The role of emotional intelligence and self-care in the stress perception during COVID-19 outbreak: An intercultural moderated mediation analysis

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A B S T R A C T

Background: The relationship between emotional intelligence (EI) and stress has been widely studied, as well as the beneficial role of self-care to maintain health and wellbeing. However, the joint contribution of EI and self-care in predicting stress has not been examined during COVID-19 lockdown. This study aimed to examine the mediating role of self-care in the relationship between EI and stress and the potential moderator role of gender.
Methods: A sample of 1082 participants from four Hispanic countries completed measures related to socio-demographic, trait emotional intelligence (Trait Meta-Mood Scale), self-care activities (Self-care Activities Screening Scale) and stress (Perceived Stress Scale).
Results: Mediation analyses revealed that self-care increased the explained variance of the prediction of stress by EI dimensions after controlling gender and age. However, gender only moderated the relationship between self-care and stress in the mediation model corresponding to emotional attention.
Conclusions: Data supported a general model for the interaction of EI and self-care as contributing factors of stress. Further research is needed to replicate it in more culturally distant samples and to fully explore the potential role of gender differences. Future intervention programs should include a balanced combination of EI and self-care to increase their benefits on people's health.

1. Introduction

Currently, nearly 73 million people have been infected by the SARS-CoV-2 virus and more than 1,620,000 people have died around the globe as a result of this pandemic. Those that have survived the disease have also suffered physical and psychological consequences due to this outbreak. The lockdown measure has entailed social isolation, significant socio-economic consequences, the need to work from home and conciliate work with childcare, etc. Due to such changes to people's lives and daily routines, many have experienced physical and mental health problems such as depression, anxiety, panic responses, insomnia, a worsening of their immune system and post-traumatic stress symptoms, among others (Brooks et al., 2020; González-Sanguino et al., 2020; Nicomedes & Avila, 2020; Pappa et al., 2020; Segerstrom, 2010; Yang & Ma, 2020; Zhao et al., 2020).

However, promoting a healthy lifestyle and psychological resources, such as self-care and emotional intelligence (EI) skills, can serve as important individual health assets to decrease the negative effects of the stress that this situation entails and help to improve/maintain health during these circumstances. In fact, as a recent meta-analysis has shown, EI is not only connected to mental health, but also to physical health through biological and behavioral variables (Sarrionandia & Miko-lajczak, 2019). These behavioral variables are factors related to self-care activities such as a healthy diet, physical activity or sleep.

Thus, it would be necessary to assess the relationship between EI and the adherence to self-care activities during a lockdown with the aim of maintaining good health and reducing stress effects. Likewise, and although the association between stress and EI has already been studied in recent years, the connection between EI, self-care and perceived stress has not been researched, even less so during a lockdown. Therefore, the

present study is the first to examine the association of EI, self-care and perceived stress during the current COVID-19 outbreak.

1.1. Emotional intelligence

Since the first academic definition in 1990, EI has been widely investigated. Nevertheless, there is no unique definition and EI can be considered as a capacity, a trait or a mixed construct. Understood as a trait, EI is a constellation of emotional dispositions situated at the lower levels of personality hierarchies (Petrides & Furnham, 2001). Trait EI has been associated with several life factors of utmost importance, such as subjective well-being (Andrei et al., 2016), social support (Goldenberg et al., 2006), interpersonal relationships with romantic partners (Malouff et al., 2014), leadership (Miao et al., 2016), and physical, mental and psychosomatic health (Martins et al., 2010; Mikolajczak et al., 2015). Besides, experimental research has demonstrated that training trait EI improves psychological, somatic and social outcomes (Nelis et al., 2009; Vesely et al., 2014; Yalçin et al., 2008). Regarding trait EI measurement, one of the most widely used instruments in the Spanish-speaking population is the self-report measure Trait Meta Mood Scale-24: TMMS-24 (Fernández-Berrocal et al., 2004; Salovey et al., 1995). This scale evaluates each person's individual perception of their level of Emotional Attention (Attention), Emotional Clarity (Clarity), and Emotional Repair (Repair) (Fernández-Berrocal & Extremera, 2008). People with high EI are characterized by moderate to low scores in attention and high scores in clarity and repair (Salovey et al., 1999). Higher levels of clarity and repair are associated with better psychological adjustment and mental health (Extremera & Fernández-Berrocal, 2006; (Fernández-Berrocal et al., 2005) (Fernández-Berrocal et al., 2006). By contrast, people who attend to their emotions excessively, without adequate clarity and repair, can develop an emotional spiral that may generate a ruminant process leading them, in turn, to maintain a negative emotional state (Thayer et al., 2003). Deficits in clarity have been linked to symptoms of anxiety and stress, and when accompanied by deficits in repair, they have been linked to symptoms of depression (Fernández-Berrocal et al., 2006) (Salovey, 2013). Of the three factors of EI assessed through TMMS-24, repair is the most appropriate component for predicting psychological adjustment indicators (Fernández-Berrocal & Extremera, 2008).

1.2. Self-care

From a recent dynamic perspective of the concept of health, it can be considered as the ability to adapt and self-care in order to face physical, social and emotional challenges (Huber et al., 2011). Thus, self-care is considered as an important and valuable principle as it emphasizes the active role of people in maintaining their own wellbeing.

Self-care involves two main components (Orem, 1991): the self-care agency or the ability to engage in self-care, and self-care behaviors or activities undertaken to maintain life and enhance well-being. In this manner, self-care entails activities carried out to keep oneself healthy (Matarese et al., 2018). That is, activities or processes to maintain physical, psychological, social, and spiritual well-being. According to the literature, self-care is positively related to self-esteem, health, social support, and well-being; and is helpful to remove and/or prevent disease symptoms (Høy et al., 2007; Mailhot et al., 2013; Marzband & Zakavi, 2017).

1.3. Perceived stress

Stress is a "relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). Perceived stress is related to health status and different diseases, including adjustment disorders (Vallejo et al., 2018). Research conducted on university students has confirmed that stress is related to

depression, anxiety, unpleasant emotions, low self-esteem, little optimism and a low sense of self-efficacy (Saleh, Camart, & Romo, 2017; Saleh, Romo, & Camart, 2017). Likewise, perceived stress has been found to be negatively correlated to EI (Jung et al., 2016; Urquijo et al., 2016; Zysberg et al., 2017) and resilience (Chen et al., 2018).

1.4. Self-care as a mediator

A theory that can link the variables measured in the present study is the Salutogenic theory. It was Antonovsky (1979) who developed this theory arguing that salutogenesis focuses on the origins of health. He defined it as a stress resource-oriented concept, explaining why some people keep healthy in spite of the influence of many stressful situations and risk factors (Antonovsky, 1987; Mittelmark et al., 2017). Stress was indeed one of the most studied concepts in his model, considering stress the maladaptive response to the tension. Therefore, health is an active, dynamic process of self-regulation (Antonovsky, 1987) and that being able to face the daily situations can be a protective factor for health and it is assumed that people are able to improve their health (Schmidt & Dantas, 2011). To do so, it is important to identify factors that can act as promoters and maintainers of the search of well-being (Espinosa & Restrepo, 2008). Bearing in mind that EI implies perceiving (identifying and expressing) and clarifying (regulating) emotions in order to better adapt and face daily situations, it is evident that improving EI will be beneficial for health. Likewise, and as the salutogenic theory confirms, stress results as a maladaptive response to the tension created when facing stressful situations. Thus, it could be thought that better EI would imply a reduced stress. Finally, and as self-care activities (physical activity, appropriate diet, etc.) are oriented to improve health, it could be thought that people with better EI will attach to more self-care activities improving health and reducing stress (Sarrionandia & Mikolajczak, 2019).

This hypothetical model about the relationship between EI, self-care and perceived stress has not been confirmed in previous studies. However, studies have been conducted on these variables separately. Regarding perceived stress and EI, research has shown that EI is negatively related to perceived stress (Jung et al., 2016; Zysberg et al., 2017). EI and stress have also been assessed with other variables. In this way, it has been demonstrated that EI is indirectly related to perceived stress through resilience (Sarrionandia et al., 2018; Sarrionandia & Mikolajczak, 2019) and that EI improves well-being, decreasing the experience of stress (Urquijo et al., 2016). In fact, perceived stress and psychological well-being are negatively and significantly related, while EI and psychological well-being are positively related.

As for self-care and EI, research is scarce. However, health consciousness –a construct closely related to self-care- has been studied in relation to EI. Notably, they have both been identified as important predictors of health behaviors (Espinosa & Kadić-Maglajlić, 2018). Health consciousness refers to self-awareness about one's health, and the willingness to engage in health and wellness promoting behaviors (Michaelidou & Hassan, 2008). People with a high level of health consciousness have positive attitudes towards exercise, nutrition, and self-care, implying healthier lifestyles compared to those with a low level of health consciousness (Chen, 2009; Hoek et al., 2004). EI has been found to be indirectly related to health behaviors through health consciousness in two ways (Espinosa & Kadić-Maglajlić, 2018): people with high EI are aware of behaviors that promote health (Wong and Law, 2002); people with high EI better regulate their emotions and are more aware of healthy strategies to manage daily life stressors (Peña-Sarrionandia et al., 2015). That is, people with better EI are more aware of their health and take more actions to improve health (Espinosa & Kadić-Maglajlić, 2018).

As health behaviors are strongly connected to physical health (e.g., Chiuve et al., 2012; Colditz et al., 2000), it could be concluded that EI is a predictor of better physical health. In fact, a recent meta-analysis has shown that trait EI is indeed related to physical health through

biological and behavioral variables. Specifically, it has been demonstrated that EI is positively related to social support, sleep, physical activity and diet, thus resulting in better physical health, and negatively related to substance use, reckless driving and risky sexual behavior (Sarrionandia & Mikolajczak, 2019). Thus, regarding these results, it could be thought that EI, self-care activities and stress are associated.

Research identifying the factors related to health-promoting behaviors is vital for creating interventions aimed at reducing the risk of illness, particularly among young adults whose health behaviors are susceptible to change (Daw et al., 2017; Johnstone & Hooper, 2016). In fact, it has been shown that prevention using health-promoting strategies is effective in reducing up to 40% of the mortality caused by unhealthy behaviors and lifestyles (McGinnis et al., 2002).

In this way and taking into account that EI and self-care will be of vital importance to achieve/maintain good health, and in order to do so, it is important to explore how EI affects perceived stress through the potential mediating influence of self-care. In fact, understanding this relationship would be helpful in designing and/or improving interventions to reduce stress and improve health, especially in lockdown situations.

1.5. The moderated role of gender

Although EI may relate to self-care and perceived stress, it is possible that not all individuals are equally influenced. In fact, research on EI and health behaviors has shown a different response between men and women (Fernández-Abascal & Martín-Díaz, 2015). Women have shown to score significantly higher than men in terms of trait EI (Meshkat & Nejati, 2017), and they also report higher levels of involvement in self-care activities (Grzywacz et al., 2011). In addition, it has been shown that gender has an effect on stress, demonstrating that women present higher levels of chronic and daily stressors compared to men and, as a result, they may report a lower level of well-being (Hogan et al., 2002).

Thus, the aim of this study was to examine the direct and indirect influence of EI (i.e., explanatory variable) on perceived stress (i.e., response variable) via self-care, and whether these effects would be moderated by gender and other socio-demographic variables such as age, income and educational levels, and country. This general model was based on a stratified population from four Hispanic countries.

Based on the findings above, the following hypotheses were proposed for this study:

Hypothesis 1. (H1). H1a. There is a positive relationship between attention, clarity, repair and self-care. H1b. There is a negative relationship between self-care, clarity, repair and perceived stress. H1c. There is a positive relationship between attention and perceived stress.

Hypothesis 2. Self-care mediates the relationship between EI and perceived stress.

Hypothesis 3. Gender moderates the direct and indirect relationships between, EI, self-care and perceived stress.

2. Methods

2.1. Participants and procedure

Participants recruitment was conducted online throughout social media on 1st April across four countries: Chile, Colombia, Ecuador and Spain. The battery of instruments was uploaded on an online platform. Before answering the questionnaires, participants received written instructions online and those who agreed to participate gave their explicit consent. Participation in the study was anonymous and voluntary, no compensation was offered for participating, and the administration of the questionnaires took approximately 15 min. This study was approved by the Research Ethics Committee of the University of Navarra (Project ID: 2020.058).

Out of a total of 3452 respondents, a stratified sample was extracted by randomizing cases by the four countries, gender and five age groups (18–29; 29–39; 40–49; 50–59; >60 years old). The final sample consisted of 1082 participants, from Chile ($n = 261$), Colombia ($n = 268$), Ecuador ($n = 282$) and Spain ($n = 271$).

2.2. Instruments

2.2.1. Trait Meta-Mood Scale (TMMS-24)

To measure trait EI, the Spanish version of the TMMS-24 (Fernández-Berrocal et al. (2004) was used. is a self-report questionnaire. It is answered on a Likert-type scale ranging from 1 = Don't agree at all to 5 = Totally agree. It is composed of 24 items and it evaluates 3 dimensions of intrapersonal EI: attention, clarity and repair. The first dimension refers to the capacity to perceive and express feelings adequately. The second dimension refers to the capacity to understand one's own feelings. The third dimension refers to the capacity to regulate one's own emotional states in an appropriate way. The TMMS-24 presents adequate psychometric properties (Fernández-Berrocal et al., 2004). In the validation sample, Crobach's alpha was $\alpha = 0.89$ for attention, $\alpha = 0.90$ for clarity, and $\alpha = 0.86$ for repair.

2.2.2. Self-care Activities Screening Scale (SASS-14)

The SASS-14 is a brief self-report instrument to screen the general population in self-care activities validated during a lockdown situation (Martínez et al., 2021). This screening tool measures four dimensions: Health Consciousness, Nutrition and Physical Activity, Sleep quality and Inter and Intrapersonal coping strategies. The SASS-14 is composed of 14 items ranging from 1 = Never to 6 = Always, and provides a total score related to individual's self-care. The higher the total score, the higher the level of self-care activities undertaken by the person. The SASS-14 has shown adequate psychometric properties with high internal consistency and convergent validity with psychological well-being and stress measures. For the validation sample, Cronbach's alpha was $\alpha = 0.77$.

2.2.3. Perceived Stress Scale (PSS-10)

The PSS-10 is a self-report questionnaire that evaluates perceived stress during the last month (Perera et al., 2017). The PSS-10 is composed of 10 items ranging from 0 = Never to 4 = Very often. The instrument provides a total score; the higher the total score, the more perceived stress. The PSS-10 has proper psychometric properties (Cohen et al., 1983). In particular, the Spanish version of the PSS-10 has good reliability (internal consistency, $\alpha = 0.81$; test-retest, $r = 0.73$), concurrent validity, and sensitivity (Perera et al., 2017). In this sample Cronbach's alpha was $\alpha = 0.85$.

2.3. Statistical analysis

Descriptive statistics analysis was used to summarize the social demographic data. Normality distribution of data variables was checked by Shapiro-Wilk tests and this assumption was not met for stress, emotional attention, clarity and repair variables. In consequence, we adopted a nonparametric approach.

In order to explore gender differences on self-care, stress, and emotional intelligence (i.e., attention, clarity and repair) Mann Whitney *U* Tests were performed. Then, we grouped data in the following age intervals: [18–28], [29–39], [40–49], [50–59], and [>60] years, and we tested for the effect of age and country by means of Kruskal-Wallis tests and Dunn's post-hocs when needed. Spearman's Rank-Order Correlation analyses were performed to determine the relationships between data variables. The significance level was set to $p = 0.05$ in all analyses.

Then, in order to determine the influence of the socio demographic variables in the relationship between emotional intelligence and stress while mediated by self-care (i.e., to be included as covariates in the later mediation and moderation models), robust regression analyses

(Cattaneo & Jansson, 2018) were applied. Here, it was evaluated if the effects of age (continuous variable), gender (i.e., dichotomous variable, 2 levels), education level (i.e., ordinal variable, 4 levels), income level (i. e., ordinal variable, 6 levels), and country (categorical variable, 4 levels) significantly predict self-care, stress, and attention, clarity and repair. These analyses were performed using STATA software (version 15).

Finally, three mediation analyses were conducted. As it is recommended by (Hayes, 2015) when conducting mediation analyses with multiple variables, independent mediation analyses were performed, where each emotional dimension was introduced as independent variable (X), self-care as mediator variable (M), and stress as dependent variable (Y), while the rest of the dimensions and the significant variables determined previously were included in these models as covariates, respectively (see Supplementary Fig. 1. Hypothetical model) and the total effect of the hypothesized mediator (c) was assessed. The indirect effects were tested with bias-corrected bootstrapping ($n = 5000$) and 95% confidence intervals (CI) and the effect size of the mediated relationship is estimated by the completely standardized direct and indirect effects (Ccs). In moderated mediation analyses, previous covariables were kept in the model and gender was introduced as the moderator (W).

These analyses were performed using IBM SPSS software v.24. The mediation model (Model 4) and the moderated mediation model (Model 59) were tested using the PROCESS macro v.19 (Hayes, 2015).

3. Results

3.1. Sample description

The age of participants ranged from 18 to 95 (mean age 43.8, SD = 15.1); 49% (551) of participants were women; with regards to educational level: 1% (11) elementary education, 14.1% (153) secondary education, 11.3% (122) technical studies and 73.6% (796) university education; in terms of economic situation (measured in statutory monthly minimum wage [mmw] in American dollars, mmw = 300 USD): 14.6% (158) of the sample had no income, 8% (87) earned less than the monthly minimum wage, 13.4% (145) earned two times the mmw, 17.5% (189) earned three times the mmw, 16.2% (175) earned four times the mmw and 30.3% (328) earned more than five times the mmw. The descriptive statistics for demographic variables and psychological measures are presented in Table 1.

Mann Whitney U tests results on gender indicated that women reported significantly higher levels of attention, clarity, and stress and also engaged in more self-care activities than men (Table 2). Kruskal-Wallis post-hocs on age showed that the youngest age group (i.e., 18–28 years) experienced greater stress than the other four age groups. Also, this group (i.e., 18–28 years) showed higher attention that all participants over 40 years and the 29–39 group showed higher attention than participants between 50 and 59 years old (Table 2).

On the other hand, the 18–28 age group showed lower clarity than the other 4 age groups, and the 29–39 group showed higher clarity than participants over 60 years. A similar situation occurred with repair, where the younger participants had lower scores on this variable compared to the rest of the groups, and both the 29–39 and 40–49 groups showed higher repair than participants over 60 years. For his part, the age did not significantly affect self-care score (Table 2). Kruskal-Wallis tests determined that countries significantly differed in stress, and post-hocs confirmed that Colombia showed lower stress than Ecuador, Chile and Spain, whereas Ecuador showed lower stress than Spain. Regarding EI, Colombia showed higher clarity levels than Chile and Spain, and, both Ecuador and Chile, showed higher clarity than Spain. Repair scores showed that Colombia reported higher level than Chile and Spain, and Chile showed higher clarity than Spain. The effect size of all these effects was found small. Finally, the country did not significantly differ in attention and self-care scores (Table 2).

Table 1
Socio-demographic characteristics.

	Spain	Chile	Colombia	Ecuador	Total
N (%)	271	261	268	282	1082
Age M (SD)	43.8 (15.7)	43.9 (14,5)	44 (14,8)	44 (14,8)	43,8 (15,1)
Gender n (%)					
Female	136 (50,2)	127 (48,7)	131 (48,9)	137 (48,6)	531 (49,1)
Male	135 (49.8)	134 (51.4)	137 (51.1)	145 (51.4)	551 (50,9)
Income level n (%)					
No salary	45 (16.6)	27 (10.3)	43 (16)	43 (15.2)	158 (14.6)
One mw*	9 (3.3)	22 (8.4)	37 (13.8)	19 (6.7)	87 (8)
Two mw	30 (11)	36 (13.8)	37 (13.8)	42 (15)	145 (13.4)
Three mw	50 (18.5)	35 (13.4)	68 (25.3)	36 (12.7)	189 (17.5)
Four mw	59 (21.7)	34 (13)	30 (12)	52 (18.4)	175 (16.2)
Five mw	78 (28.8)	107 (41)	53 (19.7)	90 (32)	328 (30.3)
Educational level n (%)					
Elementary	4 (1.48)	4 (1.53)	1 (0.4)	2 (0.7)	11 (1)
High School	42 (15.5)	28 (7.0)	35 (13.5)	48 (17.0)	153 (14.1)
Technical	37 (13.7)	33 (12.7)	40 (15.3)	12 (4.3)	122 (11.3)
University	188 (69.3)	196 (75.1)	192 (74.5)	220 (78)	796 (73.6)
COVID–19 variables n (%)					
Confinement days	21 (4.6)	17.5 (6.5)	17 (4.0)	25 (0.6)	–
Front–line workers (yes)	80 (29.5)	80 (30.7)	131 (48.9)	76 (27)	367 (33.9)
Health risk factors (yes)	89 (32.8)	84 (32.2)	77 (28.7)	87 (30.9)	337 (31.1)
Employment changes (yes)	46 (17)	51 (19.5)	87 (32.4)	87 (31)	271 (25)
Accompanied during lockdown (yes)	231 (85.2)	237 (91)	266 (99.2)	248 (88)	982 (90.8)
Community resources (yes)	245 (90.4)	233 (89.2)	225 (84)	251 (89)	936 (85.5)
Children in charge (yes)	63 (23.2)	86 (33)	93 (34.7)	95 (33.6)	337 (31.1)
Older people in charge (yes)	29 (10,5)	57 (22)	106 (39.5)	95 (33.6)	287 (26.5)
Psychological variables M (SD)					
Emotional Attention	28.8 (7)	29.2 (6.3)	29.8 (5.9)	29.5 (6.7)	29.3 (6.5)
Emotional Clarity	30.6 (5.8)	31.5 (5.9)	32.6 (5.4)	32.2 (5.7)	31.7 (5.7)
Emotional Repair	31.1 (5.7)	31.8 (5.7)	32.9 (5.3)	32.2 (5.1)	31.9 (5.5)
Self-care	58.5 (9.2)	58.2 (11)	59.9 (9.3)	59.1 (10.1)	58.9 (9.9)
Stress	17.1 (6.2)	17 (6.2)	15.3 (6.3)	16.2 (6.3)	16.4 (6.4)

3.2. Correlational analyses

Results on Spearman's correlations (Table 3) over the sample data confirmed Hypothesis 1a, H1b and H1c. As expected, stress correlated negatively with self-care, clarity and repair and positively with attention. Self-care correlated positively with attention, clarity and repair.

3.3. Mediating effect of self-care

Preliminarily, the results of the robust analyses indicated that there was a significant collective effect of age, gender and country on stress

Table 2
Main variables descriptive and inferential analysis according to differences of gender, age and country.

Main variables	Females (Mdn [IQR]) n = 531	Males (Mdn [IQR]) n = 551	Z*	p	Post-hoc Comparisons***
Self-care	60 [53–66]	58 [52–65]	2.68	0.007	Females>Males (r = 0.08)
Perceived Stress	17 [13–21]	15 [12–20]	2.85	0.004	Females>Males (r = 0.08)
Emotional Attention	31 [26–35]	29 [24–33]	4.27	0.001	Females>Males (r = 0.13)
Emotional Clarity	32 [29–37]	32 [28–36]	3.04	0.002	Females>Males (r = 0.09)
Emotional Reparation	33 [29–37]	32 [29–35]	2.09	0.03	Females>Males (r = 0.06)

Main variables	18–28 n = 219	29–39 n = 231	40–49 n = 223	50–59 n = 200	>60 n = 209	χ^{2**}	p	
Self-care	58 [52–63]	60 [51–65]	59 [52–65]	60 [52.5–67]	59 [53–66]	8.21	0.08	
Perceived stress	19 [14–22]	16 [12–21]	15 [11–20]	15 [12–19]	15 [11–19]	30.6	0.001	18–28 > 29–39 (z = 2.48, p = 0.07, r = 0.075) 18–28 > 40–49 (z = 3.88, p = 0.001, r = 0.118) 18–28 > 50–59 (z = 4.04, p < 0.001, r = 0.123) 18–28 > 60 (z = 5.03, p < 0.001, r = 0.153) 29–39 > 50–59 (z = 1.67, p = 0.047, r = 0.05) 29–39 > 60 (z = 2.64, p = 0.04, r = 0.08)
Emotional attention	31 [26–36]	31 [26–35]	30 [25–34]	29 [24–34]	29 [24–33]	21.1	0.001	18–28 > 40–49 (z = 2.55, p = 0.005, r = 0.078) 18–28 > 50–59 (z = 3.28, p < 0.001, r = 0.10) 18–28 > 60 (z = 3.90, p < 0.001, r = 0.119) 29–39 > 50–59 (z = 2.34, p = 0.001, r = 0.071) 29–39 > 60 (z = 2.96, p = 0.002, r = 0.09)
Emotional clarity	30 [25–33]	32 [28–37]	32 [29–37]	32 [30–36]	33 [30–37]	51.6	0.001	18–28 < 29–39 (z = −4.78, p < 0.001, r = −0.145) 18–28 < 40–49 (z = −5.08, p < 0.001, r = −0.154) 18–28 < 50–59 (z = −5.75, p < 0.001, r = −0.175) 18–28 < 60 (z = −6.38, p < 0.001, r = −0.194)
Emotional reparation	31 [27–34]	32 [29–36]	32 [29–36]	33 [29.5–37]	33 [30–37]	35.9	0.001	18–28 < 29–39 (z = −3.12, p < 0.001, r = −0.095) 18–28 < 40–49 (z = −3.51, p < 0.001, r = −0.107) 18–28 < 50–59 (z = −4.58, p < 0.001, r = −0.139) 18–28 < 60 (z = −5.59, p < 0.001, r = −0.17) 29–39 < 60 (z = −2.58, p = 0.005, r = −0.078) 40–49 < 60 (z = −2.15, p = 0.016, r = −0.065)

Main variables	Colombia n = 268	Ecuador n = 282	Chile n = 261	Spain n = 271	χ^{2**}	p	
Self-care	59 [53–66.5]	59 [52–66]	59 [50–66]	59 [52–64]	3.72	0.29	
Perceived Stress	15 [11–20]	16 [12–20]	17 [12–21]	17 [13–21]	13.7	0.003	Colombia<Ecuador (z = −1,67, p = 0.047, r = −0.05) Colombia<Chile (z = −3.06, p = 0.001, r = −0.093) Colombia<Spain (z = −3.29, p < 0.001, r = −0.10) Ecuador<Spain (z = −1.65, p = 0.049, r = −0.05)
Emotional Attention	30 [25.5–35]	30 [25–35]	30 [25–34]	29 [24–34]	2.33	0.50	
Emotional Clarity	32 [29–38]	32 [28–37]	32 [28–36]	31 [28–34]	17.8	0.001	Colombia>Chile (z = 1.924, p = 0.027, r = 0.059) Colombia>Spain (z = 3.94, p < 0.001, r = 0.12) Ecuador>Spain (z = 3.26, p < 0.001, r = 0.099) Chile>Spain (z = 1.98, p = 0.023, r = 0.06)
Emotional Reparation	33 [30–37]	33 [29–36]	32 [29–36]	32 [28–35]	13.6	0.003	Colombia>Chile (z=, 2.217, p = 0.013, r = 0.067) Colombia>Spain (z = 3.63, p < 0.001, r = 0.12) Chile>Spain (z = 1.98, p = 0.023, r = −0.066)

Mdn: median; IQR: interquartile range; n = sample size; * Mann Whitney U Test; ** Kruskal-Wallis test and *** Post-hocs were corrected for multiple comparisons by means of Dunn's tests and the effect size was computed by means of Cohen's R.

Table 3
Spearman's Rank-Order correlations among main variables.

	M	SD	1	2	3	4	5	6	7	8	9
1. Self-care	58.9	9.9									
2. Perceived Stress	16.4	6.4	- 0,18*								
3. Emotional Attention	29.3	6.5	−0,29*	0,18*							
4. Emotional Clarity	31.7	5.7	0,35*	−0,39*	0,30*						
5. Emotional Reparation	32	5.5	0,34*	−0,40*	0,13*	0,52*					
6. Income level			0,05	−0,19*	−0,07	0,10*	0,06				
7. Gender			−0,08	−0,08	−0,12*	−0,09	−0,06	0,14*			
8. Age	43.9	15.1	0,08	−0,16*	−0,14*	0,19*	0,18*	0,33*	0,03		
9. Educational level			0,03	−0,14*	−0,03	0,11*	0,03	0,40*	−0,04	0,14*	

N = 1.082.
* p < 0.001.

(z_{1082} = 88.32, p < 0.001, R^2 = 0.194), self-care (z_{1082} = 188.39, p < 0.001, R^2 = 0.023), attention (z_{1082} = 186.1, p < 0.001, R^2 = 0.038), clarity (z_{1082} = 154.9, p < 0.001, R^2 = 0.068) and repair (z_{1082} = 154.9, p < 0.001, R^2 = 0.038). Therefore, these variables were considered as covariates in the following analyzes to control for their possible effect.

Then, the mediation of self-care in the relation between IE and stress was tested (Hypothesis 2). The mediation analyses determined that the total effects of attention, clarity and repair mediated by self-care on stress were statistically significant, indicating a 37% of stress level is explained by this model (Table 4). Moreover, attention, clarity and repair had a significant direct influence on self-care (a) (Table 4), and the association between self-care and perceived stress (b) was also significant (β = 0.06 (0.18); p < 0.0001).

The standardized indirect effect of EI dimensions on perceived stress via self-care was statistically significant (attention β = −0.02 (0.007) 95% CI = [−0.03, − 0.007]; clarity β = −0.02 (0.006) 95% CI = [−0.03, −0.005] and repair β = −0.02 (0.007) 95% CI = [−0.04, −0.008]). Therefore, in support of Hypothesis 2, self-care had a mediating effect on the relationship between all EI dimensions and stress through a direct relationship with EI (the greater the level of EI, the greater the degree of self-care), which, in turn, related to a lower perceived stress (with the exception of attention, which is positively associated with stress).

3.4. Moderated effects of gender

Hypothesis 3 was tested by estimating a moderated mediation model that included age and country as control variables (i.e., covariates) and gender as the moderator.

As Fig. 1 indicates, there was a significant direct influence of gender on the interaction between the mediator self-care and the outcome variable of stress but not between attention, clarity, repair and stress. The indirect effects of attention, clarity and repair mediated by self-care were statistically significant for women but not for men (see Table 5). However, the index of moderated mediation was only significant for attention (Index = 0.03 (0.01) 95% CI = [0.003, 0.055], meaning that the indirect effect is only conditional on the level of the gender group for the attention dimension. Therefore, Hypothesis 3 was partially supported, given that gender moderated just the indirect effect of attention via self-care on stress.

4. Discussion

The aim of this study was to examine the direct and indirect influence of EI on perceived stress via self-care, and whether these effects would be moderated by gender.

On one hand, results from this study supported the H1 which established a positive relationship between EI dimensions and self-care, as well as a negative relationship between self-care, clarity, repair and stress. This means that the more emotional clarity, repair and self-care activities participants showed, the lower was their stress perception. On the contrary, the more emotional attention they reported, the more stressful they felt.

However, some differences on the main variables were found depending on the age-group and gender. Results showed that young people, and specially women, reported higher levels of emotional attention than older groups. These results confirm those obtained with Spanish adolescents (Salguero et al., 2010) and adults populations (Sánchez-Núñez et al., 2008) showing that girls present a greater tendency than boys to pay attention to their emotions, and that such difference becomes more pronounced as the adolescents get older. Meanwhile, these differences are not observed for boys and girls in the Clarity and Repair of emotions dimension (Fernández-Berrocal & Extremera, 2008). These high scores on emotional attention and its positive relationship with stress could explain in part why some young groups and females are experiencing high levels of stress during the COVID-19 lockdown, as it has been reported in recent studies (Xiong

Table 4
The mediating effect of self-care in the relationship between emotional intelligence and stress.

Predictors	Total effect (c)						On Self-care (a)					On Perceived Stress (c')					
	B	SE	t	p	R^2 F p	C_{CS}	B	SE	t	p	R^2 F p	B	SE	t	p	R^2 F p	C'_{CS}
Emotional Attention	0.29	0.03	11.33	0.0001	0.36/85.6/0.0001	0.29	0.32	0.04	7.25	0.0001	0.21/39.9/0.0001	0.31	0.03	11.83	0.0001	0.37/76.9/0.0001	0.32
Self-care (b)												−0.06	0.18	−3.30	0.0001		
Age	−0.001	0.01	−0.14	0.89			0.03	0.02	1.53	0.126		−0.002	0.01	0.01	0.98		
Gender	1.25	0.32	−3.97	0.0001			−0.50	0.55	0.92	0.356		−1.29	0.32	−4.07	0.0001		
Country	0.27	0.14	1.90	0.057			0.39	0.24	0.15	0.88		0.27	0.14	1.92	0.054		
Emotional Clarity	−0.39	0.03	−11.41	0.0001	0.36/85.6/0.0001	−0.34	0.29	0.05	4.9	0.0001	0.21/39.9/0.0001	−0.37	0.03	−10.9	0.0001	0.37/76.9/0.0001	−0.32
Self-care (b)												−0.06	0.18	−3.33	0.0001		
Age	−0.001	0.01	−0.14	0.89			0.03	0.02	1.53	0.126		−0.002	0.01	0.01	0.98		
Gender	1.25	0.32	−3.97	0.0001			−0.50	0.55	0.92	0.356		−1.29	0.32	−4.07	0.0001		
Country	0.27	0.14	1.90	0.057			0.39	0.24	0.15	0.88		0.27	0.14	1.92	0.054		
Emotional Repair	−0.34	0.03	−9.98	0.0001	0.36/85.6/0.0001	−0.29	0.41	0.06	6.9	0.0001	0.21/39.9/0.0001	−0.32	0.03	−9.13	0.0001	0.37/76.9/0.0001	−0.27
Self-care (b)												−0.06	0.18	−3.33	0.0001		
Age	−0.001	0.01	−0.14	0.89			0.03	0.02	1.53	0.126		−0.002	0.01	0.01	0.98		
Gender	1.25	0.32	−3.97	0.0001			−0.50	0.55	0.92	0.356		−1.29	0.32	−4.07	0.0001		
Country	0.27	0.14	1.90	0.057			0.39	0.24	0.15	0.88		0.27	0.14	1.92	0.054		

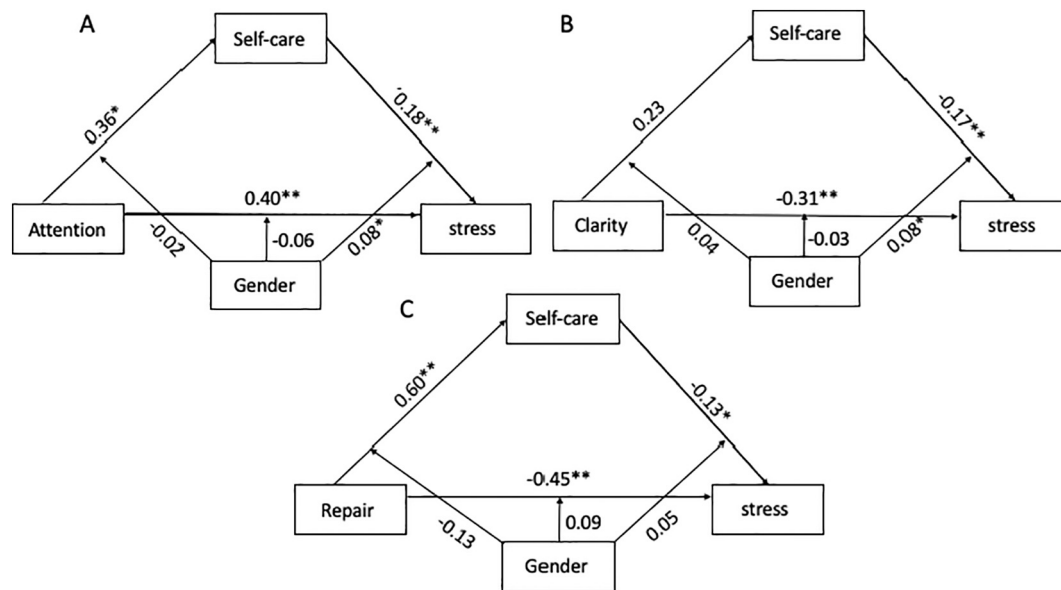Analyses conducted using PROCESS model 4, N = 1082. Gender and country were dummy coded.

Fig. 1. Moderated effects of gender.
A. Moderation model between attention and stress mediated by self-care; B. Between clarity and stress mediated by self-care and C. between repair and stress mediated by self-care; * *p* < 0.05; ** *p* < 0.001.

Table 5
Conditional direct and indirect effects of emotional intelligence on stress via self-care and moderated by gender.

Values of the moderator	Emotional Intelligence dimensions	Direct effects				Indirect effects		
		B	SE	t	p	B	SE	95%
Female	Attention	0.35	0.04	9.04	p < 0.0001	−0.03	0.01	[−0.06, −0.020]
	Clarity	−0.35	0.05	−7.67	p < 0.0001	−0.03	0.01	[−0.05, −0.009]
	Repair	−0.36	0.05	−7.93	p < 0.0001	−0.04	0.01	[−0.07, −0.020]
Male	Attention	0.28	0.04	8.08	p < 0.0001	−0.006	0.007	[−0.02, 0.010]
	Clarity	−0.38	0.04	−8.54	p < 0.0001	−0.006	0.008	[−0.02, 0.008]
	Repair	−0.10	0.05	−5.44	p < 0.0001	−0.01	0.008	[−0.03, 0.005]

et al., 2020). Regarding some differences found between countries on stress perception, Colombia and Ecuador reported lower levels of stress perception in comparison to Spain and Chile. These results could be due to the time of data collection since at that time Spain and Chile were more affected by the pandemic.

On the other hand, the second hypothesis was supported by the results showing that EI dimensions are indeed differently related to stress through self-care activities and after controlling for gender, age-group and country differences. These results may indicate that even though engaging in self-care activities can help us to reduce stress perception, it is EI which significantly predicts the adoption of self-care activities which, in turn, increases the beneficial gains on stress reduction. According to the salutogenesis theory by Antonovsky (1979, 1987), our mediation model can be considered an example of how personal recourses are important health asset to cope with stress, and so generate health From this perspective, stress is a result of a maladaptive response to the tension and some people keep healthy in spite of the influence of many stressful situations and risk factors. In this sense, EI (specially, clarity and repair) would be an important personal resource for reducing stress, but also, to adopt self-care activities (physical activity, appropriate diet, etc.) and so increase its potential benefits on stress reduction.

These results are in line with those that confirm a (negative) relationship between perceived stress and trait EI (Zysberg et al., 2017) and with those that show that emotionally intelligent people are more aware of behaviors that promote health (Wong & Law, 2002) since as they better manage their emotions, they are more aware of healthy strategies to handle daily stressors (Peña-Sarrionandia et al., 2015) and take more actions to improve health (Espinosa & Kadić-Maglajlić, 2018).

Regarding the third hypothesis, it was partially supported since gender seemed to moderate only the mediated relationship between attention, self-care and stress. These results are consistent with studies that have found a relationship between EI and gender (Fernández-Berrocal & Extremera, 2008; Petrides & Furnham, 2000) and with those that confirm that self-care is influenced by gender. For example, research has demonstrated that men present greater risk behaviors for health than women (Grzywacz et al., 2011) meanwhile, for health protective behaviors, it has been found that women are more prone to engage in preventive actions (Viera et al., 2006) and visit the physician more often than men (Cherry et al., 2008). However, men undertake other self-care activities more than women, such as physical activity (Troiano et al., 2008). Finally, regarding perceived stress and gender differences, it has been shown that gender has an effect on stress, demonstrating that women present higher levels of chronic and daily stressors compared to men (Hogan et al., 2002; Tamres et al., 2002).

These gender differences in EI, self-care and perceived stress are usually explained by culture and education. According to Sánchez-Núñez et al. (2008), EI can be observed from infancy due to the differential teaching given to boys and girls. With regards to self-care, an explanation for the differences in self-care among men and women could originate from infancy; in particular, the time children (boys vs. girls) spend at home alone (Athertona et al., 2016). In fact, parents tend to leave boys (more than girls) in unsupervised self-care for longer periods of time (Casper & Smith, 2004; Vandivere et al., 2003), resulting in these self-care differences in adulthood.

Bearing in mind these results, it would be interesting to design and implement EI intervention programs that include self-care activities as

an important mechanism to improve people's health outcomes. Besides, and considering that the present study was carried out during a lockdown, it might be concluded that improving EI will help to improve self-care, which will lead to better physical and mental health in lockdown situations.

The present study is not without its limitations. On the one hand, the study comprised an incidental non-clinical sample of adults during the recent lockdown. Thus, the results might not be generalized to a clinical population. Also, the study was cross-sectional, and we relied only on self-report measures, which do not enable the establishment of causal links and might include biases, such as social desirability.

As future lines of research, it is suggested to use longitudinal and experimental designs in order to ascertain how EI influences self-care and in which way it is related to physical health. Likewise, it would be interesting to go deeper into the relationship between different EI dimensions (such as emotion understanding and emotion regulation) and self-care.

In sum, the present study has shown that self-care mediates the relationship between EI and stress, in which gender moderated its effect on the Attention dimension. Thus, improving EI will contribute to the adoption of self-care activities, acting as a beneficial balanced dose for stress reduction and, in turn, for physical and mental health.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2021.110679.

Role of funding source

CRediT authorship contribution statement

Elena Bermejo-Martins: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Elkin O. Luis:** Conceptualization, Data curation, Formal analysis, Writing – review & editing. **Pablo Fernández-Berrocal:** Conceptualization, Formal analysis, Writing – review & editing. **Martín Martinez:** Formal analysis, Writing – review & editing. **Ainize Sarrionandia:** Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing.

Declaration of competing interest

We have no known conflict of interest to disclose.

Acknowledgment

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