2.022 1.631 1.317
% Explained variance: 17.083 16.157 8.460 7.051 6.032
% Accumulated Variance: 17.083 33.240 41.700 48.751 54.783
The MIE was composed of 36 items explaining 54.78% of the total variance, with a contribution of 17.08% by factor 1 designated Empathy with 12 items (3, 10, 13, 15, 17, 21, 23, 26, 30, 31, 33 and 36), 16.15% by factor 2 called Self-motivation with 12 items (1, 2, 5, 7, 8, 9, 12, 14, 19, 20 and 32), 8.46% by factor 3 designated Self-awareness with 5 items (11, 18, 22, 27 and 28), 7.05% by factor 4 called Self-control with 4 items (4, 16, 24 and 29) and 6.03% by factor 5 called Sociability with 3 items (25, 34 and 35).

With regards to the original version, the factors were kept with the same name, but with a different order of presentation and different organization of items by factors. Cronbach’s alpha coefficients obtained in the five factors indicate good internal consistency of items and good agreement between the statements by presenting values higher than 0.70 (Table 2).

A correlation matrix was formulated between various factors and the overall value of the scale, and the values showed positive correlations ranging from \( r = 0.649 \) (Self-Motivation/Empathy) and \( r = 0.063 \) (Sociability/Self-control). Only Sociability has a low correlation with the overall scale value (Table 3).

After exploratory factor analysis, it is necessary to confirm whether certain latent factors are responsible for the observed behaviour of certain variables. To verify the quality of factor model deduced a confirmatory factor analysis was carried out.

The overall quality fit of factorial model was evaluated according to the indices including the chi-square fit (\( \chi^2/df \)), the Goodness of Fit Index (GFI) the Comparative Fit Index (CFI), the Parcimony Comparative Fit Index (PCFI), the Root Mean Square Error of Approximation (RMSEA, \( P \{ \text{rmsea} \leq 0.05 \} \)) and the Root Mean Square Residual (RMR), based on the reference values. In analyzing the final structure of the 36 item model of the MIE, it reveals a tolerable quality fit (\( \chi^2/df = 3.71; \) GFI = 0.894; RMR = 0.046; CFI = 0.909; PCFI = 0.843; RMSEA = 0.050). To promote its overall fit the model was re-specified.

In the new MIE model item 2, “I can enliven any environment,” item 6, “I control the feelings that disturb me,” and item 11, “I make people around me feel good,” were removed because the theoretical construct as well as the original scale positions them in a factor (Self-control) that is not coincident with the factor analysis (Self-motivation and Self-awareness). It is thus composed of 33 factors and five dimensions. There was no change to the positioning of items per factor.

In comparing the results of the internal consistency obtained in MIE between the sample used in the study and the original scale, the values of Cronbach’s alpha of the study are found to be higher in only factor 1 (\( \alpha = 0.913/\alpha = 0.87 \)) and factor 2 (\( \alpha = 0.889/\alpha = 0.82 \)). The overall value of Cronbach’s alpha in our study (\( \alpha = 0.932 \)) shows a very good consistency (Table 4).

As for discriminant validity, item 1 (Self-motivation) and item 21 (Self-control) showed negative correlations with the Sociability factor. Items 22 and 31 of the Sociability factor and items 13 and 21 of the Self-control factor did not correlate with the, Self-control and Sociability factors respectively (Table 5). For Sociability only items 7, 9, 29 (Self-awareness) and item 14 (Empathy) reveal an item discrimination index greater than 0.20 between the magnitude of the correlation

| Table 3 Pearson correlation matrix between the factors and the overall value of MIE |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Factors        | Empathy | Self-motivation | Self-awareness | Self-control | Sociability |
| Self-motivation | 0.649\(^a\) | — | — | — | — |
| Self-awareness | 0.617\(^a\) | 0.617\(^a\) | — | — | — |
| Self-control   | 0.496\(^a\) | 0.470\(^a\) | 0.484\(^a\) | — | — |
| Sociability    | 0.193\(^a\) | 0.211\(^a\) | 0.183\(^a\) | 0.063\(^b\) | — |
| Overall value of MIE | 0.882\(^a\) | 0.872\(^a\) | 0.769\(^a\) | 0.655\(^a\) | 0.361\(^a\) |

\(^{a}P < .01.\)
\(^{b}P < .05.\)

| Table 4 Cronbach’s alpha by MIE factors |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Factors         | No. of items | Cronbach’s alpha | Overall Alpha (original) |
|                 |               | (Split-half) | Part 1 | Part 2 | Overall Alpha |
| Factor 1 – Empathy | 12 | 0.837 | 0.706 | 0.913 | 0.87 |
| Factor 2 – Self-Motivation | 10 | 0.751 | 0.846 | 0.889 | 0.82 |
| Factor 3 – Self-awareness | 4 | 0.558 | 0.664 | 0.766 | 0.78 |
| Factor 4 – Self-control | 4 | 0.538 | 0.708 | 0.752 | 0.84 |
| Factor 5 – Sociability | 3 | Not applicable | Not applicable | 0.736 | 0.82 |
| Overall value of MIE | 33 | 0.901 | 0.863 | 0.932 | Not obtained |
### Table 5  Correlation of items with the factors and the overall MIE scale

| Original Item No. | Items                                                                 | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | Total MIE |
|------------------|----------------------------------------------------------------------|----------|----------|----------|----------|----------|-----------|
| e1 1             | I execute my projects optimistically                                | 0.304a   | 0.511a   | 0.285a   | 0.119a   | -0.121a  | 0.371a    |
| e5 2             | I can identify the feelings of the closest people                    | 0.671a   | 0.510a   | 0.419a   | 0.365a   | 0.080a   | 0.619a    |
| e7 3             | I count to ten before responding to provocation                      | 0.246a   | 0.262a   | 0.197a   | 0.712a   | 0.121a   | 0.382a    |
| e14 4            | I use my feelings to act wisely                                      | 0.478a   | 0.616a   | 0.466a   | 0.387a   | 0.161a   | 0.606a    |
| e18 5            | I work with enthusiasm on a personal project                         | 0.479a   | 0.754a   | 0.433a   | 0.348a   | 0.183a   | 0.651a    |
| e20 6            | I achieve the goals I set out for my life                            | 0.463a   | 0.752a   | 0.446a   | 0.345a   | 0.185a   | 0.646a    |
| e21 7            | I face any obstacle to get what I want in life                       | 0.451a   | 0.704a   | 0.406a   | 0.317a   | 0.219a   | 0.616a    |
| e22 8            | I understand what a person wants with it being mentioned             | 0.686a   | 0.466a   | 0.364a   | 0.312a   | 0.119a   | 0.596a    |
| e25 9            | I insist on achieving my goals when facing strong obstacles          | 0.521a   | 0.758a   | 0.435a   | 0.389a   | 0.236a   | 0.686a    |
| e27 10           | I recognise when someone is in trouble                               | 0.719a   | 0.510a   | 0.490a   | 0.351a   | 0.126a   | 0.655a    |
| e30 11           | I focus on the plans I set forth for my life                         | 0.455a   | 0.751a   | 0.477a   | 0.353a   | 0.152a   | 0.643a    |
| e31 12           | I easily identify other people’s feelings                            | 0.747a   | 0.525a   | 0.466a   | 0.399a   | 0.128a   | 0.678a    |
| e32 13           | I control my impulses in conflict situations                         | 0.429a   | 0.419a   | 0.412a   | 0.784a   | 0.032ns  | 0.552a    |
| e33 14           | I identify a person’s intentions as soon as they begin talking       | 0.667a   | 0.413a   | 0.364a   | 0.361a   | 0.214a   | 0.592a    |
| e34 15           | I identify all of my feelings                                       | 0.528a   | 0.522a   | 0.791a   | 0.431a   | 0.142a   | 0.646a    |
| e35 16           | I guide my present actions in accordance with the plans I’ve made for the future | 0.431a   | 0.736a   | 0.449a   | 0.307a   | 0.119a   | 0.609a    |
| e36 17           | I plan situations to achieve my goals                                | 0.512a   | 0.758a   | 0.486a   | 0.358a   | 0.168a   | 0.674a    |
| e38 18           | I can identify it when someone I know is in trouble                 | 0.742a   | 0.481a   | 0.486a   | 0.324a   | 0.103a   | 0.645a    |
| e40 19           | I worry about how I feel                                            | 0.357a   | 0.393a   | 0.710a   | 0.251a   | 0.167a   | 0.485a    |
| e41 20           | I know when a friend needs my help                                   | 0.734a   | 0.481a   | 0.544a   | 0.388a   | 0.109a   | 0.663a    |
| e42 21           | I try to react carefully when facing provocations                    | 0.428a   | 0.365a   | 0.414a   | 0.763a   | -0.010ns | 0.520a    |
| e43 22           | I react immediately to aggression                                    | 0.163a   | 0.135a   | 0.134a   | 0.031ns  | 0.833a   | 0.279a    |
| e44 23           | I recognise how a friend feels through their gestures                | 0.706a   | 0.434a   | 0.414a   | 0.361a   | 0.187a   | 0.620a    |
| e45 24           | I recognise my feelings very easily                                  | 0.552a   | 0.553a   | 0.807a   | 0.419a   | 0.090a   | 0.660a    |
| e47 25           | I recognise my contradictory feelings                                | 0.460a   | 0.426a   | 0.757a   | 0.389a   | 0.159a   | 0.571a    |
| e48 26           | I try to think before responding to something I didn’t like          | 0.429a   | 0.397a   | 0.488a   | 0.764a   | 0.026ns  | 0.551a    |
| e49 27           | I recognise a person’s feeling by the way they are speaking          | 0.683a   | 0.392a   | 0.453a   | 0.357a   | 0.167a   | 0.596a    |
| e52 28           | I know when someone is in trouble even if they don’t say anything   | 0.755a   | 0.448a   | 0.443a   | 0.366a   | 0.119a   | 0.640a    |
| e53 29           | I feel enthusiastic about my life                                    | 0.491a   | 0.730a   | 0.483a   | 0.411a   | 0.214a   | 0.671a    |
| e54 30           | I easily find out what a friend is feeling                           | 0.759a   | 0.480a   | 0.423a   | 0.368a   | 0.135a   | 0.654a    |
| e55 31           | I have an answer to an insult on the tip of my tongue                | 0.115a   | 0.137a   | 0.108a   | 0.002ns  | 0.852a   | 0.254a    |
| e57 32           | I make decisions according to my impulses                            | 0.197a   | 0.255a   | 0.213a   | 0.132a   | 0.740a   | 0.356a    |
| e59 33           | I recognise whether someone is ok or not by their tone of voice      | 0.708a   | 0.429a   | 0.435a   | 0.305a   | 0.158a   | 0.607a    |

*a P < .001.

*b P < .01.

*c P < .05.
with the scale it belongs to and the magnitude of the second correlation value with another scale.
Items 22 and 31 of the Sociability factor present a discrimination index of the items less than 0.20, with all factors, item 32 (Sociability) with Empathy and Self-Motivation and item 3 (Self-control) with the Self-awareness.

Analysing the final factorial structure of the 33 item MIE model, relative to the overall fit of the model to the data revealed a good quality of fit ($X^2/df = 3.46$; GFI = 0.909; RMR = 0.025; CFI = 0.924; PCFI = 0.849; RMSEA = 0.048). The final model yielded a good fit, demonstrating that the changes made improved the indices’ fit.

Analysing the estimated parameters after CFA, it appears that the factor saturations show moderate to high values (0.40 to 0.77). The measurement errors of the observed variables proved to be low to moderate (0.16 to 0.62). The correlations between the factors show a large amplitude ($r = 0.02$ and $r = 0.74$) (Fig. 1).

**Discussion**

The aging of populations is an irreversible phenomenon of modern society\cite{11,12} making it currently a major challenge. Portugal continues this trend with an aging index of 127.6 in 2011\cite{13}(INE, 2013).

The aging process involves changes at different levels and emotions are identified as the source of most people’s problems.\cite{14} EI is of great importance for the elderly making them capable of perceiving emotions and dealing with emotional changes, promoting a healthier and productive aging as well as a better quality of life.\cite{15}

---

**Figure 1**  Factor loads, intercorrelations between the factors and error associated with each item, in the 5-factor model with 33 items.
This work sought to validate the Emotional Intelligence Measurement Scale (MIE) for the Portuguese elderly population. The psychometric validation (n=1084) for 53 items highlights a Cronbach’s alpha of 0.952 indicating very good consistency. The values for the items ranged between 0.947 and 0.950 and are higher than those obtained in the original scale (between 0.78 and 0.87).

In order to apply the factorial model, there should be a correlation between the variables. Assessing the validity of the factor analysis revealed a significant correlation between the items and an excellent quality of the data (KMO = 0.961). Factor extraction by the varimax rotation method identified nine factors that explained 56.10% of the total variance of the MIE with 53 items.

The theoretical criteria have an important role in guiding the factors and in this sense, a new factorial analysis was performed forcing 5 factors corresponding to the five EI skills, in accordance with the original scale. Some items were eliminated because the values of the factor weights and commonalities. The MIE with 36 items explained 54.78% of the total variance.

From the correlation matrix between the factors and the overall value of the scale, significant positive correlations were obtained, revealing sensitivity to different aspects of the same construct.

To confirm the factorial structure that was derived from an exploratory factor analysis, a confirmatory factor analysis with a model consisting of 5 factors and 36 items was performed. With regards to the overall fit of the model to the data, a tolerable quality fit was shown ($ \chi^2$/df = 3.71; GFI = 0.894; RMR = 0.046), such that it was re-specified so as to improve the fit.

In the model 2 items were eliminated because they did not coincide with the theoretical construct nor with the original scale’s factorial positioning. A very good internal consistency was maintained (Cronbach’s alpha = 0.932).

Analysing the final factorial structure of the 33 item MIE model, relative to the overall fit of the model to the data, revealed goodness indices and of good and very good fit ($ \chi^2$/df = 3.46; GFI = 0.909; RMR = 0.025). For the estimated parameters analysis after the AFC, it appears that the factor saturations showed moderate to high values (0.40 to 0.77) and the measurement errors of the observed variables proved to be low to moderate (0.16 to 0.62).

The analyses for the factorial validity of the MIE confirmed that the 33 items selected and distributed into five factors is in line with what was conceptualized on the five basic skills that make up emotional intelligence.

In this study we obtained lower Cronbach’s alpha values (less than 0.80) in the factors of Self-Awareness, Self-control and Sociability, suggesting further studies with the MIE applied to senior citizens in different situational contexts or with different demographic characteristics.

What we know about the theme

- The assessment of emotional intelligence is important to perceive emotions, identifying behaviours in adverse situations.
- People with better emotional intelligence show greater satisfaction with life and consequently a better quality of life.

What we get out the study

- The Emotional Intelligence Measurement Scale (MIE) was composed of 33 items and 5 factors (Empathy, Self-motivation, Self-awareness, Self-control and Sociability).
- Exploratory factor analysis showed values corresponding to good psychometric properties and confirmatory factor analysis quality fit to the model.

Funding

Study funded by Centre for Studies in Education, Technologies and Health (CI&DETS).

Acknowledgements

The authors would like to thank the seniors who participate in this study and the Centre for Studies in Education, Technologies and Health (CI&DETS).

Conflicts of interest

The authors declare that there are no conflicts of interest.

References

1. Goleman D. Working with emotional intelligence. New York: Bantman; 1998.
2. García Fernández M, Giménez-Mas Sl. (2010). La inteligencia emocional y sus principales modelos: propuesta de un modelo integrador. Espiral. Cuadernos del Profesorado. 2010;3:43-52. Available at: http://www.cepcuevasolula.es/espiral
3. Salovey P, Mayer JD. Emotional intelligence. Imagination, Cognition and Personality. 1990;9:185-211.
4. Goleman D. Inteligência emocional: A teoria revolucionária que define o que é ser inteligente. Rio de Janeiro: Objetiva; 1995.
5. Taylor D. An Age Old Problem: Exploring Options for Working with Older People. 2011 [accessed 1-9-2014] Available at: http://www.respectforseniors.org/pdf/An%20Age%20Old%20Problem%20Exploring%20Options%20for%20Working%20with%20Older%20People.pdf
6. Siqueira MMM, Barbosa NC, Alves MT. Construção e validação fatorial de uma Medida de Inteligência Emocional. Psicologia: Teoria e Pesquisa. 1999;15:143-52.
7. Pestana M, Gageiro J. Análise de dados para ciências sociais: A complementaridade do SPSS. 5 ed. Lisboa: Edições Sílabo; 2008.
8. Bryman A, Cramer D. Quantitative data analysis with IBM SPSS Statistics 17, 18 and 19: A guide for social scientists. Psychology Press; 2011.
9. Marôco J. Análise estatística com o SPSS Statistics. 6 ed. Pêro Pinheiro: ReportNumber; 2014.
10. Marôco J. Análise de equações estruturais: Fundamentos teóricos, Software & Aplicações. Pêro Pinheiro: Report Number; 2010.
11. Oliveira B. Psicologia do envelhecimento e do idoso. 3ed. Porto: Livpsic; 2008.
12. Carneiro R, Chau F, Soares C, Fialho JAS, Sacadura MJ. O envelhecimento da população: Dependência, ativação e qualidade (Relatório Final). Centro de estudos dos povos e culturas de expressão portuguesa. Lisboa: Faculdade de Ciências Humanas Universidade Católica Portuguesa; 2012 [accessed 4-9-2014]. Available at: http://www.poatfse.qren.pt/content.asp?startAt=2&categoryID=510&newsID=1805&cnt_offset=10

13. Instituto Nacional de Estatística. Estatísticas Demográficas 2011. Lisboa – Portugal: INE, I.P.; 2013.

14. Silva AFB. Envelhecimento activo, educação e promoção da saúde na população idosa. Dissertação de Mestrado. Braga: Instituto de Educação/Universidade do Minho; 2010.

15. Andrade A, Martins R, Madureira A, Albuquerque A, Ramos A, Camilo J, et al. Depressão no idoso e inteligência emocional [resumo]. Psicologia, Saúde e Doenças: 2012;13 Supl:4.