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Re-exploring the connection between Emotional Intelligence, Anxiety, Depression, and Stress in adult population

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Abstract

The relationship between emotional intelligence (EI), anxiety, depression and stress has been analysed through the application of self-reported questionnaires. The objective of this work is to expand the research on the subject, in general population, applying a tool based in mixed theoretical model of Emotional Self-efficacy. A sample of 623 Spanish adults of both sexes participated in the study. The Trait Emotional Intelligence Questionnaire - Short Form (TEIQue-SF), the Goldberg Anxiety and Depression Scale (GADS), and the Depression, Anxiety and Stress Scales (DASS-21) were administered online. The results obtained support the existence of a negative relationship between trait EI and the variables analysed. Reporting data indicating an explained variance for the global trait EI of 29.7 to 32.9% for anxiety, 27.7 to 29.1 for depression and 37.2 to 47.3% for stress, confirming the greater importance of the factors of well-being and self-control in the total effect. The demographic factors of gender, and income have a significant but low or very low influence in the incremental validity of global TEI. These results are consistent with previous studies, based on other population samples and/or with skills-based tools, opening a path for news interventions in this matter.

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1. Introduction

The COVID-19 pandemic caused an increase in mental problems in the population, particularly anxiety, depression and stress (Commodari et al., 2021: Ramlan et al., 2020; Rodríguez et al., 2021; Tolsá & Malas, 2021). This led countries such as Spain, the US or China to implement psychological intervention and first aid systems by telephone and through networks (Sandoval

& Pavón, 2020); being common the online administration of questionnaires such as 21-items Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995) and others as screening tools (e.g.: Andrade et al., 2021; Rodríguez et al., 2021).

Depression, anxiety and stress are common mental disorders in the population, and the second cause of illness in Western societies (Roca et al., 2009). This explains the abundance of studies for the development of intervention and prevention measures. In this context, recent research links Emotional Intelligence (EI) with these psychopathologies, having found well-founded indications that action aimed at increasing EI - as training programs in conflict management and emotional intelligence to improve effective conflict management - could help reduce its levels (e.g.: Boyer et al., 2017; Ciarrochi et al., 2002).

The concept of IE was created by Salovey and Mayer (1990). Initially it was raised as an ability. The most significant theoretical model of this construct is that of the Four Branches, or abilities, which include Emotional Perception, Emotional Facilitation, Emotional Understanding and Emotional Regulation (Mayer & Salovey, 1997). EI is conceptualized as a part of social intelligence that allows controlling, discriminating and using one's own emotional information and that of others to guide thought and behaviour (Salovey & Mayer, 1990). Explaining why general intelligence by itself does not predict personal and social success (Extremera & Fernández-Berrocal, 2004). In this model, EI is a capacity independent of personality, susceptible to being learned or modified, which evolves throughout the subjects' cognitive and maturational development (Ubeda et al., 2017).

Subsequently, mixed models were developed, in which EI is explained as a combination of abilities, skills and personality traits. Of these, the Emotional Self-efficacy model is one of the most significant. This model conceptualizes EI as a personality trait located at lower levels of personality hierarchies (Petrides, 2010). In this model, the identification, processing and action on emotional events (such as enthusiasm, motivation and optimism) are facilitated by the set of personality traits and relatively stable aspects of behaviour (Petrides & Furnham, 2000; Zeidner et al., 2012).

These models also differ in the way they assess EI. In EI as ability (AEI), performance tests are applied in a specific field, which are scored under predetermined and objective criteria (Petrides & Furnham, 2000). In these tests, the level of competence is not influenced by the characteristics of the subject (Úbeda et al., 2017). On the contrary, in mixed models of EI as trait (TEI), self-report measures are applied, which are affected by personality (Úbeda et al., 2017). A meta-analysis found that TEI is more associated with health than AEI, with TEIQue specifically being the measure most strongly associated with mental health (Martins et al., 2010).

Research in EI has evolved a lot in recent years after observing that, in general, high levels of EI are associated with the well-functioning of the individual in the personal, social and professional domain (e.g.: Karakus, 2013; Mayer & Salovey, 1997; Pena & Extremera, 2012); and that low levels are related to psychopathology, in particular depression, anxiety and stress (e.g.: Cîrstoveanu et al., 2020; Extremera et al., 2006; Lizeretti & Extremera, 2011; Salovey et al., 2002).

The data establish a relationship between EI and anxiety and depression mediated by the ability to cope with the negative consequences of distress. In this way, some authors have analysed possible cognitive mechanisms that influence distress. The seminal theory of learned helplessness and the emotional attention (Miller et al., 1975; Seligman, 1975); or the hopelessness theory and perceived control (Abramson et al., 1989), works along these lines. It has been observed that, the desire for control and perceived control -as a cognitive mechanism that influences distress - mediate the relationship between personality and depressive symptoms (Miles et al., 2020; Miles & Merlo, 2021). Observing that, the low levels of perceived control and desire for control can be associated with less well-being and a greater increase in depressive symptomology (Miles et al., 2021). It has also been observed negative correlations with emotional understanding and emotional regulation and positive with emotional perception have been recorded (e.g: De Avila et al., 2011; Extremera & Fernandez- Berrocal, 2004; Salguero & Iruarrizaga, 2006). And that excessive levels of emotional attention will have a detrimental effect on emotional fatigue and symptoms associated with stress (Extremera et al., 2010; Fernandez-Berrocal et al., 2006), increasing the risk of anxiety (Cejudo et al., 2018; Extremera et al., 2010) and depression (Extremera et al., 2006; Fernandez-Berrocal et al., 2006). Conversely, a high EI implies better emotional processing and fewer negative consequences from stress (e.g.: Biolcati et al., 2021; Cejudo et al, 2018; Extremera et al., 2010; Mearns & Cain, 2003).

In turn, as indicated, it has been observed that low EI scores related to excessive levels of emotional attention increase symptoms of stress and the risk of depression (Ciarrochi et al., 2002), but it would be the low emotional capacities that would sustain the disorder (Barberis et al., 2021; Davis et al., 2019). Consequently, high TEI scores are correlated with a reduced risk of depression (Lloyd et al., 2012; Mikolajczak et al., 2007). This could be due to the fact that TEI plays an important role in active coping (Boyer et al., 2017; Petrides et al., 2007), thus reducing depression and disruptive behaviours (Davis & Humphrey, 2012).

So, several studies have explored the relation-ship between trait EI and depression, anxiety and stress, also general distress. They all indicates that trait EI is a positive predictor of these psychopathologies, and that low perceived EI is inversely associated with anxiety and

depression. However, these studies have their limitations. Few of them analyse the relationship between TEI and depression and anxiety from the mixed theoretical model of Emotional Self-efficacy. In turn, these have been carried out in children (Davis et al., 1019), youth (Barberis et al., 2021; Cejudo et al., 2018; Davis et al., 2012; Fernandez-Berrocal et al., 2006; Gomez-Romero et al., 2018), older (Lloyd et al., 2012), clinical sample (Boyer et al, 2017; Lizeretti & Extremera, 2011; Miles & Merlo, 2021), students (Barraza et al., 2017; Ciarrochi et al., 2002; De Avila, 2011; Extremera et al., 2006; Ramlan et al., 2020), teachers (Extremera et al., 2004; Mearns & Cain, 2003) or health workers (Cirstoveanu et al, 2020; Extremera & Fernanded-Berrocal, 2004; Nespererira, 2017), having found limited information in the general population. Also, the influence of the sociodemographic variables on the results found are contradictory. For gender, some studies report that women obtain higher TEI scores than men (Cooper & Petrides, 2010), others report the opposite (Shahzad & Bagum, 2012) or no significant differences were found (e.g.: Heshmati & Ahmadkhanloo, 2017; Petrides & Furnham, 2006). For age, some report a non-significant association (e.g.: Fernández-Berrocal et al., 2004; Platsidou, 2010) and others from less to significant and positive association (Pérez-Diaz et al., 2021). The differences have been attributed to the use of small, homogeneous and unbalanced samples, and to interculturality (Pérez-Díaz et al. (2021).

In this context, expanding studies to the general population, applying mixed theoretical model of Emotional Self-efficacy, can provide valuable information in this field. The widespread use of social networks for the administration of measurement tools can facilitate this task. The online administration of the TEIQue-SF and other questionnaires has already been used successfully by other researchers (e.g.: Biolcati et al., 2021: Miles et al., 2020), opening the door for new research in a more general range of the population.

1.1 The present study

The present study aims to expand previous research on the relationship between TEI and depression, anxiety, and stress in the general adult population, applying the TEIQue-SF, a tool based on the mixed theoretical model of Emotional Self-efficacy. The results are expected to be consistent with those reported in the literature, obtained with tools based on the Four Branches and/or in samples different from the general population. Based on this, the proposed study hypotheses were: (1) The global score of the TEIQue-SF and its subscales will present negative and significant correlations with depression, anxiety and stress. (2) EI, anxiety, depression and stress share sociodemographic risk factors. (3) The global TEI and its subdimensions will present incremental validity in the prediction of anxiety, depression and stress.

2. Method

2.1 Participants

A non-clinical sample (n = 623) of Spanish general adult population is used, including 45.6% male, 53.1% female, and 1.3% of other gender, with a mean age of 40.90 years (*SD*: 15.05), ranging from 18 to 82 years. Other data can be seen in Table-1.

2.2 Procedure and ethics

Instruments were administered online during September-October 2021. Recruitment was carried out with a message containing the study link, which was distributed by direct message through social networks. Participation was completely voluntary. A consent form was inserted at the beginning of the study to inform the participants of the aim of the research and the protection of privacy. To continue with the administration of the questionnaires, each participant had to accept the terms of the study that complied with the Helsinki declaration.

2.3 Instruments

Sociodemographic information. The participants were asked about age, gender, marital state, dependence (with/without minors/older dependents), study levels and month income.

Trait Emotional Intelligence Questionnaire - Short Form (TEIQue-SF: Cooper & Petrides, 2010): For this study validated Spanish version was used (Laborde et al., 2016). This is a 30-item questionnaire designed to measure global TEI. It evaluates four factors of IE: Wellbeing, Self-control, Emotionality and Sociability. Items are assessed using a 7-point Likert scale that ranged from 1 (completely disagree) to 7 (completely agree). The scale includes 15 items in reverse order (items 2, 4, 5, 7, 8, 10, 12, 13, 14, 16, 18, 22, 25, 26 and 28), which must be recoded to have only one sense in all items. In turn, items 3, 14, 18 and 29 only contribute to the global TEI. The final score is calculated by adding the item scores and dividing by the total number of items. In this study the scale sowed adequate to good psychometric properties with a Cronbach's α of 0.815, 0.655, 0.526 and 0.595 for wellbeing, self-control, emotionality and sociability sub-scale factors respectively, and 0.878 for global TEI scale. The obtained data revealed that the global TEI, also wellbeing and self-control was very reliable, but the other two showed acceptable but not good reliability (Taber, 2018). According Jacobs et al. (2015) or Perazzo et al. (2021), as example, it is common to find lower alpha coefficients at the factor level of the TEIQue-SF (0.58 to 0.85), in contrast to the global score, whose internal consistency typically exceeds 0.80. Thus, the results obtained for these two factors should be viewed with caution.

Anxiety, Depression and Stress Scale (DASS-21: Lovibond & Lovibond, 1995): It is a self-reporting questionnaire that measures emotional distress in three 7-item dimensions: 1) depression; 2)

anxiety; and 3) stress. All 21 items are rated on a four-point Likert scale evaluating both intensity and frequency of emotional distress during the last week (from 0 = did not apply to me at all to 3 = applied to me very much, or most of the time). The higher the score the more intense/frequent the emotions of distress. Each factor has a discrete score varying from 0 to 21. Scores greater than 14, 10 and 17 suggest extremely severe Depression, Anxiety and Stress respectively (Lovibond & Lovibond, 1995). The scale has been validated in multiple languages, showing a stable structure and good reliability in all cases. In this study, the scale sowed good psychometric properties with a Cronbach's α of 0.870, 0.931 and 0.878 for the anxiety, depression and stress sub-scale respectively, and 0.956 for full scale.

Goldberg Anxiety and Depression Scale (GADS: Goldberg et al., 1988): This instrument is a self-reporting questionnaire, that measures emotional distress in two dimensions: 1) depression; and 2) anxiety. Composed of 9 binary (yes/no) items everyone. Items 1 to 9 for anxiety; and items 10 to 18 for depression. In each subscale, the first four questions are conditioning questions, because two affirmative answers are required to continue with the subscale. In research the full scale is usually applied, and that is how it was used in the present study. Higher point values indicate a more severe problem with 9 as the highest possible value for each subscale. The scale has been validated in multiple languages, showing a stable structure and good reliability in all cases. In this study the scale sowed good psychometric properties with a Cronbach's α of 0.825 and 0.806 for anxiety and depression sub-scale respectively, and 0.893 for full scale.

2.4 Statistical analysis

The applied methodology is the same of Biolcati et al. (2021), Cîrstoveanu et al. (2020), Fernández-Berrocal et al. (2006), and Hjalmarsson & Dåderman (2020). After adjusting the data for analysis, demographic characteristics were studied using frequency analysis and descriptive calculation (mean, standard deviation, skewness, and kurtosis). The equivalence between the subgroups, of each demographic characteristic, with respect to the global trait EI score and the anxiety, depression and stress scores, was determined using Fisher's Chi-square. One of the main research questions for this study was to investigate whether anxiety, depression, and stress correlate with the global trait EI scale score, as well as its subscales. Therefore, correlation analysis was applied. Correlations were calculated using scale scores for both the global trait EI and its four subdimensions. The same procedure was followed for the DASS-21 and the GADS. As Hjalmarsson & Dåderman (2020), the Bonferroni correction was applied to obtain a more accuracy result (correction for multiple comparisons, to avoid overvalue alpha level). To explore whether self-report EI predicted anxiety, depression, or stress, we conducted a series of stepwise multiple regression analyses using the global score and the subscales score of the TEIQue-SF,

and the DASS-21 and GADS factor scores as dependent variables. To investigate whether TEIQue-SF has incremental validity over sociodemographic variables, these were analysed as covariables in the regression analyses. Statistical analyses were performed using the SPSS v.27 package.

3. Results

3.1 Descriptive Statistics

Table 1 includes demographic characteristic of the sample with their frequency analysis.

Table 1. Demographic characteristics of the sample

Total sample *n*= 623		Frequency (%)
Age: M: 40.90 (SD:15.05)		
Age range:	<20	7.2%
	20-29	22.8%
	30-39	13.3%
	40-49	25.7%
	50-59	8.6%
	60-69	10.0%
	>70	2.1%
Gender	Males	45.6%
	Females	53.1%
Marital situation	Single	48.3%
	Coupled	42.5%
	Divorced	7.9%
	Widower	1.3%
Dependents in charge	Wit dependents	34.7%
Studies	Compulsory	7.1%
	Mean	32.2%
	Technical	7.7%
	University	53.0%
Annual income (€)	<12.000	37.4%
	<18.000	16.1%
	<28.000€	22.0%
	<37.000€	10.4%
	>37.000€	14.1%

The mean values for each item, skewness and kurtosis can see in Table-2. The results for skewness and kurtosis of the global TEIQue-SF, as well as its factors, are within the range of ± 1, which indicates that the distribution curve is symmetric for all variables. For DASS, within the range of ± 1.5, indicating that the distribution curve is relatively symmetrical for all variables.

The skewness and kurtosis obtained for the GADS scale and subscales scores were anecdotal, since the empirical data are dichotomous and therefore do not present a normal distribution.

The comparative analysis of frequencies indicates that, for anxiety, no significant differences related to age were observed (DASS: $X^2/gl = 0.93$, $p = 0.661$. GADS: $X^2/gl = 1.10$, $p = 0.257$). Significant differences were observed related to sex (DASS: $X^2/df = 2.44$, $p < 0.001$. GADS: $X^2/df = 3.01$, $p < 0.001$), marital status (DASS: $X^2/gl = 2.79$, $p < 0.001$, GADS: $X^2/df = 1.44$, $p < 0.001$), having or not dependents in charge (DASS: $X^2/df = 1.48$, $p = 0.041$, GADS: $X^2/gl = 2.17$, $p = 0.003$), educational level (DASS: $X^2/df = 1.27$, $p = 0.073$ GADS: $X^2/df = 1.52$, $p = 0.022$) and income (DASS: $X^2/df = 1.81$, $p < 0.001$ GADS: $X^2/df = 2.29$, $p < 0.001$). For depression, no significant differences were observed related to age (DASS: $X^2/df = 0.91$, $p = 0.765$. GADS: $X^2/df = 1.49$, $p = 0.051$), or educational level (DASS: $X^2/df = 1.12$, $p = 0.200$. GADS: $X^2/df = 0.94$, $p = 0.561$). Significant differences were observed related to gender (DASS: $X^2/df = 1.90$, $p < 0.001$. GADS: $X^2/df = 4.25$, $p < 0.001$), marital status (DASS: $X^2/df = 2.77$, $p < 0.001$. GADS: $X^2/df = 4.84$, $p < 0.001$), having or not dependents in charge (DASS: $X^2/df = 1.77$, $p < 0.001$. GADS: $X^2/df = 2.39$, $p < 0.001$) and income (DASS: $X2/df = 2.02$, $p < 0.001$ GADS: $X^2/df = 2.73$, $p < 0.001$). For stress, no significant differences related to age were observed ($X^2/df = 120$, $p = 0.296$). Significant differences were observed related to gender ($X^2/df = 2.53$, $p < 0.001$), marital status ($X^2/df = 2.77$, $p < 0.001$), having or not dependents in charge ($X^2/df = 1.59$, $p = 0.021$), educational level ($X^2/df = 1.30$, $p = 0.057$) and income ($X^2/df = 1.90$, $p < 0.001$).

Being a woman, living alone, having dependents in charge, and low income were identified as risk factors for anxiety, depression and stress. Low educational level or be student also was identified for anxiety and stress.

For the global TEI score, no significant differences were observed related to age ($X^2/df = 0.95$, $p = 0.787$) neither for its subdimensions. For gender, no difference is observed for the global TEI score ($X^2/df = 1.15$, $p = 0.067$), but there is for their subdimensions of well-being ($X^2/df = 1.35$, $p = 0.023$), self-control ($X^2/df = 1.65$, $p < 0.001$) and emotionality ($X^2/df = 1.50$, $p = 0.003$), also for self-motivation ($X^2/df = 1.91$, $p = 0.005$) and adaptability ($X^2/df = 1.76$, $p = 0.011$). Significant differences were observed for marital status ($X^2/df = 3.54$, $p = 0.002$), related to the subdimension of well-being ($X^2/df = 1.68$, $p < 0.001$), emotionality ($X^2/df = 1.24$, $p = 0.036$) and self-motivation ($X^2/df = 3.31$, $p < 0.001$). Also, for to have or not dependents in charges ($X^2/df = 0.97$, $p = 0.607$) related to self-motivation ($X^2/df = 1.87$, $p = 0.006$). For the educational level ($X^2/df = 1.13$, $p = 0.033$) related to self-control ($X^2/df = 169.56$, $p = 0.027$).

The difference observed for income (X^2/df = 1.11, p = 0.043), is mediated by all the subdimensions, from well-being (X^2/df = 1.28, p = 0.006), to self-control (X^2/df = 1.40, p < 0.001), emotionality (X^2/df = 1.17, p = 0.047), sociability (X^2/df = 1.20, p = 0.038), self-motivation (X^2/df = 2.39, p < 0.001), or adaptability (X^2/df = 1.57, p = 0.003).

The identified risk factors (low levels of global TEI score) were living alone (low well-being, emotionality and self-motivation), having dependents in charge (low self-motivation), low educational level (low perceived self-control) and low salary (mediated by all the dimensions analysed).

Table 2. Descriptive statistics and bivariate correlations (n=623)

	Descriptive statistics				Correlations*				
	M	SD	S	K	IE	WB	SC	EM	SO
IE	16.55	3.111	-0.259	-0.353	--				
WB	4.04	1.08	-0.615	-0.206	0.843	--			
SC	4.40	1.12	-0.202	-0.258	0.762	0.527	--		
EM	5.03	0.87	-0.186	-0.095	0.737	0.430	0.389	--	
SO	4.56	1.05	-0.159	-0.596	0.525	0.503	0.316	0.370	--
D21	**12.78**	**12.03**	**0.991**	**0.056**	**-0.682**	**-0.629**	**-0.566**	**-0.377**	**-0.288**
DA	2.54	3.51	1.492	1.411	-0.526	-0.476	-0.477	-0.282	-0.209
DD	5.00	5.70	1.099	0.094	-0.688	-0.670	-0.502	-0.388	-0.330
DS	5.24	4.05	0.535	-0.735	-0.598	-0.512	-0.560	-0.328	-0.208
GS	**7.43**	**5.02**	**0.170**	**-1.195**	**-0.613**	**-0.560**	**-0.532**	**-0.329**	**-0.284**
GA	4.24	2.85	0.115	-1.183	-0.539	-0.491	-0.511	-0.268	-0.217
GD	3.64	2.64	0.212	-1.147	-0.610	-0.559	-0.480	-0.352	-0.320

(*) p< 0.05, after the Bonferroni correction (0.05/66 = 0.00075).

M= Mean. SD= Standard Deviation. S = skewness. K = kurtosis. EI = global trait EI scale score. WB = Well-Being. SC = Self-Control. EM = Emotionality. SO = Sociability. D21: general distress DASS score. DA = DASS-21 anxiety. DD = DASS-21 depression. DS = DASS-21 stress. GS= general distress GADS score. GA = GADS anxiety. GD = GADS depression.

3.2 Correlations between the investigated variables

Table 2 gives an indication of which variables correlate with each other, at p < 0.05 after the Bonferroni correction (0.05/66 = 0.00075). Correlations between global EI and its factors were significant good (r = 0.503 – 0.843) and correlations between factors were significant but adequate to poor (r = 0.315 – 0.525), as expected for factors of the same construct. As expected, the correlations of both the global TEI and its four factors were significant and negative with anxiety, depression and stress, also with general distress. These correlations were good for global TEI (r = 0.526 - 0.688) and its factors of well-being (r = 0.476 - 0.670) and self-control (r =

0.477 - 0.566), but poor or fair for emotionality (r = 0.268 - 0.388) and sociability (r = 0.208 – 0.330).

3.3 Hierarchical regression analysis

Predictive and incremental effect of EI and sociodemographic variables were determined. Stepwise multiple regression analyses were performed between the sociodemographic variables and the TEIQue-SF subscales as independent variables, and the anxiety (DASS-21 and GADS), depression (DASS-21 and GADS) and stress (DASS-21) subscales, respectively, as dependent variables.

The results of the regression analysis obtained for anxiety can be seen in Table-3. The first and second models show salary, sex, self-control and well-being as predictive variables. In our sample, the predictive value for other sociodemographic variables (age, marital status, dependents in charge or educational level) and other subscales of the TEIQue-SF was not significant. In the third regression model, the explained variance of self-control (22.7 to 26.1%) and well-being (6.8 to 7.0%), described in the second model, shows an increase related to salary (1.3 to 0.8%) and gender (1.9 to 2.1%). The fourth model does not explain the variance better than the second model.

Table 3. Hierarchical regression analysis for anxiety

	DASS-21-Anxiety				GADS-Anxiety			
	R^2	⊿R^2	F	β	R^2	⊿R^2	F	β
Step-1: Covariables	0.133		68.19		0.128		70.64	
1. Income		0.099		-0.267		0.102		-0.278
2. Sex		0.034		0.191		0.026		0.167
Step-2: TEIQue-SF	0.297		182.43		0.329		218.99	
1. Self-control		0.227		-0.313		0.261		-0.349
2. Wellbeing		0.070		-0.311		0.068		-0.307
Step-3:	0.331		182.43		0.355		218.99	
1. Self-control		0.227		-0.258		0.261		-0.302
2. Wellbeing		0.070		-0.287		0.068		-0.283
3. Sex		0.021		0.127		0.019		0.125
4. Income		0.013		-0.124		0.008		-0.095
Step-4: Global TEI	0.277	0.277	237.93	-0.526	0.291	0.291	254.82	-0.539

Note: in all case $p < 0.001$

The results of the regression analysis obtained for depression can be seen in Table-4. The first and second models show salary, sex, well-being, self-control, and emotionality as predictive variables. In our sample, the predictive value for other sociodemographic variables and other subscale of the TEIQue-SF was not significant. In the third regression model the explained variance of well-being (31.3 to 44.9%), self-control (4.8 to 3.1%), and emotionality (0.6%), described in the second model, shows an increase related to salary (3.3%) and sex (0.4 to 0.7%). The fourth model present similar values (explained variance of 37.2 to 47.3%) to second model.

Table 4. Hierarchical regression analysis for depression

	DASS-21-Depression				GADS-Depression			
	R^2	ΔR^2	F	β	R^2	ΔR^2	F	β
Step-1: Covariables	0.150		98.55		0.159		98.87	
1. Income		0.137		-0.341		0.137		-0.333
2. Sex		0.013		0.117		0.021		0.150
Step-2: TEIQue-SF	0.485		505.76		0.367		282.67	
1. Wellbeing		0.449		-0.535		0.313		-0.396
2. Self-control		0.031		-0.187		0.048		-0.236
3. Emotionality		0.006		0.085		0.006		0.089
Step-3:	0.512		505.76		0.407		282.67	
1. Wellbeing		0.449		-0.507		0.313		-0.3063
2. Self-control		0.022		-0.144		0.048		-0.180
3. Income		0.033		-0.146		0.033		-0.168
4. Sex		0.004		0.065		0.007		0.101
5. Emotionality		0.005		0.084		0.006		0.091
Step-4: Global TEI	0.473	0.473	557.99	0.688	0.372	0.372	368.57	0.610

Note: in all case $p < 0.001$

The results of the regression analysis obtained for stress can be seen in Table-5. The first and second models show salary (11.5%), sex (2.7%), self-control (31.4%) and wellbeing (6.5%) as predictive variables, and, to a lesser extent, sociability (0.7%) and emotionality (0.4%). In our sample, the predictive value for other sociodemographic variables was not significant. The third model explains a lower percentage of variance than the second model, and shows how the sociodemographic variables have a decreasing effect on the predictive factors of TEIQue-SF. The fourth model is the one that explains a higher percentage of variance.

Table 5. Hierarchical regression analysis for stress

	DASS-21-Stress			
	R^2	ΔR^2	F	β
Step-1: Covariables	0.142		80.90	
1. Income		0.115		-0.297
2. Sex		0.027		0.170
Step-2: TEIQue-SF	0.485		284.33	
1. Self-control		0.314		-0.393
2. Wellbeing		0.065		-0.328
3. Sociability		0.007		-0.108
4. Emotionality		0.004		0.074
Step-3:	0.408		284.33	
1. Self-control		0.314		-0.380
2. Wellbeing		0.065		-0.319
3. Income		0.020		-0.160
4. Emotionality		0.009		0.108
Step-4: Global TIE	0.598	0.598	345.84	0.598

Note: in all case $p < 0.001$

4. Discussion

The objective of the study has been achieved. The results allow providing information that relates TEI with anxiety, depression and stress in a heterogeneous adult population sample, applying TEIQue-SF, a tool based in mixed theoretical model of Emotional Self-efficacy.

The data obtained in first analysis confirm the first hypothesis. The obtained results show a weak to moderate and significant relationship between the three psychopathological symptoms and the global TEI; also, with the wellbeing and self-control factors; being significant but very poor or fair for the emotionality and sociability factors. The TEI is shown as a negative predictor of these psychopathologies. The results were in concordance with these obtained in other studies and population samples as children (e.g.: Russo et al., 2012), adolescents (e.g.: Mavroveli et al., 2007) or adults (e.g.: Petrides et al., 2017), using TEIQue large version tool. Or with that reported by other researchers who, carrying out their studies from a conceptualization of EI as an ability, also observed that global trait EI had a protective effect against anxiety (e.g.: Gomez-Romero et al., 2018) depression (e.g.: Barraza et al., 2017; Gómez-Romero et al. 2018) and stress (e.g.: Nespereira & Vázquez, 2017; Puigbó et al., 2019).

Respect to second hypothesis, in this study, the risk factors shared by IE (lower score) and anxiety, depression and stress (higher score) ware living alone, having dependents in charge and low income. Previous studies refer to these factors as risk factors for these psychopathologies (e.g..: Ramlan et al., 2020; Tolsá & Malas, 2021). We have not found studies in this regard for TEI with which to compare this extreme. No significant difference was obtained for age or gender. Obtained results were consistent with those reported, for example, by Fernández-Berrocal et al. (2004) and Platsidou (2010) for age; or by Petrides & Furnham (2000, 2006) for gender. But not with those reported, for example, by Petrides & Furnham (2000, 2006) for age, or Cooper & Petrides (2010), and Shahzad & Bagum (2012) for gender. Siegling et al. (2015) attribute this to the variety of trait EI measures used, and the use of small or unbalanced samples. The sample used in this study is heterogeneous and relatively large, but - like most of the previous investigations that applied ANOVA or similar - sociodemographic variables differences were determined using Fisher's Chi-square test, which are subject to measurement error (Vandenberg & Lance, 2000) and can be considered as suboptimal. It is known that, without conducting measurement invariance analyses, the constancy of a construct across sociodemographic variables is unwarranted (e.g., Petrides et al., 2003). In any case, Peres-Diaz et al (2021), in a cross-cultural study including 4 different countries, applying invariance statistics, also obtained variable results for age, gender, educational level, marital status and occupational status, which was justified - as MacCann et al. (2020) - citing the small size of the effect that would make it not always be detected. In the present analysis, for gender, no difference is observed for the global score of the TEI, but there is for its subdimensions of well-being, self-control and emotionality, as well as for self-motivation and adaptability. It would be possible to postulate that it is the balance between these scores that equalize the global TEI scores between genders, or that, in their readjustment, originate the small effect sizes detected in some studies. In any case, these data must be taken with caution. Information obtained through hierarchical regression analysis, including demographic variables as covariates, should be analysed to verify these results.

Regarding the third hypothesis, the hierarchical regression analysis confirms that the global TEI score has good incremental validity in predicting anxiety, depression and stress. The results were in line with previous research (e.g.: Cîrstoveanu et al., 2020; Extremera et al., 2006; Lizeretti & Extremera, 2011; Salovey et al., 2002) carry out with other tools and other samples, indicating a negative relationship between TEI and anxiety, depression and stress. The comparative study of frequencies drew attention to the subdimensions of self-control, self-motivation and well-being. Hierarchical regression analyses show how the self-control subdimension is behind the

highest percentage of explained variance of the global trait TEI in anxiety and stress. Being the well-being subdimension the one that explains the highest percentage of explained variance in depression. Results were concordant with previous research (e.g.: Amoura et al., 2013; Cheng et al., 2013; Myles et al., 2021) indicating the existence of an inverse relationship between psychological distress and perceived control and desire for control; supporting the theoretical proposition that the absence of perceived control culminates in a feeling of hopelessness that can lead to psychopathology. Also, a similar relationship between depression and well-being was described by Fernández-Berrocal & Extremera (2016); or by Sánchez-Álvarez et al. (2016) who obtained a strong association for the cognitive component of well-being and also, but to a lesser extent, for the affective component. The positive effect of emotionality on stress, recorded by De Avila et al. (2011), Extremera & Fernandez- Berrocal (2004) or Salguero & Iruarrizaga, (2006), is also recorded, although the explained variance is low compared to that reported for well-being and self-control. Consequently, this study expands on the evidence for incremental validity of the global TEIQue–SF and provides evidence for the predictive effects of its subscales. Also, and contrary to the results obtained with the Fisher's Chi-square test - which indicate that there is no effect of gender - the regression analysis indicates that gender has a low but significant increasing predictive value on TEI, in anxiety and depression, but not in stress. In any case, as observed by MacCann et al. (2020) and Peres-Diaz et al (2021), the effect is low (1.9 to 2.1% for anxiety and 0.4 to 0.7% for depression). Finally, confirm a low but significant effect of income, but not for other sociodemographic variables.

5. Limitations and conclusion

The first limitation of this study is its breadth. Global EI trait and its subdimensions ware analysed against anxiety, depression and stress, applying two scales. The breadth of the topic has not allowed to delve into the results. Second, may be influenced by several limitations present in the study methodology. The results will be affected by self-report biases applied online, particularly those related to social desirability, or the ease of accessing and using online tools. In other hand, the sample includes a higher proportion of people with higher education. The proportion of the sample with compulsory studies is very low.

6. Suggestions for Future Studies

The results obtained raise questions that could be analyzed in greater depth. For example, the use of the DASS-21 allows obtaining stress results in addition to anxiety and depression. Analyses to test the mediating effect of stress on EI-depression and EI-anxiety relationships

would be useful. On the other hand, in the study differences were observed between the discriminant value provided by the subdimensions and the global EI trait, which are not explained by sociodemographic variables. It would be interesting to continue analysing this point. Also, a greater depth in the analysis of each subdimension regarding these psychopathologies could be of interest. Another possibility for future research would be to complement the analysis by applying joint measures of FDI and AEI, and considering both the global score and the impact of each individual factor. This would help to better focus clinical and educational interventions. Finally, considering that cross-sectional studies do not allow clear identification of the cause-effect relationship, a longitudinal study in applied settings would be interesting.

7. Conclusions

This study provides new evidence on the incremental validity of the TEI construct. The data suggest that the global EI trait, and mainly its subdimensions of self-control and well-being, show certain differences and provide an incremental variance in the explanation of the symptoms of anxiety, depression and stress in people.

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Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

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