EMOTIONAL INTELLIGENCE: CURRENT RESEARCH AND FUTURE PERSPECTIVES ON MENTAL HEALTH AND INDIVIDUAL DIFFERENCES

EDITED BY: Federica Andrei, Roberta Biolcati, Dana Joseph,
Giacomo Mancini and Elena Trombini
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EMOTIONAL INTELLIGENCE: CURRENT RESEARCH AND FUTURE PERSPECTIVES ON MENTAL HEALTH AND INDIVIDUAL DIFFERENCES

Topic Editors:
Federica Andrei, University of Bologna, Italy
Roberta Biolcati, University of Bologna, Italy
Dana Joseph, University of Central Florida, United States
Giacomo Mancini, University of Bologna, Italy
Elena Trombini, University of Bologna, Italy

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Editorial: Emotional intelligence: Current research and future perspectives on mental health and individual differences

Giacomo Mancini[1]*, Roberta Biolcati[1], Dana Joseph[2], Elena Trombini[3] and Federica Andrei[3]

[1]Giovanni Maria Bertin Department of Education Studies, University of Bologna, Bologna, Italy, [2]Department of Management, College of Business, University of Central Florida, Orlando, FL, United States, [3]Department of Psychology, University of Bologna, Bologna, Italy

Editorial on the Research Topic
Emotional intelligence: Current research and future perspectives on mental health and individual differences

The last two decades have seen a steadily growing interest in emotional intelligence (EI) research and its applications. As a side effect of this boom in research activity, a flood of conceptualizations and measures of EI have been introduced. Consequently, the label "EI" has been used for a wide array of (often conflicting) models and measures, which has impeded consistent summaries of empirical evidence. This confusion among models/measures is problematic because different measurement approaches produce different results, which makes it difficult to theorize what EI really is or what it predicts since there is limited consistency in the empirical data. On one side there are proponents of the ability model (see Mayer et al., 2016) which recognizes that EI includes four distinct types of ability and defines EI as the ability to perceive and integrate emotion to facilitate thoughts, understand and regulate emotions to promote personal growth (Mayer and Salovey, 1997). This kind of EI would only be measurable through maximum performance tests. On the opposite side, we find supporters of the trait model. In particular, Petrides et al. (2007) defines trait EI as a constellation of emotional perceptions assessed through questionnaires and rating scales. The theory of trait EI is summarized with applications from the domains of clinical, educational, and organizational psychology (Petrides et al., 2016) and it's clearly distinguished from the notion of EI as a cognitive ability. Of course, there is no scarcity of other models and perspectives of EI, including mixed approaches, often used in professional setting to train and evaluate management potential and skills, that consider EI as a broad concept that includes (among others) motivations, interpersonal and intrapersonal abilities, empathy, personality factors and wellbeing (see Mayer et al., 2008).

In accordance with Hughes and Evans (2018), we argue that various conceptualizations of EI may be considered constituents of existing perspectives of cognitive ability (ability EI), personality (trait EI), emotion regulation (EI competencies), and emotional awareness (the aptitude to conceptualize and describe one's own emotions and those of others). Across all models, EI involves handling emotions and putting them at the disposal of thinking activity. Although EI is an ability to understand and control emotions in general, this is only a small part of some models of EI. Indeed, trait EI concerns our perceptions of our emotional world and comprises a broad collection of traits linked to the opportunity of understanding, managing, and utilizing our own and other people's emotions, helping us figure out and dealing with emotional and social situations. All these facets are critical for intelligent behavior because they enable and facilitate our capacities for resilience, communication, and reasoning, to name a few, across the life span. Indeed, existing literature suggests that individual differences in EI consistently predict human behavior and EI is now recognized by the scientific community as a relevant psychological factor for several important real-life domains, including a successful socialization, community mental health and individual wellbeing. To advance the field both theoretically and practically, this special issue aims to provide new data which may help to critically review EI's theory.

The collection of articles is quite diverse and covers a number of issues relevant to an advancement of the field by including participants from several cultural contexts (e.g., Italian, Brazilian, and Turkish). Seven articles used self-report tools for the assessment of EI, while only two studies employed an ability measure (the Mayer–Salovey–Caruso Emotional Intelligence Test). With regards to the topic being addressed, one study focuses on psychometrics, and confirms the validity of the Trait EI Questionnaire as an assessment tool for trait EI in a large Brazilian sample (Zuanazzi et al.), while seven analyzed the relationship between EI and research questions pertaining the domain of psychological health and wellbeing. Among these, the papers by García-Martínez et al. and Kökçam et al. analyze instead the relationship between EI and stress management in university students. García-Martínez et al. found mixed results compared to existing literature on the path from EI and academic achievement, while Kökçam et al. found that EI plays an important role in the identification of stress profiles.

Through a systematic review Pérez-Fernández et al. highlights that EI may be a protective factor of emotional disorders in general population and offers a starting point for a theoretical and practical understanding of the role played by EI in the management of diabetes. Along these lines Sergi et al. showed that the domains of EI involved in emotion recognition

and control in the social context to reduce the risk to be affected by depression and anxiety, while Pulido-Martos et al. show the contribution of socioemotional resources (including EI) to the preservation of mental health. Iqbal et al. considered the associations among EI, relational engagement (RE) and cognitive outcomes (COs) and found that EI directly and indirectly influenced COs during the pandemic: the students with higher levels of EI and RE may achieve better COs.

Last, the two articles using the Mayer–Salovey–Caruso Emotional Intelligence Test show that coping strategies mediate the relationships of ability EI with both well- and ill-being (MacCann et al.), and give some preliminary evidence on the associations between ability EI, attachment security, and reflective functioning (Rosso).

Despite their specific aims, these studies demonstrate the importance to stake on individuals' EI to favor a high psychological and physical wellbeing. At the same time, the present articles collection highlights some open issues to be addressed by future research, including: putting order and possibly connecting the existence of many conflicting models and related measures of EI; deepen the study of the relation between EI with other partially overlapping constructs; identify the most helpful training to increase EI in individuals of all ages, such as children and their parents, adolescents, adults.

Author contributions

GM and FA drafted the editorial. RB, DJ, and ET participated in the discussion on the ideas presented and have edited and supervised the editorial. All authors approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The Role of Gender in the Association Among the Emotional Intelligence, Anxiety and Depression

Maria Rita Sergi[1], Laura Picconi[1], Marco Tommasi[1], Aristide Saggino[1]*, Sjoerd J. H. Ebisch[2] and Andrea Spoto[3]

[1] *Department of Medicine and Aging Sciences, University of G.' d'Annunzio, Chieti, Italy,* [2] *Department of Neurosciences, Imaging and Clinical Sciences, Chieti, Italy,* [3] *Department of General Psychology, University of Padua, Padua, Italy*

Recent epidemiological data show an increase of depression and anxiety that cause a loss of about 3–4% of the gross domestic product in Europe, as a consequence of a reduced productivity and a premature death of people. Gender differences in both psychopathologies were found from mid-to-late adolescence until 55 years, and data indicate an increase of depression in women. Considering these data, new interventions focused on promoting psychological well-being were designed. A predictive factor of psychological disorders is Emotional Intelligence (EI), the ability to understand and regulate our own emotions, as well as those of others. EI is associated with psychological well-being, as well as with the treatment of mental illness, but gender differences in the association among EI, anxiety and depression remains unclear. The present study aims at analyzing the nomological associations among EI, anxiety and depression. Furthermore, the possible moderating role of gender in the relation between EI, depression and anxiety is investigated in a sample of 1725 healthy participants. Our results show that the ability to recognize and to control emotions in the social context helps us to reduce the risk to be affected by depression and anxiety. Moreover, our study shows that the association of EI with anxiety and depression wasn't gender moderated. In conclusion, the findings highlight that EI can help people to manage emotions linked to negative events and to successfully understand emotions in others. In addition, we found no moderation role of gender in the association between EI, anxiety and depression.

Keywords: emotional intelligence (E.I.), depression, anxiety, nomological association, gender differences

INTRODUCTION

Recent epidemiological data underline an increase of mental disorders (World Health Organization; World Health Organization [WHO], 2020a,b) according to two indicators: Years Lived with Disability (YLDs) and Disability-Adjusted Life Years or DALYs. Years Lived with Disability is a measure of years lived with a disease; DALYs is a measure of numbers of years lost due to diseases. Between 2007 and 2017, depression was the third leading cause of YLDs with an increase of 14.3% (Global Borden of Disease [GBD], 2018). In addition, anxiety and depressive disorder were among the highest causes of DALYs in 2019

(Global Borden of Disease [GBD], 2020). Depression can lead to suicide, which is the second leading cause of death in people with ages between 15 and 29. Depression and anxiety are among the most common mental disorders with a relevant socioeconomic impact. Recent data show that mental disorders cause a loss of about 3–4% of the gross domestic product in Europe, as a consequence of a reduced productivity and a premature death of people suffering from psychopathologies (De Girolamo et al., 2005; World Health Organization [WHO], 2016; Italian National Institute of Health [ISS], 2020a). In Italy, in the years between 2016 and 2019, 6% of the adult population reported depressive symptoms and having a deteriorated well-being (Italian National Institute of Health [ISS], 2021). Considering these data, new interventions were designed that focused on promoting psychological well-being and on preventing the onset of mental disorders through effective psychotherapeutic and pharmacological treatments (Kendrick and Pilling, 2012; World Health Organization [WHO], 2017, 2020c; Italian National Institute of Health [ISS], 2020b).

Depression and anxiety are the common causes of DALYs among women in 2019. Gender differences in Major Depressive Symptoms (MMD) were found from mid-to-late adolescence until 55 years, and data indicate an increase of depression in women (Global Borden of Disease [GBD], 2020). No significant gender differences between 55 and 65 were found (Girgus and Yang, 2015). Indeed, stressful life events and biological factors explain gender differences: women are more exposed to trauma than men; moreover, ovarian hormones are linked to mood changes. In particular, women process traumatic events worse than men due to a hypothalamic-pituitary-adrenal (HPA) axis's dysregulation. This dysregulation leads to an elevated cortisol response to stress. In addition, ovarian hormones modulate the HPA axis. The HPA axis's dysregulation increases during periods of change of ovarian hormones (e.g., postpartum period). This aspect leads to a difficulty to regulate the stressor, making women more vulnerable to depressive symptoms (Nolen-Hoeksema et al., 1999; Weiss et al., 1999; Nolen-Hoeksema, 2001; Oh et al., 2018). Gender differences in anxiety occur in middle age and they decline after the age of 65, due to neurobiological factors (Jalnapurkar et al., 2018). Hypothalamic-pituitary-adrenal (HPA) axis's dysregulation contributes to mood regulation (Altemus et al., 2014).

An important predictive factor of psychological disorders that needs further exploration is Emotional Intelligence (EI), that is, the ability to understand and regulate our own emotions, as well as those of others (Salovey and Mayer, 1990). Mayer and Salovey (1997) defined EI as a form of "intelligence" composed by four cognitive abilities: the evaluation and the expression of emotions; the regulation of emotions; the use of emotions for solving problems; the emotive regulation. Petrides and Furnham (2000, 2001, 2003) introduced two new concepts related to EI: "Trait EI" or "Trait Emotional Self-Efficacy" and "Ability EI." The first concept indicates a series of self-perceptions concerning the ability to identify emotions; the second concept concerns a "cognitive-emotional ability." "Trait EI" is measured via self-reporting instruments (e.g., Emotional Intelligence Scale; EIS;

Schutte et al., 1998; Emotional Quotient Inventory; EQ-i; Bar-On, 1997; Trait Emotional Intelligence Questionnaire; TEIque; Petrides and Furnham, 2009); "Ability EI" is measured through maximum performance tests (e.g., Mayer – Salovey – Caruso Emotional Intelligence Test; MSCEIT; Mayer et al., 2002; Petrides et al., 2016).

EI is associated with psychological well-being and with the treatment of mental illness (Brackett et al., 2004; Austin et al., 2005; Martins et al., 2010; Di Fabio, 2011; Schutte and Malouff, 2011; Picconi et al., 2019). In particular, Trait EI is negatively associated with anxiety and depression. Suicidal thoughts related to depression disorder was found to be decreased in individuals with a high ability to understand emotions and a good self-control (Bauld and Brown, 2009; Armstrong et al., 2011). Depressed persons have a lower ability to understand, to express emotions and to manage negative emotions (Fernández-Berrocal et al., 2006; Sergi et al., 2012). In the clinical context it's of great clinical relevance that the ability to recognize and to control emotions in social contexts reduces the risk for depression and anxiety. Indeed, the inability to control negative emotions is associated to stress and depression, because there is a difficulty of emotional expression (Batool and Khalid, 2009). In particular, a recent review demonstrated an association between self-report EI tests and suicide risk in people with major depressive disorders (Domínguez-García and Fernández-Berrocal, 2018). For example, high scores in managing self-emotions correlated negatively with suicidal behavior tendency ($r = -0.41$; $p < 0.001$) (Ciarrochi et al., 2002). Regarding anxiety disorders, several studies reported negative correlations between trait EI and anxiety in university students. For example, Jan et al. (2020) reported negative correlations between EIS's factors of Perception of Emotions, Managing own Emotions, Managing others' Emotions and Utilization of Emotions and anxiety in a sample of university students ($r = -0.182$; $p < 0.01$; $r = -0.251$; $p < 0.01$; $r = -0.237$; $p < 0.01$; $r = -0.197$; $p < 0.01$, respectively). Ahmadpanah et al. (2016) showed negative correlations between EQ-i's factors of Intrapersonal skills, Interpersonal skill, Stress Management, Adaptability and General Mood ($r = -0.65$; $p < 0.001$; $r = -0.61$; $p < 0.01$; $r = -0.55$; $p < 0.01$; $r = -0.56$; $p < 0.01$; $r = -0.61$; $p < 0.001$, respectively). Several studies showed that emotional dysregulation is one of the predictors of anxiety and depression (Downey et al., 2008, 2010). Certainly, a proper emotional regulation involves inhibitory processes that suppress the generation of inadequate emotional states and, consequently, a better individual adaptation. Therefore, the ability to use effective regulatory strategies increases psychological well-being, while the inability to regulate emotions leads to a poor mental health. Finally, emotional regulation permits a good control of ruminative thoughts generated by anxiety and depression (Galeazzi and Meazzini, 2004; Fernández-Berrocal et al., 2005; Lim and Kim, 2005).

Gender differences in the association between EI, anxiety, and depression have been studied, but results are inconsistent. Some authors found no significant differences in self-report EI tests between males and females (Petrides and Furnham, 2000; Fernández-Berrocal et al., 2004; Poulou, 2010). Other

studies, on the contrary, showed that EI scores were higher in females than in males (Ciarrochi et al., 2001; Schutte et al., 2002; Katyal and Awasthi, 2005; Van Rooy et al., 2005a; Craig et al., 2009; Whitman et al., 2009). To our knowledge, only one study investigated the moderation effect of gender on the relationship between EI and depression, indicating a negative relation between ability EI and depressive disorders in men (β = −0.12; $p < 0.01$) (Salguero et al., 2012). No studies analyzed the effect of gender on the relationship between perceived EI, anxiety and depression. Despite the connection between EI and anxiety and depression, many critiques arose concerning the scientific validity of the EI construct. The major criticism concerns the existence of different and, in some cases, contradictory models of EI (Bechara et al., 2000; Brackett and Mayer, 2003; Van Rooy and Viswesvaran, 2004; Huang et al., 2006; Cherniss, 2010). Many authors argue that studies need to be increased to better define the number and structure of EI dimensions (Davies et al., 1998; Ciarrochi et al., 2000; Newsome et al., 2000; Van Rooy et al., 2005b; Di Fabio, 2011; Hansenne, 2011; Rullo et al., 2015). As a consequence of the presence of competing models of EI, some authors underline the urgency to redefine the dimensions and the terminology of EI through the development of valid and reliable assessment instruments (Tapia and Marsh, 2006; Hussein et al., 2019). In psychological research, there are two types of psychometric instruments for the measurement of EI: self-report and ability tests (Saggino et al., 2013). The principal debate is about the method of *scoring* in ability tests, due to a difficulty to use an objective method to score the experience of emotions (Zeidner et al., 2012), whereas the issue of self-report instruments of EI is the unclear factorial validity. Self-report instruments measure perceived EI (PEI) or self-perceptions (Van Rooy and Viswesvaran, 2004; Keele and Bell, 2008; Gong and Paulson, 2018). Because of its brevity and large availability, the Emotional Intelligence Scale (EIS; Schutte et al., 1998) is among the most used self-report instruments to evaluate PEI. Emotional intelligence scale consists of 33-items with 5-Likert response scale (from 1 = "Totally disagree" to 5 = "Totally agree") and it is based on Salovey e Mayer's model of EI. The major limit of EIS is related to the ambiguity of its factorial structure (Tapia and Marsh, 2006; Zhoc et al., 2017; Gong and Paulson, 2018). Di Fabio et al. (2008) analyzed the EIS dimensional structure in a sample of Italian adults. A three-factors solution has been found: "Evaluation and Expressions of Emotions" (α = 0.84), "Regulation of Emotions" (α = 0.82) and "Use of Emotions in Problem Solving" (α = 0.79). Grazzani Gavazzi et al. (2009) analyzed EIS factor structure in an Italian adolescents' sample. Also in this case, the authors found a three-dimensions structure: "Evaluation of Emotions to Others" (α = 0.73), "Evaluation of Emotions to Self" (α = 0.66) and "Regulation of Emotions" (α = 0.72). Ciucci et al. (2009) tested this factorial structure in a sample of Italian pre-adolescents, obtaining reliable measure for each factor: α = 0.68 for "Evaluation of Emotions to Others"; α = 0.64 for "Evaluation of Emotions to Self"; α = 0.71 for "Regulation and Use of Emotions." However, other scientific studies did not find a consistent factor structure of the EIS, both in samples composed by university students (Petrides and

Furnham, 2000; Ciarrochi et al., 2002; Saklofske et al., 2003; Austin et al., 2004; Jonker and Vosloo, 2008; Ng et al., 2010; Zhoc et al., 2017; Gong and Paulson, 2018; Hussein et al., 2019; Adamakis and Dania, 2021) and by adults (Austin et al., 2005; Gignac et al., 2005). Finally, very few studies have examined the generalizability of the EIS' structure in males and females (Grazzani Gavazzi et al., 2009). There is a little knowledge about structural and measurement invariance between sex in trait EI (Tsaousis and Kazi, 2013).

Considering these data, the first aim of this study was to analyze the factor structure of EIS and its validity and reliability. The second aim was to analyze EIS measurement invariance between genders. The third aim was to study the nomological associations between EIS, anxiety, and depression scores. Finally, the possible moderating role of gender in the relation between EI, depressive and anxiety score was investigated. On the basis of our aims and previous literature we hypothesize a model with four-factor dimensions of trait EI (Petrides and Furnham, 2001; Saklofske et al., 2003; Hussein et al., 2019); we hypothesize the same factor structure between gender of the tested model (Grazzani Gavazzi et al., 2009); we hypothesize that high EI scores are associated to lower levels of depression and anxiety (Fernández-Berrocal et al., 2006; Sergi et al., 2012); finally, no we hypothesize that no moderating role of gender on the relationship between trait EI, anxiety and depression.

MATERIALS AND METHODS

Participants and Procedure

1725 participants, (62.2% females) were included in the study on a voluntary basis. The participants were representative sample of the normal population. The mean age of the total sample was 25.68 years (SD = 11.34); the mean age for female's sample was 24.75 (DS = 10.479); the mean age for male's sample was 27.19 (DS = 12.489). Eighteen participants (1.0%) did not declare their age. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Anonymity and privacy of the participants were guaranteed according the Italian and the European laws about privacy (Italian law n. 196/2003 and EU GDPR 679/2016, respectively). Informed consent was obtained from all individual participants included in the study. Participation was voluntary. Furthermore, the sample was heterogeneous in terms of the age range (maximum 70 years old). Indeed, the sample was composed by university students and workers. The most of workers were housewives, liberal professions and teachers. The questionnaires were administered by a trained person in psychometrics methodology and clinical practice. Participants signed an informed consent in which the respect of the privacy of their data (even if questionnaires were in anonymous format) was declared and the main aim of the research was explained. The study was approved by the Department of Medicine and Aging Sciences, University of Chieti, Italy.

Measures

Emotional Intelligence Scale

The EIS (Schutte et al., 1998) is a self-report scale with 33-items. Scores are on a five levels Likert scale (from 1 = "Totally disagree" to 5 = "Totally agree").

Teate Depression Inventory

The Teate Depression Inventory (TDI) (Balsamo and Saggino, 2013, 2014; Balsamo et al., 2014) consists of 21 items which measures major depressive disorders, according to the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013). The severity of each symptom is rated on a five levels Likert scale ranging from 1 ("Never") to 5 ("Always").

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI; Beck and Steer, 1993) is a self-report scale for screening anxiety disorders. Item scale was a 4 levels Likert scale ranging from 0 ("Not at all") to 3 ("Severely").

Statistical Analyses

Missing values have been replaced by the variable mean (Pigott, 2001). Means and standard deviations were computed, and skewness and kurtosis were estimated to analyze data distributions (Ercolani and Perugini, 1997). The internal consistency of the psychological scales was estimated with McDonald's omega (Zinbarg, 2005; Dunn et al., 2014).

The sample was divided randomly into two sub-samples (Bollen, 1986). The factorial validity of the EIS was analyzed via *Explorative Factor Analysis* (EFA) in the first sub-sample (n = 828). The *maximum Likelihood* extraction method was used; the criteria used for determining the number of factors were the *scree plot* (Cattell, 1966) and the eigenvalue > 1 (Kaiser, 1974). The Oblimin rotation was used for oblique factor rotation. Items with factor loadings less than |0.30| and/or with multiple saturations were removed. *Confirmatory Factor Analysis* (CFA) was conducted on the second sub-sample (n = 897) to confirm the factor structure of the first analysis (Floyd and Widaman, 1995). The adequacy of the factor model was assessed using Goodness-of-Fit Indices: traditional Chi-Square (χ^2) goodness of fit test and its degrees of freedom, the Root-Mean-Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI). The cutoff values for a satisfactory model were: RMSEA $\leq$ 0.08; CFI $\leq$ 0.95; GFI $\leq$ 0.90; AGFI $\leq$ 0.85. The acceptable values were: CFI < 0.90 – 0.94 >; RMSEA = 0.08. The cutoff values for a good model were: CFI $\geq$ 0.95; RMSEA = 0.06 (Hu and Bentler, 1999; Schermelleh-Engel et al., 2003; Steiger, 2007; Savalei and Bentler, 2010; Tarka, 2018). Hu and Bentler (1999) recommended a cutoff of 0.95 for CFI.

To study measurement invariance of the EIS between genders, a Multigroup Confirmatory Factor Analysis (MG-CFA) was performed. The MG-CFA started with separate baseline CFA models that were tested separately for males and females. In the configural invariance model (M1), factorial patterns were

set identical in both groups, with factor loadings and intercepts set free across samples; in the metric invariance model (M2) factor loadings were constrained to be equal for each group; in the scalar invariance model (M3) factor loadings and intercepts were identical in both groups. Model fit was calculated through χ^2 statistical test, the RMSEA and the CFI. Measurement invariance was estimated on the difference between CFIs (ΔCFI). A value of ΔCFI smaller than or equal to |0.010| confirmed the measurement invariance between males and females (Meredith, 1993; Floyd and Widaman, 1995; Little, 1997).

To analyze the nomological network between EI, depression and anxiety, bivariate correlations were computed. To analyze the role of Emotional Intelligence in depression and anxiety, a series of regression analyses were calculated. In the regression model the EIS' factors were independent variables; dependent variables were anxiety and depression scores. Collinearity was verify through the Condition Index (Barbaranelli and D'Olimpio, 2006).

Finally, to analyze the moderating effect of gender on the association among EI, anxiety and depression, a series of hierarchical regression analyses were performed (Aiken et al., 1991).

SPSS V.16.0 (Spss inc, 2007) was used to calculate descriptive statistics, EFA, correlations, regressions and mediation analysis. AFC, and Invariance Measurement were computed through LISREL V.8.71 (Joreskog and Sorbom, 2004).

RESULTS

Descriptive Statistics

Means, standard deviations, normality indices and reliability for each item of the EIS are shown in **Table 1**. Skewness and kurtosis showed values are in the range $\pm$ 1, supporting normal distribution of data (Barbaranelli, 2003). The obtained McDonald's omega indicated a high internal consistency. Indeed, reliability ranged from 0.854 to 0.860; while the internal consistency of the total scale was 0.860.

Explorative Factor Analysis

The sub-sample for EFA was composed of 828 participants (males = 302; females = 526), with a mean age of 25.15 (SD = 11.03). The mean age for female's sample was 23.87 (SD = 9.468); the mean age for male's sample was 27.39 (SD = 13.055). Bartlett's Test of Sphericity [χ^2 (528) = 5914.78; p < 0.001] and Kaiser-Meyer-Olkin (KMO = 0.845) showed that data were adequate for factor analysis. Scree plot (**Figure 1**) and initial eigenvalues (5.873, 2.420, 1.909, 1.588) indicated a four-factor solution. Applying an economic criterion, the four-factor model has been chosen.

Results show that items 1-2-3-6-12-13-26-28-33 can be removed, because of factor loadings < |0.30|, whereas item 12 had double factor loadings on the first and third dimension (0.307 and.326, respectively). The factor model explained the 27.544% of variance **Table 2**. On the basis of these results, a second EFA without the removed items has been conducted. The second model explained the 32.474% of variance. In this AFE items 10

TABLE 1 | Mean, standard deviation, normality indices, and internal consistency of the EIS (*N* = 1725).

Item EIS	Mean	SD	Skewness	Kurtosis	McDonald's ω if item deleted
1	0.0371	0.968	−1.050	0.800	0.858
2	0.077	0.901	−0.881	0.664	0.856
3	0.039	0.961	−0.814	0.199	0.856
4	0.028	0.960	−0.737	0.138	0.856
5	0.015	0.983	−0.635	−0.256	0.859
6	0.095	0.847	−1.184	0.723	0.860
7	0.015	0.985	−0.490	−0.014	0.859
8	0.100	0.817	−1.436	1.186	0.857
9	0.044	0.968	−0.838	0.135	0.854
10	0.039	0.961	−0.715	−0.101	0.856
11	0.027	0.982	−0.824	0.027	0.856
12	0.028	0.979	−0.286	−0.251	0.855
13	0.020	0.991	−0.270	−0.641	0.858
14	0.046	0.940	−0.875	0.711	0.855
15	0.008	0.996	−0.606	−0.183	0.856
16	0.051	0.934	−0.881	0.778	0.857
17	0.074	0.892	−0.742	0.155	0.856
18	0.037	0.964	−0.626	0.439	0.854
19	0.013	0.982	−0.345	−0.521	0.856
20	0.043	0.960	−0.708	0.294	0.855
21	0.011	0.995	−0.311	−0.653	0.857
22	0.018	0.985	−0.571	−0.177	0.853
23	0.037	0.965	−0.773	0.337	0.855
24	0.061	0.922	−1.030	0.790	0.856
25	0.003	0.990	−0.470	−0.193	0.854
26	0.029	0.989	−0.339	−0.336	0.858
27	0.023	0.977	−0.293	−0.120	0.856
28	0.012	0.988	−0.921	0.113	0.860
29	0.003	0.981	−0.418	−0.119	0.855
30	0.055	0.934	−0.841	0.815	0.854
31	0.043	0.970	−0.781	0.230	0.856
32	0.024	0.979	−0.544	0.044	0.855
33	0.003	0.995	−0.484	−0.287	0.860

and 16 had factor loadings < |0.30|. On the basis of these results, a further AFE without the two items has been conducted. This model explained 33.853% of the variance.

By content analysis of items, the factors have been labeled as follows: "Social Skills"; "Evaluation and Expression of Emotion of Emotion to Others"; "Evaluation and Expression of Emotion to Self; "Optimism/Mood Regulation".

Confirmatory Factor Analyses

The sub-sample for CFA was composed of 897 participants (males = 350; females = 547), with a mean age of 26.17 years (DS = 11.60). The mean age for female's sample was 25.62 (SD = 11.318); the mean age for male's sample was 27.02 (SD = 11.997). **Table 3** shows the goodness-of-fit indices of models tested via EFA. On the basis of results obtained with previous EFA, the items 1-2-3-6-10-12-13-16-26-28-33 were eliminated because of low or double loadings. Without these items the factor model shows better goodness–of-fit indexes.

Measurement Invariance

Emotional intelligence scale (EIS) scalar invariance was demonstrated across gender. **Table 4** shows that ΔCFI values were smaller than | 0.010| for all the model comparisons. In addition, RMSEA showed good values for each model (0.054 for the configural invariance; 0.053 for the metric invariance and 0.053 for the scalar invariance). Therefore, the assumption of equivalent factor loadings and intercepts in males and females was confirmed.

Correlations

Table 5 showed bivariate correlations among the EIS dimensions, depression and anxiety. Results showed that all of the EIS dimensions, in general, had significant and negative correlations with the TDI and the BAI scales in both sexes. In particular, correlations between depression and Emotional Intelligence ranged from −0.412 for "Social Skills" to −0.208 for "Evaluation and Expression of Emotion to Others" in males; correlations ranged from −0.283 for "Social Skills" to −0.025 for "Evaluation
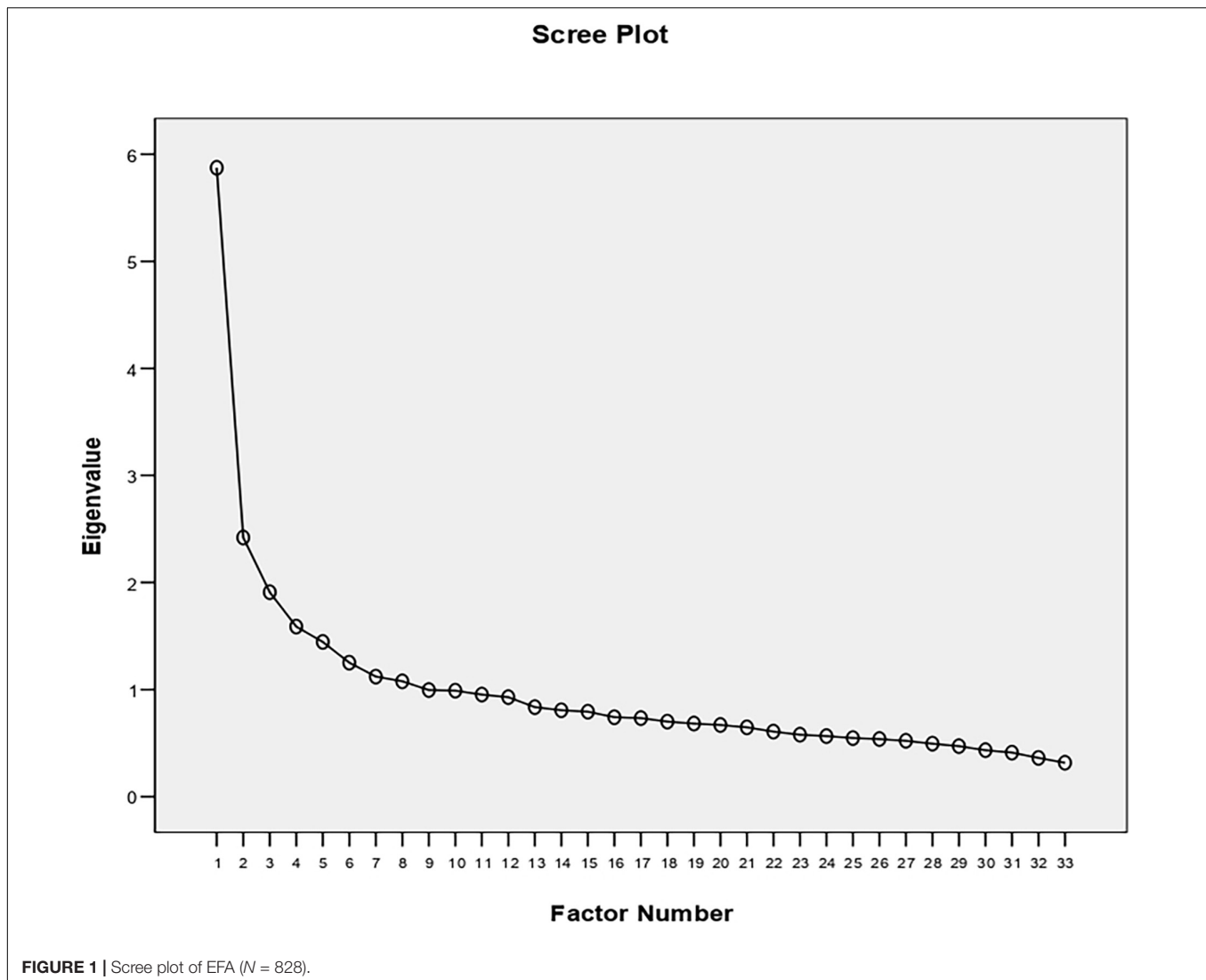
FIGURE 1 | Scree plot of EFA (N = 828).

and Expression of Emotion to Others" in females. Correlations between anxiety and EIS dimensions ranged from −0.252 for "Social Skills" to −0.001 for "Evaluation and Expression of Emotion to Others" in males, whereas only the "Social Skills" dimension showed a significant and negative correlation with anxiety ($r = −0.111$) in females.

Regressions of Emotional Intelligence Scale Dimensions on Anxiety and Depression

The Condition Index was < 15 and didn't show problems of collinearity (Barbaranelli and D'Olimpio, 2006). Anxiety and depression were regressed on EIS dimensions. **Table 6** shows the results of regression analyses. The four dimensions of EI explained the 14% of variance of the depression ($F = 41.904$; $p < 0.001$) and the best predictor was the "Social Skills" ($β = −0.290$, $t = −9.238$; $p < 0.001$). In addition, the four dimensions of EI explained the 5% of variance of anxiety

($F = 8.832$; $p < 0.001$) and the best predictor of anxiety was "Social Skills" ($β = −0.216$, $t = −5.260$; $p < 0.001$).

The Moderating Effect of Gender on the Relationship Among Emotional Intelligence, Depression and Anxiety

To study the potential moderating effect of gender on the relationship among EI, depression and anxiety, a series of hierarchical regression analyses were performed. Gender was entered as predictive variable in the first step. In the second step, the total score of EIS was included. In the third step, a multiplicative term EIS x gender was entered. In the fourth step, the total score of the Social Skills as the best predictor of studied illnesses was included. In the last step, a multiplicative term Social Skills x gender was entered. As can be seen from the **Table 7**, no significant moderating effects of gender on the relationship between the total score of the EI Trait, Social Skills, anxiety and depression was found.

TABLE 2 | Factor loadings, communalities (h²) and % of variance explained.

Item EIS	F1	F2	F3	F4	h²
20	**0.638**	0.103	0.057	−0.039	0.392
27	**0.529**	0.127	0.015	−0.150	0.301
17	**0.481**	0.051	0.058	0.062	0.269
31	**0.477**	−0.139	0.010	0.140	0.267
7	**0.447**	0.096	0.019	−0.089	0.207
23	**0.441**	0.024	−0.086	0.019	0.238
14	**0.424**	−0.093	−0.088	0.107	0.275
10	**0.374**	−0.198	−0.207	0.135	0.329
16	**0.313**	0.016	−0.023	0.071	0.180
3	0.292	−0.103	−0.197	0.121	0.275
2	0.270	0.074	−0.150	0.089	0.238
28	0.176	−0.170	−0.143	0.099	0.214
13	0.174	0.019	0.004	0.150	0.174
25	0.086	**0.711**	−0.099	−0.065	0.462
18	0.031	**0.602**	−0.122	0.115	0.437
29	−0.064	**0.595**	−0.121	0.199	0.420
5	0.024	**0.459**	0.009	0.026	0.271
32	0.119	**0.395**	−0.079	0.133	0.278
15	0.098	**0.384**	−0.169	−0.063	0.239
26	0.155	0.263	0.109	0.181	0.235
33	−0.043	0.235	0.043	0.213	0.141
22	−0.062	0.091	**−0.835**	0.023	0.530
9	−0.058	−0.013	**−0.640**	0.198	0.442
21	0.041	0.067	**−0.571**	−0.093	0.341
19	0.079	0.225	**−0.484**	−0.089	0.304
12	**0.307**	−0.024	**−0.326**	−0.017	0.314
30	0.016	0.094	−0.006	**0.601**	0.318
4	−0.069	0.147	0.003	**0.574**	0.287
8	0.086	−0.008	−0.045	**0.420**	0.230
24	0.171	0.037	−0.026	**0.364**	0.251
11	0.174	−0.090	−0.112	**0.313**	0.241
1	−0.057	0.086	−0.222	0.247	0.184
6	0.159	0.130	0.088	0.178	0.162
% of variance	15.49	5.00	4.32	2.68	

N = 828. F1 = Evaluation and Expression of Emotion to Self; F2 = Evaluation and Expression of Emotion to Others; F3 = Social Skills; F4 = Optimism/Mood Regulation. Significant factor loadings are in bold.

TABLE 3 | EIS's fit indexes.

EIS	χ^2	df	RMSEA	90% RMSEA	CFI	GFI	AGFI
Sample N = 867	704.19***	203	0.05	0.048;0.057	0.95	0.93	0.92

df = degrees of freedom; RMSEA = Root-Mean-Square Error of Approximation; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index.
***: p < 0.001.

DISCUSSION AND CONCLUSION

The guidelines of the (National Institute for Clinical Excellence [NICE], 2017) stressed the importance of the prevention of depressive and anxiety disorders. The aim is to increase the emotional competences, such as emotional regulation ability to promote well-being through valid and reliability instruments of assessment of emotional competence and management (Nélis et al., 2011).

According to previous studies, trait EI is associated with depressive and anxiety disorders. The literature further showed that trait EI could be a predictive factor of a better social adaptation (Ciarrochi et al., 2002; Hansenne, 2011). It can be hypothesized that emotional competence and management are linked to a positive mood and a better social support, which offer protection against a wide range of psychopathological conditions. In particular, emotional management moderated the relation between stress and mental health (citation). For this reason,

TABLE 4 | Measurement invariance.

Model	χ^2	df	Δ df	RMSEA	RMSEA90%CI	CFI	Δ CFI	Model comparision
Baseline model girls (n = 1073)	841.74*; $p < 0.001$	203		0.054	0.0504; 0.0580	0.936		
Baseline model boys (n = 652)	568.43*; $p < 0.001$	203		0.053	0.0475; 0.0577	0.951		
M1	1410.18; $p < 0.001$;	406		0.054	0.0505; 0.0566	0.943		
M2	1431.67; $p < 0.001$	424		0.053	0.0495; 0.0555	0.942	−0.001	2 vs 1
M3	1587.84; $p < 0.001$	464		0.053	0.0502; 0.0559	0.935	−0.007	3 vs 2

*M1 = model for configural invariance; M2 = model for metric invariance (equal loadings between groups); M3 = model for scalar invariance (equal loadings and intercepts between groups). * = Sig.*

TABLE 5 | Correlations between EIS dimensions, TDI and BAI, divided for gender.

EIS dimensions	TDI		BAI	
	Males N = 335	Females N = 704	Males N = 288	Females N = 407
Social skills	−0.412**	−0.283**	−0.252**	−0.111*
Evaluation and expression of emotion to others	−0.208**	−0.025	−0.001	0.073
Evaluation and expression of emotion to self	−0.293**	−0.265**	−0.004	−0.024
Optimism/Mood regulation	−0.245**	−0.137**	0.022	0.073

TDI = Teate Depression Inventory; BAI = Beck Anxiety Inventory.
*p < 0.05. **p < 0.01.

TABLE 6 | Regression analysis of EIS dimensions with anxiety and depression as dependent variables.

	TDI (N = 1039)		BAI (N = 695)	
Social skills	β	t	β	t
	−0.290	−9.238***	−0.216	−5.260***
Evaluation and expression of emotion to others	0.082	2.590**	0.089	2.185*
Evaluation and expression of emotion to self	−0.198	−6.075***	−0.025	−0.594
Optimism/Mood regulation	0.002	0.046	0.118	2.747**
p	< 0.001		<0.001	
R^2	0.14		0.05	
AR^2	0.14		0.04	
F	41.904		8.832	

p = Significance; R^2 = R Square; AR^2 = Adjusted R Square. *p < 0.05. **p < 0.01. ***p < 0.001.

WHO underlined the ability to manage emotions to cope with stressful events during the 2019-nCoV outbreak (World Health Organization [WHO], 2020a).

Despite the role of trait EI in anxiety and depression has been studied, the psychometric properties of the self-report instruments that assess trait EI remain ambiguous. The EIS, whose factorial structure is not clearly defined in literature (Schutte et al., 1998), is among the most used self-report instruments of trait EI.

Considering these problems, the first aim of this study was to analyze the EIS factor structure and its validity in a sample of 1725 participants. Our results showed that the model with four-factor dimensions of trait EI is the best solution. The dimensions were: "Social Skills"; "Evaluation and Expression of Emotion of Emotion to Others"; "Evaluation and Expression of Emotion to Self; "Optimism/Mood Regulation". These results substantially confirmed previous findings obtained by factor analyses (Petrides and Furnham, 2001; Saklofske et al., 2003; Hussein et al., 2019). Our study evidenced that the "Evaluation and Expression of Emotion" was divided into two different components: evaluation of Self or Others emotions. The "Evaluation and Expression of Emotion to Others" concerns the ability to recognize others'

emotions through the sound of the voice or the facial expression of other people, while the "Evaluation and Expression of Emotion to Self" concerns the ability to recognize and control our own emotions. During childhood, the development of emotional competence allows individuals to know and use their own and others' emotions to adapt to the socio-cultural context (Zsolnai, 2015). Emotional competence and management comprises three components: the expression of emotions or the ability to communicate positive and negative emotions; the understanding of emotions; the experience of emotions or the ability to recognize emotions (Zsolnai, 2015). The "Emotion Regulation" concerns the monitoring of emotions; while the "Social Skills" concern the tenacity to face all adversities, empathy, and abilities of communication. Finally, our study showed a good level of internal consistency of the four EIS dimensions.

The second aim was to study the measurement invariance of the EIS across gender. Our results confirmed the scalar invariance of the instrument in males and females. These data confirm previous results (Grazzani Gavazzi et al., 2009). Therefore, the four-factor model of EIS is likely unaffected by gender characteristics of participants.

TABLE 7 | Moderating effect of gender on the relationship between EI, depression and anxiety.

	β	t	F	R²	sr²
TDI					
Step 1			28.567	0.03	
Gender	−0.164	−5.345***			0.03
Step 2			65.018	0.11	
Gender	−0.197	−6.679***			0.04
EIS	−0.293	−9.939***			8
Step 3			44.404	0.11	
Gender	−0.201	−6.802***			0.04
EIS	−0.257	−7.096***			0.04
EIS × gender	−0.062	−1.713			< 0.01
Step 4			74.903	0.13	
Gender	−0.151	−5.180***			0.02
Social Skills	−0.316	−10.863***			0.09
Step 5			51.165	0.13	
Gender	−0.149	−5.119***			0.05
Social Skills	−0.281	−8.138***			0.02
Social Skills × gender	−0.063	−1.83			0
BAI					
Step 1					
Gender					
	−0.117		9.581	0.01	
		−3.095**			0.01
Step 2			5.056	0.01	
Gender	−0.12	−3.157**			0.01
EIS	−0.028	−0.734			< 0.01
Step 3			3.722	0.01	
Gender	−0.123	−3.221**			0.01
EIS	0.005	−0.1			< 0.01
EIS × gender	−0.051	−1.026			< 0.01
Step 4			14.06	0.04	
Gender	−0.116	−3.112**			0.01
Social Skills	−0.159	−4.278***			0.02
Step 5			10.111	0.04	
Gender	−0.115	−3.099*			0.01
Social Skills	−0.116	−2.450**			0
Social Skills × gender	−0.07	−1.471			0

p = Significance; R^2 = R Square; sr = Part Correlations; *$p < 0.05$. **$p < 0.01$. *** $p < 0.001$.
0 = female, 1 = male.

The third aim was to study the association between EIS dimensions, depression and anxiety. Our results showed that high scores in each EIS dimension are associated to lower levels of depression and anxiety in both males and females. These results are confirmed by previous studies (Fernández-Berrocal et al., 2006; Sergi et al., 2012). In addition, our results showed that EIS dimensions are able to predict depression and anxiety scores. In particular, the dimension "Social Skills" showed to be the best predictor of both depression and anxiety scores. Other studies found that "Evaluation and Expression of Emotion to Self" had a predictive role in depression and anxiety (Saklofske et al., 2003; Downey et al., 2010; Sergi et al., 2012; Picconi et al., 2019). Therefore, our results showed that the ability to recognize and to control our own emotions in relation to social context help us to reduce the risk to be affected by depression and anxiety.

Finally, our study showed no moderating role of gender on the relationship between trait EI and depression. These results suggest that the association among EI, anxiety and depression is not gender moderated.

Some limitations of the present study need to be mentioned: EIS measurement invariance was not tested in relation to age; lastly, the association between EI emotional, anxiety and depression should be tested also in a clinical sample composed by people with depression or anxiety disorders. Our study shows that trait EI can play an important role in managing stress and negative emotions also in people with psychological disorders.

In conclusion, the present study provides important new insights into the associations between trait EI, gender, anxiety and depression in a sample of participants without specific mental disorders. EI can help people to manage emotions linked to

negative events and to successfully understand emotions in others (Sulaiman, 2013). Indeed, our study showed that "Social Skills" was the best predictor of anxiety and depression. In addition, we found no moderating role of gender in the association among EI, anxiety and depression. This result is confirmed by the EIS measurement invariance for gender. The relationship between EI and psychological disorders can have a positive effect on individual life. Emotional intelligence can improve the quality of peer relations, increase assertiveness and regulate the deleterious effects of attentional bias. Depressed and anxious individuals suffer from attentional bias, in which attentional resources are allocated to identify above all negative events or situations. Indeed, new interventions in psychotherapy and in education context based on creating situations that elicit emotions could be proposed. In particular, these interventions could be focused on "naming emotions," discerning emotional states and attributing appropriate meaning to moods." These aspects reduce depression and anxiety. Indeed, poor emotional regulation maximizes the impact of stressful events and it leads to worry and rumination that discern emotions in a dysfunctional way (Salovey et al., 2002). Several studies explain the poor cognitive task performance in depressed individuals as a consequence of hyper-activation in frontal and parietal brain areas. This hyper-activation is related to the difficulty to deactivate limbic regions, which affect the efficiency of cognitive processes reducing the cognitive control on thoughts (Hamann et al., 2004; Harvey et al., 2005; Jones et al., 2010).

The major limitation of the work is the absence of a randomized clinical trial, with a control and an experimental group, that permits a more massive generalization of results. Another limitation is the representativeness of our sample. Indeed, the most of our sample was composed by university students.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Department of Medicine and Aging Sciences, University of Chieti, Italy. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MS designed the study, recruited the sample, wrote the manuscript, and collaborated in editing the final manuscript. LP assisted with the design of the study, collaborated in the data analyses, and collaborated in writing the manuscript. MT assisted with the data analyses, collaborated in writing the manuscript, and assisted with the design of the study. ArS assisted with the design of the study and collaborated in editing the final manuscript. SE assisted with the data analyses and revised the article. AnS assisted with the data analyses and collaborated in writing the manuscript. All authors contributed to the article and approved the submitted version.

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How Emotional Intelligence Influences Cognitive Outcomes Among University Students: The Mediating Role of Relational Engagement During the Covid-19 Pandemic

Javed Iqbal [1†], Muhammad Azeem Ashraf [2*†], Shahnaz Perveen [3], Naima Qureshi [4], Zahid Imran [5] and Ning Jin [2]

[1] School of Education, Guangzhou University, Guangzhou, China, [2] Research Institute of Educational Science, Hunan University, Changsha, China, [3] Department of Education, The Government Sadiq College Women University Bahawalpur, Bahawalpur, Pakistan, [4] Division of Education, University of Education, Lahore, Pakistan, [5] Lahore Business School, The University of Lahore, Lahore, Pakistan

This study investigated the relationships among emotional intelligence (EI), relational engagement (RE), and cognitive outcomes (COs). A survey questionnaire containing 34 statements was completed by 338 undergraduate students from the four universities of China, with responses recorded on a 7-point Likert-type scale. The relationships were examined using the partial least squares structural equation modeling. The findings showed that EI influenced the COs directly and indirectly during the pandemic. In the forms of self-regulation (SR) and social skills (SS), the high levels of EI improved the COs of the students. Further, the aspects of EI, such as SR, self-awareness (SA), empathy (E), motivation (M), and SS were found to improve the RE of the students. The RE was positively correlated with the COs, indicating its potential for improving critical thinking among university students. Finally, the RE was a key mediator of the relationship between the EI and COs. It is concluded that the students with higher levels of EI and RE may achieve better COs. The implications of the research and suggestions for future studies are also discussed.

Keywords: emotional intelligence, cognitive outcomes, relational engagement, Covid-19 pandemic, China

INTRODUCTION

The COVID-19 pandemic has reshaped the educational landscape worldwide with measures restricting the transmission of the virus such as lockdowns, working from home, and online education (Iqbal et al., 2021a). However, online learning during such public health crises is associated with the fear of infection, boredom, frustration, and insufficient information (Calandri et al., 2021). The students have been required to manage these stressors, uncertainties, and depression linked to the pandemic (Rubin and Wessely, 2020). Previous research suggested that

emotional intelligence (EI) predicts such emotional reactions (Kaya et al., 2017) and contributed to the interest of the present study in investigating the EI and cognitive outcome (COs) during the pandemic.

Emotional intelligence has helped the individuals to cope with the pandemic and is also an antecedent of the COs. EI consists of self-awareness (SA), motivation (M), self-regulation (SR), social skills (SS), and empathy (E) (Jan and Anwar, 2019). However, the exact role of each dimension of EI in improving the COs during the pandemic has not been investigated (Mitrović Veljković et al., 2020). EI has been shown to predict relational engagement (RE), educational achievements, and work-related success, among the other positive COs (Cherry et al., 2018). On the assumption that EI is associated with RE and COs, the present study attempted to understand these relationships in greater depth.

The cognitive outcomes consist of cognitive strategy, motor skills, intellectual skills, verbal information, and attitude. Previous research has demonstrated a significant relationship between critical and creative thinking skills and COs (Yazzie-Mintz and McCormick, 2012). The significant correlations between EI and COs have been noted (Fredricks et al., 2016). Similarly, RE has been found to predict and positively correlate with COs (Cherry et al., 2018). This study, therefore, assumed that the COs are dependent on EI and RE and sought to further investigate the correlations between the three areas.

Relational engagement is a subset of student classroom engagement (Zhoc, 2015) that consists of relationships with teachers and peers. It has been shown to improve student-teacher relationships inside the classroom (Hew et al., 2016). Further, RE appears to positively impact some student learning outcomes across the disciplines, such as class attendance, promotion rates, and graduation rates (Craig et al., 2015). RE has been studied as an apparent teacher press and teacher support (Craik and Lockhart, 1972). However, few studies to date have explored the mediating role of RE in higher education. Thus, the present research assumed that RE mediates the associations between EI and COs and sought to further investigate this role in the Chinese universities during the pandemic.

While EI has been the focus of considerable research, the current knowledge of the interrelationship of EI, RE, and COs is incomplete. Most studies have explored the role of RE in advanced countries (Kelly and Turner, 2009; Wang and Holcombe, 2010; Cooper, 2014; Zhoc et al., 2018), with its functions relatively underexplored in the context of emerging nations. Additionally, the pandemic has interrupted the efforts of educational institutions, such as universities, to investigate RE and its relationships with EI and COs. Thus far, RE has not been considered as a significant construct in terms of its relationships with EI and COs. On this basis, the present study aimed to highlight the importance of RE as a means of developing new approaches to improve the COs. Within the research framework of this study, the following questions are addressed:

RQ 1: How do the dimensions of EI (such as SA, SR, M, E, and SS) influence the COs and RE?

RQ 2: How does RE influence the COs?

RQ 3: How does RE mediate the relationship between emotional engagement and COs?

LITERATURE REVIEW

EI Studies in China

Emotional intelligence in emerging countries has received less attention, although many studies in China have highlighted its positive influence on the academic outcomes of undergraduate students (Zhoc et al., 2018, 2020; Li and Xu, 2019). In addition, Zhoc (2015) explored the role of EI in COs among higher education students. Despite the evidence of its positive impact, the universities are slow to implement the programs and measures that would help to build the EI of the students. Suwannaset (2010) concluded that EI is particularly necessary for international students in the Chinese context, who often experience stress when attempting to adjust to the demands of their new environment.

Emotional Intelligence

The two main constituents of EI are emotion and intelligence. Emotions refer to the feelings of individuals, which are derived from internal or external states. They act as the sources of energy, conveying certain information about these states and compelling individuals to act accordingly (Zhoc et al., 2018). Emotions are also described as the planned responses to events that involve physiological, experiential, and cognitive aspects. Intelligence allows humans to think, learn, and solve problems efficiently in the workplace and beyond (Mayer et al., 2008; Olson et al., 2019). Zhang et al. (2020) introduced the combined term "EI." After the term had been established, the theories and models of EI were developed on the aspects, such as EI skills, traits, and mixed models. The EI ability models focus on the psychological capacities that allow individuals to receive information to attain COs (Jan and Anwar, 2019). These models specify the cognitive skills used in EI to solve the problems linked with emotion. The mixed EI models combine cognitive skills with the personality traits, such as optimism, enthusiasm, and self-confidence (Lee et al., 2017; Jan and Anwar, 2019).

The present study used the trait model of EI developed by Boyatzis et al. (2000) and Petrides and Furnham (2001). Furthermore, the three-stream model for classifying EI (Ashkanasy and Daus, 2005) was applied. In this model, stream 1 is based on Mayer and Salovey's (1997) four-branch model of ability, stream 2 includes numerous self- and peer-report measures, while stream 3 consists of additional aspects that do not feature in Mayer and Salovey's model. The present study emphasized the stream 2 approach and focused on the self-report measures.

Relational Engagement

Relational engagement includes social integration, social belonging, social inclusion, and social involvement. It refers to the sense of attachment of individuals to their peers, teachers, and other people in their educational organization (Hu and Bentler, 1998; Huang, 2021). RE helps individuals to build confidence and to increase their energies once M fails (Bentler

and Bonett, 1980; Huang, 2021). The notion of RE with peers, instructors, and the school is also described as an emotional engagement by some scholars (Fredricks et al., 2004; Henseler et al., 2014). However, RE is a term widely used in research in higher education contexts (Vizoso et al., 2018). RE often occurs in learning the situations outside the classroom, such as interactions with academic supervisors, teachers, and campus peers (Bentler and Bonett, 1980; Huang, 2021). This study combines these understandings of the term to focus on the RE in terms of student relationships with teachers and peers during the pandemic.

Cognitive Outcomes

The COs denote a set of various purposes and perspectives for learning (Trigueros et al., 2019). The COs are referred to the progress in the academic achievements of students. Oriol-Granado et al. (2017) view COs as the intellectual efforts and activities of the students that result from the teaching and learning process. The cognitive learning outcomes are the primary indicators of educational quality (Xu et al., 2020) and can be assessed *via* exams and continuous assessment. The previous studies show that different factors influence the cognitive learning outcomes of the students (Gallego et al., 2016). The current study defines COs as creative and critical thinking skills, global understanding, and problem-solving skills.

Development of Hypotheses and Theoretical Framework

The model described in this study aimed to illuminate how emotional engagement affects the COs through RE. As previously mentioned, EI and RE have occupied a considerable amount of research attention. EI both predicts the COs and exerts many variable effects on them (Zhoc, 2015; Cherry et al., 2018). The theory of student involvement contends that EI may play a significant role in the COs (Lei et al., 2018). In the educational environment, RE impacts university students and may improve the COs. Thus, the current study contends that RE affects the relationship between EI and COs, and aims to investigate how this occurs. To do so, it empirically analyzes these connections and highlights the influence of EI on the COs through RE. The study also helps to clarify the previous literature by explaining the role of EI in affecting the RE that leads to the COs. Furthermore, it is recognized that the students can attain better outcomes through learning EI and better RE. While COs have been defined as the ability to solve complex problems and think critically and creatively (Xu et al., 2020), they might also be evaluated in relation to the EI of teachers. Finally, it has been found that the EI of students can help their RE to improve their COs (Zhoc et al., 2018). On this conceptual basis, the following research model was proposed (**Figure 1**).

Emotional Intelligence and Cognitive Outcomes

The positive relationships between the EI dimensions of SA, SR, M, SS, and E, and COs are well-established (Estrada et al., 2021). Multiple studies have previously identified the roles of different dimensions of EI and their effects on the COs, confirming

the positive relationship between the two constructs (Li, 2009; Seifert et al., 2010; Estrada et al., 2021). A student involvement theory similarly supports the importance of EI in achieving cognitive learning outcomes (Zhoc, 2015). Furthermore, strong evidence exists to support the claims that EI and RE are positively associated with positive learning outcomes among university students. Therefore, a positive relationship between the EI and COs is predicted by the following hypotheses:

H1.1. Self-awareness positively influences COs.
H1.2. Self-regulation positively influences COs.
H1.3. Motivation positively influences the COs.
H1.4. Empathy positively influences the COs.
H1.5. Social skills positively influence the COs.

Emotional Intelligence and Relational Engagement

The literature confirms that the students with high EI are more engaged in the classroom *via* the relationships they develop with the teachers and peers (Zhoc et al., 2020). There is a clear pattern of research suggesting that EI positively influences RE (Olivier et al., 2019). Zhoc (2015) explored the relationship between EI and RE among the undergraduates in Hong Kong and found a significant relationship between the two. Thomas and Allen (2021) study of how the EI of undergraduates affected their RE and indicated a significant effect of the former on the latter. Research conducted by Merino-Tejedor et al. (2018) on the Spanish undergraduates recorded similar results, confirming those of earlier studies. Hence, the assumption of a significant relationship between EI and RE informs the following hypotheses:

H2.1. Self-awareness positively influences RE.
H2.2. Self-regulation positively influences RE.
H2.3. Motivation positively influences RE.
H2.4. Empathy positively influences RE.
H2.5. Social skills positively influence RE.

Relational Engagement and Cognitive Outcomes

The theory of student involvement states that RE—especially the relationships of students with the teachers and peers—helps to improve the COs (Zhoc et al., 2018). Lincoln (2009) detected a positive association between student engagement and cognitive learning outcomes, while Davis (2003) found that the teacher-student relationship positively affected such outcomes. Similarly, Roksa and Kilgo (2017) noted that the diverse interactions of students in the places of learning were a helpful way to develop positive COs. However, the association has not been confirmed in all the fields of education: Post et al. (2019) directed the researchers to investigate the relationship of RE and COs in additional subjects besides that of engineering, which featured in their study. Based on the previous findings, the assumption of a positive relationship between the RE and COs informs the following hypothesis:

H3. Relational engagement positively influences the COs.

EI and COs: The Mediating Role of RE

Emotional intelligence predicts the academic outcomes among the students in university (Gupta and Suman, 2017; Lei

FIGURE 1 | Theoretical framework.
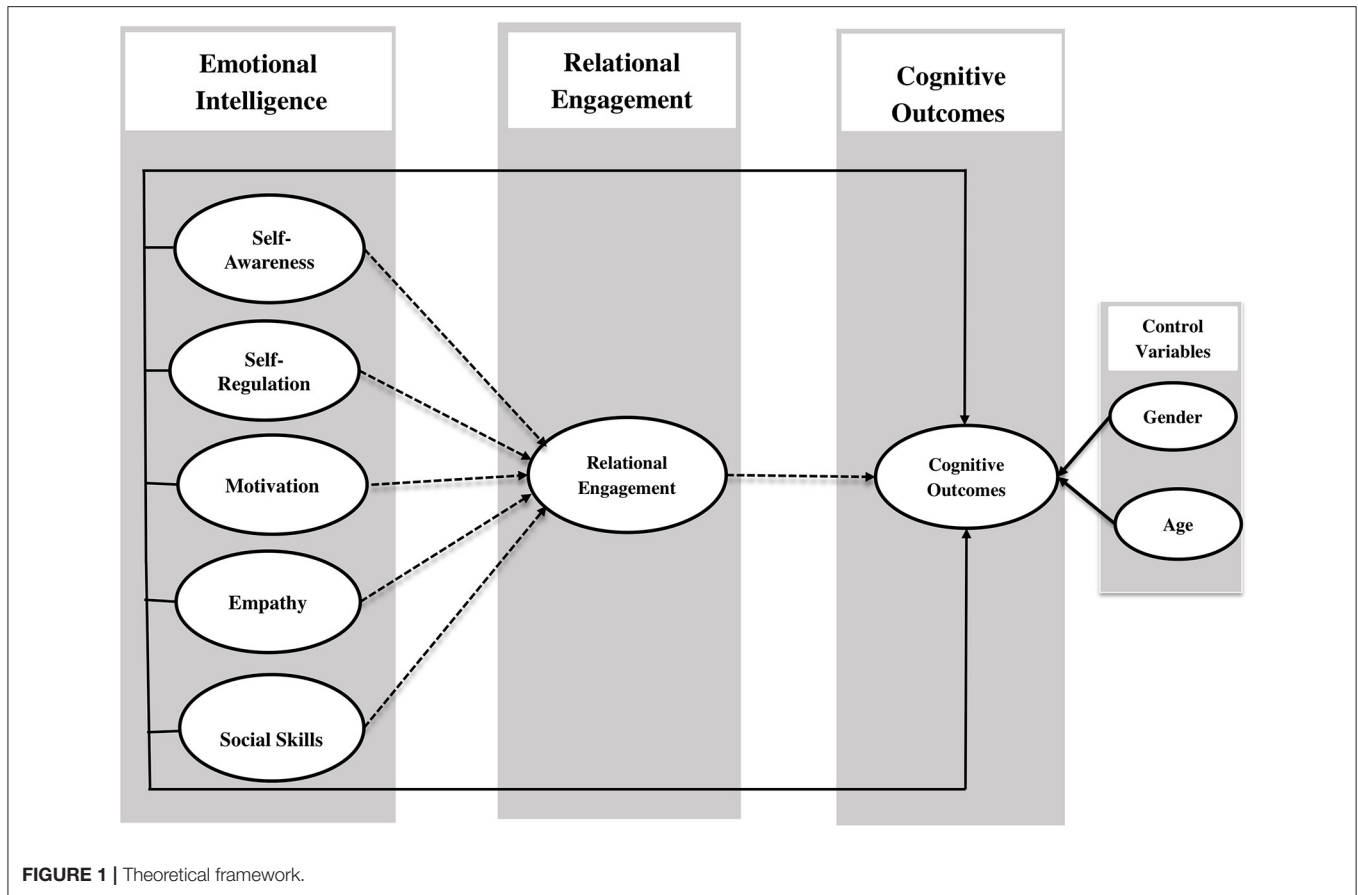
et al., 2018). RE is an antecedent of the cognitive learning outcomes (Zhoc, 2015) and is positively correlated with the COs of the students. Hong et al. (2018) explored the direct interaction among the emotional and cognitive interests of the students, behaviors of the teachers, and student engagement. The results suggested that EI and RE are positive predictors of cognitive interests. Thus, in line with this three-way association, we predicted a positive and significant relationship among the EI, RE, and COs. This investigation into the mediating role of RE in the relationship between EI and COs hypothesized the relationship as follows:

H4.1 RE mediates the relationship between EI (SA) and COs.
H4.2 RE mediates the relationship between EI (SR) and COs.
H4.3 RE mediates the relationship between EI (M) and COs.
H4.4 RE mediates the relationship between EI (E) and COs.
H4.5 RE mediates the relationship between EI (SS) and COs.

METHODOLOGY

This study was carried out in the context of higher education in China, where little research to date has been conducted. It was motivated by the need to investigate how the strategies of China for coping with the COVID-19 pandemic may have impacted the relationship among

the EI, RE, and the COs of university students in the country.

Questionnaire Design

Data were collected using a survey questionnaire which contained 34 items graded on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). The items were adapted from the previous studies related to EI, RE, and COs (Perera and DiGiacomo, 2013; Lau, 2017; Zhoc et al., 2020). EI was measured by the responses to 21 statements on the subtopics of SA, SR, M, E, and SS. The COs and RE were covered by six and seven statements, respectively. The questionnaire was piloted with 20 participants with similar characteristics to the main sample to ensure its validity and reliability, and feedback from this was used to revise a few of the items to ensure they were comprehensible to all the participants. **Table 2** and **Figure 2** display the questionnaire and factor loadings for each item.

Measures
Self-Awareness
The four statements related to the SA were adapted from Zhoc et al. (2020) and Perera and DiGiacomo (2013). The examples of these items included "I am able to identify my emotions in different situations" and "I find it easy to express how I feel in different scenarios." The Cronbach's alpha value for SA was 0.702 (**Table 2**).
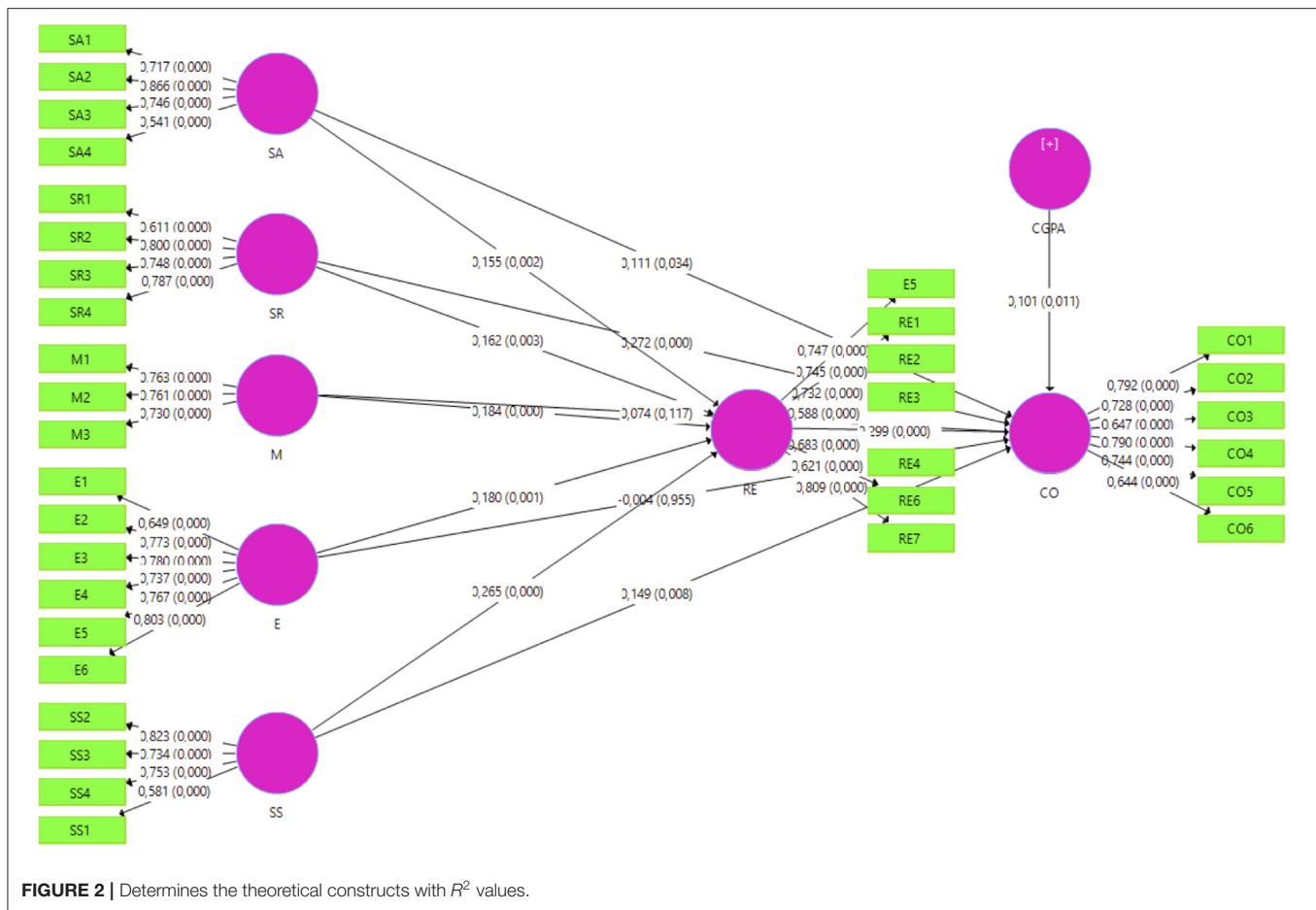
FIGURE 2 | Determines the theoretical constructs with R^2 values.

Self-Regulation

The four statements related to the SR drew on the study of Zhoc et al. (2020). They included sentences, such as "I am able to control my overthinking" and "I concentrate on a pleasant activity when I am feeling low." The Cronbach's alpha value for SR was 0.731 (**Table 2**).

Motivation

The three items exploring M were also developed from the study of Zhoc et al. (2020), with responses again graded on a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree). The examples of statements were "I am determined in achieving goals despite obstacles and setbacks" and "I learn to do better next time." The Cronbach's alpha value for M was 0.714 (**Table 2**).

Empathy

The six items related to the construct of E were developed from those provided in Zhoc et al. (2020). The example statements were "My friends can trust me with their secrets" and "I am supportive of the people going through difficult situations." The Cronbach's alpha value for E was 0.846 (**Table 2**).

Social Skills

The four statements were designed to measure the social skill levels and were again based on Zhoc et al. (2020). The example

items were as follows: "It is easy for me to make friends" and "Others can depend on me." The Cronbach's alpha value for SS was 0.705 (**Table 2**).

Relational Engagement

The seven statements covered RE and were based on the study of Zhoc et al. (2020) and Lau (2017). They included "I have a close friend(s) in my class" and "I enjoy working with my classmates on different activities." The Cronbach's alpha value for RE was 0.83 (**Table 2**).

Cognitive Outcomes

Finally, the six statements drawn from Zhoc et al. (2020) focused on the COs. Example statements were "I am dealing with unfamiliar problems" and "I am developing in-depth knowledge in my areas of study." The Cronbach's alpha value for COs was 0.82 (**Table 2**).

Sampling and Data Collection

Prior to the data collection, the study was approved by the Institutional Review Board of Hunan University, China. The participants of this study were selected using a convenience sampling strategy that has the advantage of being easily applied (Rasool et al., 2020). We selected the participants from students in undergraduate and postgraduate courses at

Characteristics	Categories	Frequency (n)	Percentage (%)
Gender	Male	185	54.7
	Female	153	45.3
	Total	338	100.0
Background	Rural	135	39.9
	Urban	203	60.1
	Total	338	100.0
Sector	Public	102	30.2
	Private	236	69.8
	Total	338	100.0
Field of study	Social science	169	50.0
	Business sciences	67	19.8
	Pure sciences	102	30.2
	Total	338	100.0

the six universities in China. Pseudonyms were applied to the participating institutions. Participation in the study was entirely voluntary and informed consent was sought before the questionnaires were distributed. All the participants were provided with detailed information about the aims and objectives of the research and informed that the collected data would be used for research purposes only. In total, 400 questionnaires were distributed and completed by 382 participants, with a response rate of 95.5%. Of these, 44 questionnaires were incomplete or filled incorrectly. Thus, the data were gathered from a total sample of 338 respondents (as shown in **Table 1**).

RESULTS

Confirmatory Factor Analysis

In the study, confirmatory factor analysis (CFA) was used, owing to its close alignment with the structural equation modeling (SEM). The convergent and discriminant validity of each construct was determined through CFA to ensure the fit of the entire model. Some items were removed during this process to achieve the required levels for the scale. The 0.70 threshold value for data reliability (Hair et al., 2019) was met for all the subscales (as shown in **Table 2**). Although the threshold for factor loading was set at 0.60, a loading of 0.50 is considered acceptable if the average variance extracted (AVE) exceeds 0.50 (Iqbal et al., 2021b). **Table 2** indicates that the results of these tests supported the reliability and validity of the scale.

A heterotrait-monotrait (HTMT) analysis (Henseler et al., 2015) was used to assess the discriminant validity; this is viewed as more accurate than the earlier approach by Fornell and Larcker (1981) and Rasool et al. (2021). An HTMT value higher than 0.90 indicates insufficient levels of discriminant validity (Hair et al., 2019). **Table 3** presents the HTMT value for each construct, none of which exceeded the 0.90 thresholds.

Constructs	Loading	CR	rho_A	CR	AVE
Self-awareness		0.702	0.754	0.814	0.529
SA1	0.717				
SA2	0.866				
SA3	0.746				
SA4	0.541				
Self-regulation		0.731	0.759	0.828	0.548
SR1	0.611				
SR2	0.800				
SR3	0.748				
SR4	0.541				
Motivation		0.714	0.714	0.796	0.565
M1	0.763				
M2	0.761				
M3	0.730				
Empathy		0.846	0.850	0.887	0.567
E1	0.649				
E2	0.773				
E3	0.780				
E4	0.737				
E5	0.767				
E6	0.803				
Social skills		0.705	0.737	0.817	0.530
SS1	0.581				
SS2	0.823				
SS3	0.734				
SS4	0.753				
Relational engagement		0.830	0.835	0.874	0.500
RE1	0.745				
RE2	0.732				
RE3	0.588				
RE4	0.683				
RE5	0.747				
RE6	0.621				
RE7	809				
Cognitive outcomes		0.820	0.834	0.87	0.528
CO1	0.792				
CO2	0.728				
CO3	0.647				
CO4	0.790				
CO5	0.744				
CO6	0.644				

Descriptive Statistics

The descriptive statistics for the study are presented in **Table 4**. For all the responses, the range of mean values is from 4.852 to 5.386, while the range of SD falls within 1.09377–1.29637 (as shown in **Table 4**).

Regression Analysis

Bootstrapping (5,000 iterations) using SmartPLS-SEM 3.2.2 (SmartPLS GmbH, Bönningstedt, Germany) was performed to

TABLE 3 | Discriminant validity.

Constructs	CGPA	CO	E	M	RE	SA	SR	SS
CGPA	1,000							
Cognitive outcomes	0.135	0.727						
Empathy	−0.005	0.455	0.753					
Motivation	−0.025	0.407	0.438	0.751				
Relational engagement	0.111	0.617	0.566	0.478	0.707			
Self-awareness	−0.076	0.438	0.578	0.407	0.506	0.727		
Self-regulation	0.041	0.553	0.394	0.353	0.479	0.323	0.74	
Social skills	0.001	0.531	0.572	0.355	0.583	0.45	0.492	0.728

TABLE 4 | Descriptive analysis.

Subscales	N	Minimum	Maximum	Mean	Std. Deviation
Self-awareness	338	1.00	7.00	5.278	1.25198
Self-regulation	338	1.00	7.00	4.852	1.29637
Motivation	338	1.00	7.00	4.946	1.09377
Empathy	338	1.00	7.00	5.460	1.15574
Social skills	338	1.00	7.00	5.187	1.25567
Relational engagement	338	1.00	7.00	5.386	1.12313
Cognitive outcomes	338	1.00	7.00	5.110	1.18965

examine the relationships among the variables in the theoretical model (Hair et al., 2019). We also used the partial least squares (PLS), a variance-based structural equation modeling technique (VB-SEM), to measure the reliability and validity of the conceptual variables (the simultaneous appraisal of the measurement model) and analyze the underlying relationships hypothesized among the constructs (the structural model—Sarstedt et al., 2017).

Table 5 presents the direct effects of the components of EI (SR, SA, M, E, and SS) on the COs of the students. It shows that the SA had a significantly positive influence on COs ($\beta = 0.111$, $p < 0.05$), which confirmed H1.1. Additionally, the effect of SR on COs ($\beta = 0.272$, $p < 0.05$), supported H1.2. However, M had no significant positive influence on COs ($\beta = 0.074$, $p > 0.05$), so H1.3 was not supported. Similarly, E carried no significant influence on CO ($\beta = -0.004$, $p > 0.05$), meaning H1.4 was not confirmed. SS showed a significantly positive influence on CO ($\beta = 0.149$, $p < 0.05$), thus supporting H1.5.

Self-awareness positively influenced RE to a significant level ($\beta = 0.155$, $p < 0.05$), thus supporting hypothesis H2.1. Furthermore, SR positively affected the RE ($\beta = 0.162$, $p < 0.05$), upholding H2.2. M was found to positively influence the RE ($\beta = 0.184$, p < 0.05), confirming the corresponding hypothesis (H2.3), and E positively affected RE ($\beta = 0.180$, $p < 0.05$), supporting H4.4. SS also significantly influenced the RE ($\beta = 0.265$, $p < 0.05$), thereby verifying H2.5. RE exerted a positive influence on CO ($\beta = 0.299$, $p < 0.05$), supporting H2.5, and a similar positive effect was detected for RE on CO. We also measured the effect of a control variable CGPA on CO, detecting a significant and positive relationship (as shown in **Table 5** and **Figure 2**).

To investigate the mediating effects of RE, the study first examined the indirect effects of EI on COs (as shown in **Table 6**).

Table 6 shows the indirect effects of SA ($\beta = 0.047$, $p < 0.05$) and SR ($\beta = 0.049$, $p < 0.05$) on the COs. It also breaks down the EI components into the effects of M ($\beta = 0.055$, $p < 0.000$), E ($\beta = 0.054$, $p < 0.05$), and SS ($\beta = 0.079$, $p < 0.05$) on the COs. The mediating effect of RE on the relationship between EI and COs can thus be inferred. To determine the extent of mediation, the changes in the effect sizes of SA, SR, M, E, and SS on the CO were also measured. The complete effects of SA, SR, M, E, and SS ($\beta = 0.111$, $p < 0.05$; $\beta = 0.272$, $p < 0.005$; $\beta = 0.074$, $p < 0.05$; $\beta = -0.004$, $p > 0.05$; and $\beta = 0.0149$, $p > 0.05$, respectively) varied in significance (**Table 6**), indicating that SA, SR, M, E, and SS retained a significant positive relationship with the COs through the mediation of RE, while E and M did not. Thus, the relationship between the COs and the EI components of SA, SR, and SS was partly mediated by RE. On the other hand, the relationship between M and E and COs was fully mediated by RE. Hence, hypotheses 4.1–4.4 were upheld. **Figure 2** presents the theoretical constructs, with R^2 values provided.

DISCUSSION

The present study analyzed the impact of EI on the COs through RE during the COVID-19 pandemic among university undergraduate students in China. The theoretical model developed for this study was tested and revised as a result of the analysis. The majority of the previous study was carried out in the advanced countries (Junco et al., 2011; Ravizza et al., 2014), with very few research studies conducted in the emerging nations (Gregory et al., 2014). There is also a dearth of research into higher education and its essential role in improving the COs of students during the COVID-19 pandemic in China. To the best of the knowledge of the authors, the present study was among

Direct relations	Estimations	Mean	SD	T statistics	P-values
SA -> CO	0.111	0.113	0.053	2.121	0.034
SR -> CO	0.272	0.272	0.055	4.903	0.000
M -> CO	0.074	0.076	0.047	1.568	0.117
E -> CO	−0.004	−0.007	0.062	0.056	0.955
SS -> CO	0.149	0.152	0.056	2.647	0.008
SA -> RE	0.155	0.155	0.049	3.144	0.002
SR -> RE	0.162	0.163	0.054	3.017	0.003
M -> RE	0.184	0.185	0.046	3.997	0.000
E -> RE	0.180	0.183	0.055	3.259	0.001
SS -> RE	0.265	0.263	0.062	4.260	0.000
RE -> CO	0.299	0.299	0.058	5.132	0.000
CGPA -> CO	0.101	0.101	0.039	2.556	0.011

SA, self-awareness; SR, self-regulation; M, motivation; E, empathy; SS, social skills; RE, relational engagement; CO, cognitive outcomes.

Indirect relations	Estimations	Mean	SD	T statistics	P-values
SA -> RE -> CO	0.047	0.046	0.018	2.628	0.009
SR -> RE -> CO	0.049	0.05	0.022	2.254	0.024
M -> RE -> CO	0.055	0.055	0.017	3.257	0.001
E -> RE -> CO	0.054	0.054	0.019	2.773	0.006
SS -> RE -> CO	0.079	0.078	0.023	3.465	0.001

the first to explore the effect of EI on the COs in the Chinese universities, especially considering RE as a mediator.

The investigation of the study of the direct relationship between the EI and COs confirmed that three out of five dimensions of EI (SA, SR, and SS) significantly influenced the COs, supporting our intuitions in the hypotheses H1.1, H1.2, and H1.5. The previous studies have shown that these skills have a significant positive relationship with the COs (Bentler and Bonett, 1980; Li, 2009; Van Schaaijk et al., 2020). Charoensukmongkol and Phungsoonthorn's (2020a) research into the impact of EI on cognitive processes among University of Malaga undergraduates ($N = 178$) concluded that the higher levels of EI were strongly predictive of COs. The current study found that only the dimensions of M and E were not significantly associated with the COs, meaning that the hypotheses H1.3 and H1.4 were not upheld. A possible reason for this finding is that COVID 19 measures (i.e., lockdowns and online learning) made it more difficult for the students to motivate themselves or show empathetic behavior toward others but did not impact their cognitive achievements. It is plausible to suggest that the curriculum does not currently address the developmental needs of the students in the area of EI and requires some revision.

In terms of its investigation into the positive and direct impacts of EI on RE, the study underlined that EI (SA, M, SR, SS, and E) is directly and positively linked with RE, supporting hypotheses H2.1–H2.5. This confirms the results of the study carried out by Charoensukmongkol and Phungsoonthorn (2020b). Similarly, Hair et al. (2011) analysis of 84 students found that EI and RE occurred naturally in the university environment. Therefore, it may be concluded that the high EI of students enhances their RE in the university.

A direct, positive relationship between the RE and COs was confirmed, upholding H3. This corroborates the previous studies showing that the RE of the students positively affects the COs (e.g., Hair et al., 2011). It also validates Huang (2021), who measured the effects of RE on active and collaborative learning, COs, and student-faculty interaction, finding that RE positively affects the COs. Thus, the study concluded that high RE predicted the COs of students during the COVID-19 pandemic.

Finally, the study also measured how RE mediated the relationships between EI (SA, M, SR, SS, and E) and COs. The results confirmed that RE mediated the association of all the components of EI (SA, SR, M, E, and SS) with COs, thus supporting H4.1–H4.5. They also validate the research of Rönkk and Evermann (2013), who found that EI, in tandem with RE, enhanced the COs. Moreover, our findings corroborate those of Iqbal and Qureshi (2021), who reported an association between the EI and COs; they also confirm the importance of teachers in enhancing the cognitive processes of students (Prafitriyani et al., 2019). Overall, our study underlines that the RE of the students with teachers and peers is a key mediator of the association between the EI and COs.

CONCLUSIONS

The model designed for this study drew on the insights of previous literature and the theory of student involvement. The findings have valuable implications for both educational practitioners and researchers. They highlight the need to attend to the relationships of EI, RE, and COs among the students in the context of China. In particular, SA, SR, and SS were found to have a direct, significant, and positive effect on the COs, which were also directly influenced by M and E, although not at a significant level. RE also had a direct, significant, and positive influence on

the COs, mediating the relationship between these and the EI of students.

Four main conclusions can be drawn from the results of this study. First, EI can be confidently associated with and predicts the cognitive achievements of undergraduates; EI may have helped the students in this study to develop their critical and analytical abilities during the pandemic. Second, the high levels of EI increase forms of RE, such as the student relationships with teachers and peers in university. Third, the high levels of RE improved the COs during the COVID-19 pandemic. Finally, the critical role of RE in mediating between the EI and COs indicates its importance to student achievement during the pandemic.

IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

Implications

The practical implications of the study for enhancing the COs of students should be noted. First, the teachers should emphasize the RE of students and engage them in various intellectual activities to increase this (e.g., encouraging discussions, asking students to justify their ideas, and building good relationships with the teachers and peers). Second, the teachers must identify the students with lower levels of EI and teach the strategies for boosting their skills in this area, by exploring each of the key components (SA, M, SR, etc.) in turn. Third, the curriculum designers must include the content related to EI, which would benefit the students exposed to demanding situations such as the COVID-19 pandemic. Finally, since the relationships with teachers and peers create a positive impact on the COs, guidance should be provided to the students on how such relationships can be established and maintained. This would be likely to enhance the academic learning outcomes during conditions that resemble those of the pandemic in the future.

Limitations and Future Research

The study contains several limitations which may affect the interpretation of its results. First, it was conducted in the Chinese cultural context, exclusively with the students from China, and at a unique point in time (the pandemic). All these factors limit the generalizability of the conclusions: empirical evidence from other countries is also required to confirm the study outcomes. Moreover, the data were collected from undergraduate students from three disciplinary areas (social science, business science, and medical sciences). However, natural science students were omitted from the sample and future research should concentrate on such individuals. Finally, future research efforts might explore the relationship between the EI and COs, considering study habits or cognitive engagement as mediating variables.

DATA AVAILABILITY STATEMENT

The data supporting the conclusions of this article will be made available by the authors, upon reasonable request.

ETHICS STATEMENT

This study was approved by Institutional Review Board of Research Institute of Educational Science, Hunan University. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

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The Relationship Between Emotional Intelligence and Diabetes Management: A Systematic Review

Aida Pérez-Fernández[1], Pablo Fernández-Berrocal[1] and María José Gutiérrez-Cobo[2]*

[1]*Department of Basic Psychology, Faculty of Psychology, University of Málaga, Málaga, Spain, [2]Department of Developmental and Educational Psychology, Faculty of Psychology, University of Málaga, Málaga, Spain*

Diabetes has been associated with affective disorders which complicate the management of the disease. Emotional intelligence (EI), or the ability to perceive, facilitate, understand, and regulate emotions, has shown to be a protective factor of emotional disorders in general population. The main objective of this study was to systematically review the role of the EI construct in Type 1 and Type 2 diabetics and to observe how EI is related to biological and psychological variables. Comprehensive searches were conducted in PubMed, Scopus, PsycInfo, and Cochrane without time limitations, for studies examining the link between diabetes and EI. A total of 12 eligible studies were selected according to the inclusion criteria. We divided the results into four sections: (1) EI and hemoglobin glycosylated (HbA1c), (2) EI training effects, (3) differences in EI between persons with diabetes and without diabetes, and (4) EI and psychological adjustment and well-being. The results showed negative correlations between EI and HbA1c, positive effects of EI training on quality of life, anxiety, and glycemic control, no differences in EI between people with diabetes and healthy individuals, and, finally, negative correlations between EI and different psychological variables such as diabetes-related anxiety and distress, and positive correlations with quality of life, well-being, and marital satisfaction. This systematic review offers a starting point for a theoretical and practical understanding of the role played by EI in the management of diabetes and reveals that EI is a promising protective factor for biological and psychological variables in this population.

Keywords: emotional intelligence, Type 1 diabetes, Type 2 diabetes, HbA1c, diabetes management, systematic review

INTRODUCTION

Diabetes mellitus is a chronic disease associated with significant morbidity and mortality throughout the world (Wild et al., 2004). The global prevalence of diabetes in 2019 is estimated to be 9.3% (463 million people), which may increase to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045 (Saeedi et al., 2019). Diabetes is a condition in which the body does not properly metabolize glucose. Two types of diabetes can be distinguished: Type 1 or insulin-dependent diabetes and Type 2 diabetes. For Type 1 diabetes, the causes are still unknown, it is a chronic disease, and its onset has a higher incidence in young people and children. Type 2 diabetes is triggered by excess body weight and physical inactivity, and onset

is usually in adulthood. People with Type 1 diabetes need insulin, while those with Type 2 diabetes can be treated with oral medications, exercise, and diet (WHO, 2020). Over time, high glucose levels can lead to severe consequences, such as stroke, heart attacks, blindness, and kidney failure. The primary purpose of diabetes care should be to keep glucose levels within healthy limits. The daily behaviors aimed at maintaining healthy glucose levels and preventing the severe consequences of the disease (especially in Type 1 diabetes), and all make this condition highly stressful. This routine puts people with diabetes at a higher risk of psychological problems (Musselman et al., 2003; Egede, 2004; Goldney et al., 2004). In turn, it has been observed that alterations in glucose variability in diabetics have an impact on mood (Gonder-Frederick et al., 1989; Hermanns et al., 2003). Additionally, several studies analyzing the neuropsychobiological mechanisms underlying this relationship have found that the increase in hormones related to depression and stress (Sapolsky et al., 2000; Goodnick, 2001) also increases glucose levels.

Specifically, diabetes is associated with an increased risk of affective disorders in the adult population (Hislop et al., 2008; Gendelman et al., 2009). The relationship between diabetes and problems such as anxiety, depression, and anguish related to diabetes is attracting more attention due to its high prevalence (Anderson et al., 2001; Grigsby et al., 2002; Nicolucci et al., 2013) and its negative effect on self-care, glycemic control, and risk of complications and mortality (Collins et al., 2009; Park et al., 2013; Smith et al., 2013). Importantly, these disorders are associated with fewer self-care behaviors, poorer clinical outcomes, lower quality of life, and more severe and earlier onset of diabetes (Peyrot et al., 1999; Sipkoff, 2005; Gendelman et al., 2009; Lin et al., 2010). Consequently, psychology plays an essential role in the management of this disease, particularly when dealing with the practical problems and day-to-day diabetes routine. Due to this, it would be of interest to look for protective factors for population with diabetes that favor better control of the disease. One factor that researchers have recently been paying attention to is the emotional intelligence (EI) ability. Mayer and Salovey (1997) have defined this construct as:

The ability to perceive accurately, appraise, and express emotion; the ability to access and generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and regulate emotions to promote emotional and intellectual growth (p. 10).

Emotional intelligence has been conceptualized into three models depending on the measurement instrument used and the conceptualization of the construct: performance-based ability model, self-report ability models, and self-report mixed models (Joseph and Newman, 2010). The performance-based ability models evaluate EI through performance tests in an objective manner and conceive EI as a set of emotional skills based on the definition of Mayer and Salovey (1997). These models have greater empirical support (Mayer et al., 2016) than the other models. The self-report ability models are also based on these authors' conceptualization, although they use subjective self-report measures. Finally, although they use self-report instruments, the self-report mixed models include a broader number of variables to define EI, such as mental abilities, personality factors, motivations, interpersonal and intrapersonal skills, and other facets (Bar-On, 2004). It is crucial to consider the model employed as the previous literature suggests there are weak correlations among them, suggesting that the models do not cover the same construct (Goldenberg et al., 2006).

The existing literature has shown that people with higher EI scores are more readily able to cope with stressors and problems in daily life, have closer relationships, and more significant social support networks (Zeidner et al., 2012). Consequently, EI is perceived as an indicator of psychological adjustment and is associated with well-being (Sánchez-Álvarez et al., 2016), happiness, and life satisfaction (Zeidner et al., 2012). In addition, there are also other reasons for proposing the hypothesis that EI is a critical element of diabetes. A higher EI level has been linked to healthier behaviors (Fernández-Abascal and Martín-Díaz, 2015), better health (Mikolajczak et al., 2015), along with fewer negative emotions such as anxiety (Killgore et al., 2016), depression (Fernández-Berrocal and Extremera, 2016), or distress in the face of adversity (Armstrong et al., 2011). In clinical populations, the level of EI is lower among people with inflammatory disease (such as rheumatoid arthritis, ankylosing spondylitis, or multiple sclerosis) compared to the healthy population (Costa et al., 2014).

Rationale

Considering the previous literature, the primary purpose of this study is to systematically review the role of the EI construct in people with Type 1 and Type 2 diabetes by observing how EI is related to both biological and psychological variables in this population. We hypothesized that higher levels of EI would be a protective factor of diabetes management, as shown by better glycemic control and higher levels of psychological adjustment and well-being.

MATERIALS AND METHODS

Literature Search

PubMed, Scopus, PsycInfo, and Cochrane databases were searched exhaustively, without time limitations, for studies examining the link between diabetes and emotional intelligence. Searches were conducted using the following keywords in English: "Diabetes" combined with "emotional intelligence" as terms in the title or abstract. The searches were undertaken between September 2020 and September 2021.

Inclusion Criteria

To be included in the review, papers had to meet the following criteria: (1) empirical research providing data on the relationship between EI with any biological or psychological variable related to diabetes, (2) a sample with a Type 1 or Type 2 diabetes diagnosis, (3) a sample of any ethnicity, gender, or age (4) use of a valid and reliable emotional intelligence scale, and (5) articles written in Spanish or English.

Exclusion Criteria

Letters, theses, comments, editorials, reports, or book chapters on previously published studies, intervention protocols, qualitative studies, and non-English or non-Spanish language publications were excluded.

Data Extraction

The initial database search identified 78 potentially eligible studies: 33 from Scopus, 15 from PubMed, 12 from Cochrane, and 18 from PsycInfo. After removing duplicates, this resulted in 59 studies. Two reviewers independently assessed the titles and abstracts of all of the reports identified. Of these 59 studies, only 20 were selected for full text review after considering the inclusion/exclusion criteria specified, and 12 studies were finally included. Disagreements were resolved by discussion with the senior reviewer. The process of finding and selecting the items is shown in **Figure 1**. In order to analyze the quality of the studies, we have included a table of quality assessment using the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018; **Table 1**).
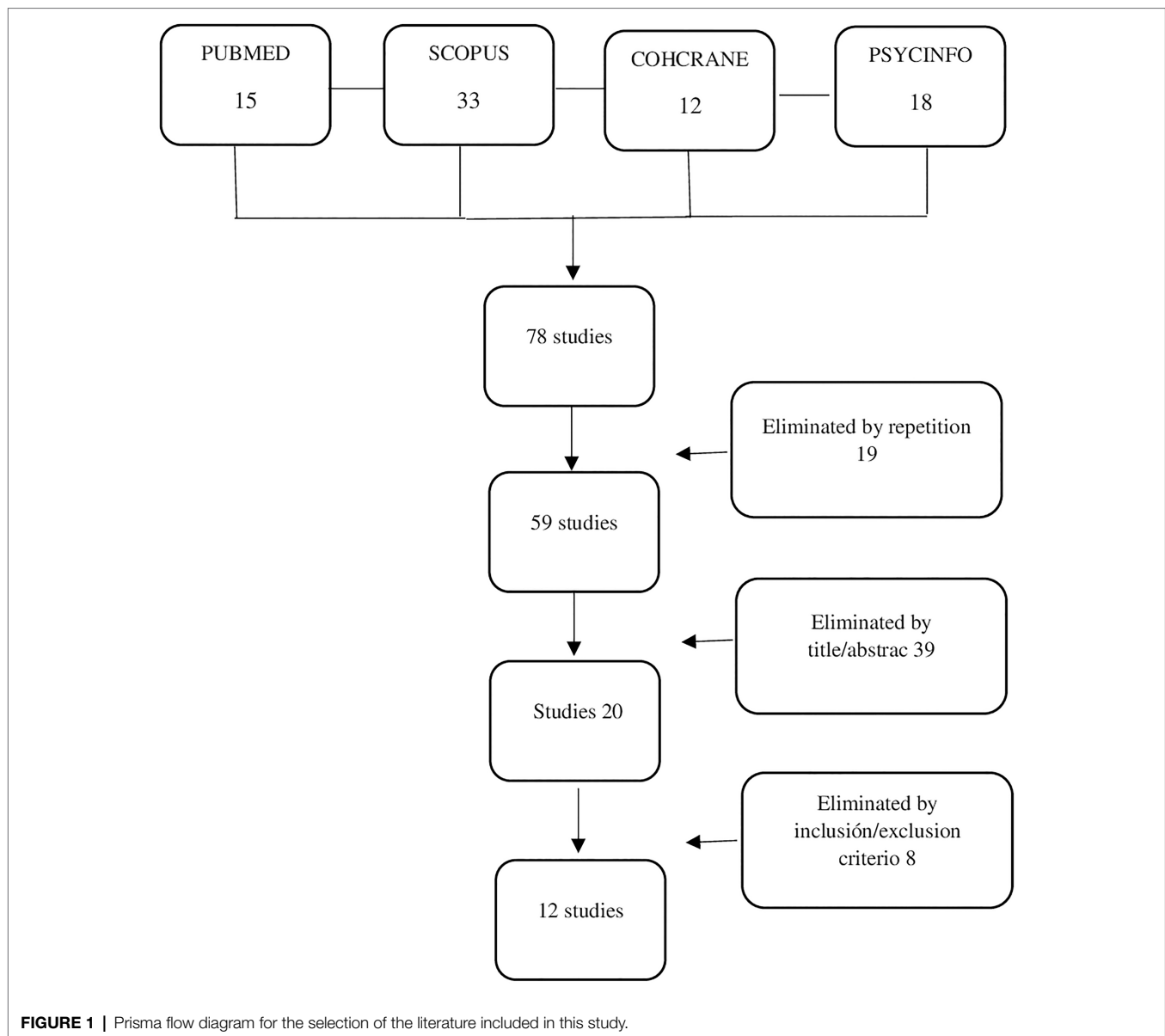
EI Instruments

We next define the instruments used to measure EI in the studies selected.

I. The audiovisual emotional intelligence test (AVEI; Zysberg et al., 2011). This questionnaire belongs to the performance-based ability model of EI and measures the ability to perceive emotions. Twenty-seven audiovisual items are presented to the respondents (half are video clips and the other half images), and the participants must identify the emotion experienced by people portrayed in various personal and interpersonal settings. The total score measures correct responses, so a high score represents a higher level of EI. The reliability of the test has been shown to be acceptable (ranging from 0.67 to 0.78 in various settings).

II. The Emotional Processing subscale of the Emotional Approach Coping Scale (Stanton et al., 2000) belongs to the self-report ability models of EI. The scale consists of four items that are scored on a Likert scale that ranges from 1 (never) to 5 (always). It measures how the respondents recognize, accept, and understand their own emotions. The internal consistency and test–retest reliability of the scale were $\alpha = 0.72$.

III. The Schutte Self-Report Emotional Intelligence Test (SEIS; Schutte et al., 1998) belongs to the self-report ability models of EI. This consists of 33 items that are scored on a Likert-type scale that ranges from 1 (strongly agree) to 5 (strongly disagree) in which respondents indicate their level of agreement with various statements on aspects of EI. It includes four subscales: emotion perception, utilizing emotions, managing self-relevant emotions, and managing others' emotions. The scale presents a high reliability of 0.90.

IV. The Trait Meta Mood Scale (TMMS; Salovey et al., 1995) belongs to the self-report ability models of EI. It includes 30-items on a Likert scale ranging from 0 to 4 (from "totally disagree" to "totally agree") and evaluates a total of three dimensions: "Attention" to emotions, which refers to people's belief in how much they attend to their feelings; "clarity" of emotions that measures how a person thinks that they perceive emotions, and, finally, emotional "repair" which evaluates a person's efforts to maintain positive emotions and block negative moods. Internal reliability for all three factors ranges from $\alpha = 0.62$ to 0.87.

V. The short version of EI-DARL (Antinienė and Lekavičienė, 2014). This belongs to the self-report ability models of EI. It consists of 73 questions in which respondents must report their agreement or disagreement on a 6-point Likert scale. This scale evaluates a total of five dimensions: "Understanding your emotions," "Your emotional control," "Understanding emotions of the other person," "Control of other emotions," and "Manipulations." The internal consistency was $\alpha = 0.92$ (Žilinskiene et al., 2021).

VI. BarOn Emotional Quotient Inventory (EQ-I; Bar-On, 2004, 2006). This belongs to the self-report mixed models of EI. It includes 133 items with a Likert response scale of 1–5 (ranging from very rarely or not true for me to very often true for me or true for me). The scale provides an estimate of emotional and social intelligence. It is made up of five composite scales and 15 subscales: intrapersonal scales (self-regard, emotional self-awareness, assertiveness, independence, self-esteem), interpersonal scales (empathy, social responsibility, interpersonal relationships), adaptability scales (reality tests, flexibility, problem-solving), stress management scales (stress tolerance, impulse control), and general scales of the state of mood (optimism, happiness). EQ-I has proven to be a consistent, stable, and reliable measure. Its overall internal consistency is $\alpha = 0.97$.

VII. The Shrink emotional intelligence questionnaire (Moradi et al., 2020). This belongs to self-report mixed models of EI. It consists of 33 items divided into five subscales (self-motivation, self-awareness, self-management, coherence, and social skills). Its reliability coefficient was as follows: self-motivation = 54%, self-awareness = 69%, self-management = 64%, coherence (social intelligence) = 51%, social skills = 50%, and the global score = 85%.

VIII. The profile of emotional competence (PEC; Brasseur et al., 2013) belongs to the self-report mixed models of EI. The questionnaire comprises 50 items scored on a 1–5 scale (ranging from strongly disagree to strongly agree). The final result offers three global scores: an intrapersonal EC score ($\alpha = 0.86$) and interpersonal EC score ($\alpha = 0.89$) and a total EC score ($\alpha = 0.92$).

IX. The Trait Emotional Intelligence Questionnaire: Short Format (TEIQue – SF; Petrides, 2009) belongs to the EI self-report mixed models. It consists of 30 items and uses a 7-point scale. This questionnaire assesses four constructs: well-being, self-control, emotionality, and sociability. The internal consistency of the scale was good ($\alpha = 0.881$).

RESULTS

Emotional intelligence was measured with nine different questionnaires across the 12 selected articles. In addition, these

FIGURE 1 | Prisma flow diagram for the selection of the literature included in this study.

instruments were associated with different variables related to diabetes, such as HbA1c, distress, and well-being. Given the variability in the studies, the results are divided into four main sections. The first section focuses on results concerning the relationship between EI and HbA1c. The second presents studies that evaluate how EI training affects biological and psychological diabetes variables. Third, we describe those articles that compare EI between persons with diabetes and without diabetes, and finally, we present those results that relate EI with measures of psychological adjustment and well-being that have not previously been described.

EI and HbA1c

One of the main findings of this review concerns the relationship between EI and HbA1c level. HbA1c is an indicator of mean blood glucose over the past 2–3 months and is highly sensitive

to changes in blood glucose levels (Kyngäs, 2000). It is the most common and widely acceptable indicator of long-term glycemic balance (Sato, 2014). Higher levels of HbA1c indicate inadequate glycemic control. We found six studies that directly evaluated the association between EI and HbA1c (**Table 2**). In adults, three studies found a negative association between EI and HbA1c (Coccaro et al., 2016; Zysberg et al., 2017; Ruiz-Aranda et al., 2018). This means that higher levels of EI were related to a lower level of HbA1c. Of these three studies, two were conducted with people diagnosed with Type 1 diabetes (Zysberg et al., 2017; Ruiz-Aranda et al., 2018).

Regarding the adolescent population, two studies were found. Zysberg et al. (2013) analyzed how the parent's EI was related to the HbA1c levels of their offspring, and they found a negative correlation between both variables. That is, the higher the parent's EI, the lower the offspring's HbA1c. The study by

TABLE 1 | Quality assessment of the included studies using the Mixed Methods Appraisal Tool (MMAT).

Quantitative non-randomized studies	Zysberg et al., 2017	Ruiz-Aranda et al., 2018	Hughes et al., 2012	Zysberg et al., 2013	Coccaro et al., 2016	Moradi et al., 2020	Žilinskiene et al., 2021	Schinckus et al., 2018	Dehghan et al., 2014
S1. Are there clear research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S2. Do the collected data allow to address the research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.1. Are the participants representative of the target population?	Yes	Cannot tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.3. Are there complete outcome data?	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
3.4. Are the confounders accounted for in the design and analysis?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quantitative randomized controlled trials	Tavakol et al., 2018			Yalcin et al., 2008			Karahan and Yalcin, 2009		
S1. Are there clear research questions?	Yes			Yes			Yes		
S2. Do the collected data allow to address the research questions?	Yes			Yes			Yes		
2.1. Is randomization appropriately performed?	Yes			Yes			Yes		
2.2. Are the groups comparable at baseline?	Yes			Yes			Yes		
2.3. Are there complete outcome data?	Yes			Yes			Yes		
2.4. Are outcome assessors blinded to the intervention provided?	Cannot tell			Cannot tell			Cannot tell		
2.5. Did the participants adhere to the assigned intervention?	Yes			Yes			Yes		

Hughes et al. (2012) also showed a negative relationship between the EI of young people and their HbA1c. Specifically, EI uniquely predicted variance in metabolic control above other diabetes-specific constructs measured in the study, such as self-control, self-efficacy, or adherence.

Finally, in a sample of 134 children and in contrast to previous results, Žilinskiene et al. (2021) found that a higher EI perception of mothers was related to poorer metabolic control in their children; that is, the ability of mothers to understand and regulate their own emotions, understand the

TABLE 2 | Studies analyzing the relationship between emotional intelligence (EI) and HbA1c levels.

Study	Design and objectives	Sample	Type of diabetes	EI Scale	Outcome measures	Results
Zysberg et al., 2017 Israel	Cross-sectional study To evaluate the hypothesis that EI will show negative associations with blood glucose and HbA1c level	78 young adults. 61.5% females (mean age 31.89 ± 9.97 years) No psychological or medical intervention described	Type 1 diabetes	The audio-visual test of emotional intelligence (AVEI) Performance-based ability model Mean = 17.87 ± 2.90	Blood levels of sugar/ glucose during the last day HbA1c levels	A negative association between EI and HbA1c and marginal results in the same direction with blood sugar levels
Ruiz-Aranda et al., 2018 Israel	Cross-sectional study To examine the relationship between EI and HbA1c levels in a sample of patients with Type 1 diabetes	85 adults. 62% females (mean age 31 ± 9.97 years) No psychological or medical intervention described	Type 1 diabetes	The AVEI Performance-based ability model Mean = 17.87 ± 2.90	HbA1c level	EI showed a negative association with HbA1c
Hughes et al., 2012 United States	Cross-sectional study To examine whether emotional processing, self-control and the interaction between these variables predicted HbA1c for adolescents with Type 1 diabetes in addition to diabetes-specific constructs	137 adolescents. 54% females (mean age 13.48 ± 1.51 years) Approximately half (63%) of the adolescents were on an insulin pump, with the remainder prescribed MDI	Type 1 diabetes	The Emotional Approach Coping Scale. Self-report ability model Mean = 11.81 ± 3.02	HbA1c level Self-control Self-control scale (Finkenauer et al., 2005)	EI in interaction with self-control is negatively related to HbA1c
Zysberg et al., 2013 Israel	Cross-sectional study To evaluate the hypothesis that parents' emotional intelligence is associated with their children's Type I diabetes	81 parents. 54.3% females (mean age 41.12 ± 6.90 years). The mean age of the children was 9.9 ± 3.41 years No psychological or medical intervention described	Type 1 diabetes	The AVEI Performance-based ability model Mean = 14.33 ± 3.46 The Schutte Self-Report Emotional Intelligence Test (The SEIS) Self-report ability model Mean = 2.00 ± 0.44	HbA1c level	A negative relationship was found between EI of parents and the HbA1c of their children
Coccaro et al., 2016 United States	Cross-sectional study To investigate the relationship between measures of emotional regulation and EI and HbA1c levels in adult patients with Type 2 diabetes	100 adults. 55% females (mean age 59 ± 13 years) No psychological or medical intervention described	Type 2 diabetes	Trait Meta-Mood (TMMS) Self-report ability model Mean = 78.8 ± 11.0	HbA1c level	EI showed a negative association with HbA1c
Žilinskiene et al., 2021 Lithuania	Cross-sectional study To investigate the association between mothers' EI and Type I diabetes disease management in their children	134 mothers (mean age 37.83 ± 4.37 years) 134 children 51.5% female (mean age 9.26 ± 2.03 years) No psychological or medical intervention described	Type 1 diabetes	the short version of EI-DARL Self-report ability model	HbA1c level	An increase in scores of the EI scales and subscales of mothers increases the likelihood of deterioration in T1DM management of their children

causality of one's own emotions, and transform one's negative emotions into positive emotions did not facilitate the management of diabetes in their offspring.

In summary, in five out of six studies, higher levels of EI were related to better HbA1c. In the case of adults, they included individuals with Type 1 and 2 diabetics. Finally, regarding the effect of parental EI on the HbA1c of their offspring, EI appears to be beneficial for the glycemic control of an adolescent sample, while, contrary to expectations, counterproductive in a sample of children.

EI Training and Diabetes

Three studies found a link between EI training and quality of life, well-being, anxiety, and HbA1c in samples of adults with Type 2 diabetes (**Table 3**). Tavakol et al. (2018) showed that the application of a self-care EI program improved the HbA1c levels of the participants, while Yalcin et al. (2008) showed that EI training improved quality of life and well-being in persons with diabetes and that these improvements persisted over time. Finally, Karahan and Yalcin (2009) evaluated the effect of EI training on the emotional burnout, anxiety, and HbA1c levels of persons with diabetes. The authors found that the program positively affected all these parameters compared to a control group of people with diabetes.

Taken together, these studies showed the positive effect of EI training in improving biological and psychological factors in people with Type 2 diabetes.

Differences Between People With Diabetes and Without Diabetes

Two studies have focused on comparing EI between persons with diabetes and without diabetes (**Table 4**). Schinckus et al. (2018) analyzed whether the levels of EI of people with diabetes (Type 1 and 2 indistinguishable) differed from those without diabetes. The results showed that the persons with diabetes in the study had lower intrapersonal and interpersonal EI, which resulted in a lower global emotional intelligence score than that of people without diabetes. However, when matching both groups in terms of gender, age, and educational level, the differences between the groups disappeared. Moradi et al. (2020) compared the EI and quality of life of elderly with diabetes (Type 1 and 2 indistinguishable) and without diabetes. The results showed no statistically significant differences in EI and quality of life between persons with diabetes and without diabetes.

According to the two studies described, there were no differences between the population with diabetes (Type 1 and 2 indistinguishable) and without diabetes.

Emotional Intelligence and Psychological Adjustment and Well-Being

Given the heterogeneity of the variables included in the studies selected for the review, the last section focused on the results of studies that explored the link between EI and other variables related to lifestyle of people with diabetes not previously mentioned (**Table 5**). Specifically, the results were divided into four sections: the relationship between EI and anxiety and burnout, EI and diabetes-related distress, EI and quality of life and well-being, and, finally, EI and marital satisfaction.

Anxiety and Burnout

One study found a linked between EI and anxiety and burnout in adults with Type 2 diabetes. Karahan and Yalcin (2009) indicated that there was a negative relationship between these two variables; that is, the higher the EI, the lower the emotional burnout and anxiety.

Diabetes-Related Distress

One study was included in this section. Schinckus et al. (2018) showed that in adults with diabetes (Type 1 and 2 indistinguishable),

diabetes-related distress acted as a mediator between EI and diabetes self-management. In addition, they found that EI reduced diabetes-related distress and that this improves self-management of the disease. This means that the higher the EI, the lesser the anxiety related to diabetes, which influences the implementation of more self-management behaviors.

Quality of Life and Well-Being

One study found a link between the EI and quality of life in adults with Type 2 diabetes. Yalcin et al. (2008) demonstrated a positive relationship between EI and quality of life; a higher EI level was related to a better quality of life and general well-being of people with diabetes.

Marital Satisfaction

Finally, marital satisfaction was a further variable analyzed in adults with Type 2 diabetes. Dehghan et al. (2014) showed that marital satisfaction was positively related to EI level; that is, people with diabetes who had a higher level of EI showed greater satisfaction with their relationship.

DISCUSSION

The present systematic review has focused on analyzing the relationship between EI and various biological and psychological variables in people with Type 1 and Type 2 diabetes to clarify the state of the art within the field and suggest future directions for research and intervention. We hypothesized that higher levels of EI would be related to better diabetes management and fewer emotional problems in this population. Given the variety of studies found in the literature search, we divided the results in four main sections.

In the first section, we included those studies in which the relationship between EI and HbA1c was analyzed. This was one of the main objectives of the review since HbA1c is a standard indicator of glycemic control. The results in both adults and adolescents showed that higher EI scores were related to lower HbA1c levels in people with Type 1 and 2 diabetes. This negative relationship was also found between the EI of the parents and the HbA1c of their adolescent offspring, except for a study in children, which found the opposite (and unexpected) result: a positive relationship between maternal EI and the HbA1c of their children. According to the authors, this result may be due to the use of a self-report which reflects the mothers' subjective attitude toward their EI ability and also the fact that caregivers use ineffective cognitive strategies to regulate their emotions; that is, mothers may try to understand and control their emotions, but coping strategies may not be appropriate for responding to the diabetes challenges of their offspring (Cabello et al., 2021). From this, we can conclude that EI seems to play a relevant role in glycemic control. Diabetes (primarily Type 1 diabetes) has been related to anxiety, depression, and anxiety (Anderson et al., 2001; Grigsby et al., 2002; Nicolucci et al., 2013) which makes management of the disease more difficult. The results of this section might seem logical given that EI provides people with the resources required to manage their emotions and adequately

TABLE 3 | Studies analyzing EI training in people with diabetes.

Study	Design and objectives	Sample	Type of diabetes	EI Scale	Outcome measures	Results
Tavakol et al., 2018 Iran	Randomized Controlled Trial To investigate the effect of self-care education on EI and HbA1c in patients with Type 2 diabetes	42 adults. 73.8% females. Control group $n = 21$ (mean age 45.42 ± 7.71 years). Intervention group $n = 21$ (mean age 48.57 ± 7.89 years) No medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Intervention before: Mean = 65.09 ± 6.49 Control before: Mean = 64.68 ± 7.66 Intervention after: Mean = 70.95 ± 6.92 Control after: Mean = 64.38 ± 7.09	HbA1c level	Self-care education improved HbA1c and EI levels
Yalcin et al., 2008 Turkey	Randomized Controlled Trial with 1st and 2nd follow-ups. To investigate the effect of an EI program on the health-related quality of life and well-being of individuals with Type 2 diabetes	36 adults. 50% females Study group $n = 18$ (mean age 54.33 ± 7.34 years) Control group $n = 18$ (mean age 51.17 ± 5.81 years) No medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Intervention before: Mean = 97.77 ± 8.98 Control before: Mean = 98.38 ± 8.89 Intervention after: Mean = 124.27 ± 5.64 Control after: Mean = 98.88 ± 9.31	HbA1c level Well-Being Well-Being Questionnaire (WHO-WBQ-22; Savli and Sevinc, 2005) Quality of Life WHO-Quality of Life (WHOQOL-Bref; Skevington et al., 2004)	EI training improved quality of life and well-being in persons with diabetes over time
Karahan and Yalcin, 2009 Turkey	Randomized Controlled Trial with 1st and 2nd follow-ups. To investigate the effects of an "EI Skills Training Program" on anxiety levels, burnout, and HbA1c in Type 2 diabetes mellitus patients	36 adults. 50% females Training group $n = 18$ (mean age 53.06 ± 4.43 years) Control group $n = 18$ (mean age 52.22 ± 5.2 years) No medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Intervention before: Mean = 97.0 ± 6.3 Control before: Mean = 96.7 ± 6.0 Intervention after: Mean = 127.1 ± 6.1 Control after: Mean = 97.0 ± 6.1	HbA1c level Anxiety Beck Anxiety Inventory (BAI; Beck et al., 1988) Burnout Maslach Burnout Inventory (MBI; Maslach and Jackson, 1981)	EI program improved emotional burnout, anxiety and HbA1c

face the challenges imposed, in this case, by the disease (Gratz and Roemer, 2004). In addition, these findings are consistent with the previous literature that offers evidence on the relationship between EI and physical and mental health (Martins et al., 2010; Fernández-Abascal and Martín-Díaz, 2015).

The second section included those studies evaluating the effect of EI training on people with Type 2 diabetes. The objective was to test whether EI training could improve various life aspects of people with diabetes, such as quality of life, anxiety, or glycemic control. The three studies showed that training in EI could improve all these variables compared to the control group of people with diabetes. Therefore, it is essential to note that training in EI can be a way to manage not only glycemic control but other psychological factors associated with the disease. The benefits of EI training have been found in the population with diabetes and healthy adults (Hodzic et al., 2018) and adolescents (Ruiz-Aranda et al., 2012). These studies showed EI training to be a

plausible predictor of health by reducing risk factors such as anxiety, social stress, depression, or somatization and that the results can persist over time. The literature shows that EI dimensions can be better predictors of mental health than physical health (Fernández-Abascal and Martín-Díaz, 2015).

In the third section, EI levels were compared between people with Type 2 diabetes and a healthy population sample. The two studies showed that there were no statistically significant differences in EI between persons with diabetes and without diabetes. There is, however, no reason to expect individual differences as a consequence of the disease. Instead, we proposed that there might be individual differences in diabetes management according to EI levels, as shown in the first section. However, future lines of investigation should aim to analyze these results in people with Type 1 diabetes together with the employment of other EI models.

Finally, we included those studies in which EI was related to different variables of psychological adjustment and well-being

TABLE 4 | Studies analyzing differences between people with diabetes and without diabetes.

Study	Design and objectives	Sample	Type of diabetes	EI Scale	Outcome measures	Results
Schinckus et al., 2018 Belgium	Cross-sectional study To explore whether the levels of EI of people with diabetes differs from the non-diabetes population	Study 1: 8,532 participants (60.2% females) of which 333 had diabetes (mean age was 55.7 ± 13.5 years) Not psychological or medical intervention described	Type 1 and 2 diabetes	Study 1: The profile emotional competence (PEC) Self-report mixed model Diabetes group: Mean = 3.37 ± 0.42 Control group: Mean = 3.47 ± 0.43	Study 1: EI	The persons with diabetes in the study had a lower global EI score than that of people without diabetes. However, when matching both groups in terms of gender, age and educational level, the group differences disappeared
Moradi et al., 2020 Iran	Cross-sectional study To determine the effect of EI on the quality of life of elderly diabetic patients	People with diabetes $n = 63$ (mean age 65.01 ± 6.08 years) and people without diabetes $n = 66$. 47.3% females. No psychological or medical intervention described	Type 1 and 2 diabetes	The Shrink emotional intelligence questionnaire Self-report mixed model Diabetes group: Mean = 99.42 ± 10.37 Control group: Mean = 97.18 ± 18.49	EI	No statistically significant differences were found in EI between persons with diabetes and without diabetes

and did not meet the criteria for the previous section. The results showed that EI was negatively related to diabetes-related distress, anxiety, and burnout and positively related to quality of life, well-being, and marital satisfaction. These results are consistent with the existing literature, which supports the hypothesis that emotional abilities are an essential factor for psychological adjustment that can mitigate both anxiety and depression in adolescents (Fernandez-Berrocal et al., 2006) and adults and improve their quality of life (Sánchez-Álvarez et al., 2016).

Taking together, the results of this review offer a starting point for a theoretical and practical understanding of the role played by EI in the management of diabetes. Specifically, in light of the studies shown, EI could be a protective factor for biological and psychological variables such as glycemic control, anxiety, and diabetes-related distress. Future investigations should also evaluate the role of EI as a mediator (and not just a mechanism) between the emotional state of individuals with Type 1 and 2 diabetes and biological outcomes such as HbA1c. More importantly, EI training seems to benefit both glycemic control and the psychological dimension of the patients. These results suggest that people with diabetes, that is, Type 2, will benefit from training in EI to maximize the strategies needed to deal with the disease on a daily basis.

Despite these preliminary conclusions, it is essential to highlight certain limitations that open possible future lines of investigation. First, relatively few articles have been published that study the role of EI in people with diabetes, since we found a total of 12. This implies that this research area is still emerging. Second, regarding the EI conceptualization employed in the different studies described, three instruments belonged to the performance-based ability models, three to self-report ability models, and seven to the self-report mixed models. It is crucial to consider which model is used to measure EI since, as previously shown, there is little correlation between them

(Goldenberg et al., 2006), and they are not based on the same variables. Thus, the theoretical and clinical implications of the findings could differ according to the model employed. The model that has received the most empirical support is the performance-based ability model (Mayer et al., 2016), which was used in only three of the studies included in this review. In addition, the instrument based on the performance-based ability model only evaluates one of the four branches of the model (emotion perception), thus missing important information regarding the facilitating, understanding, and regulating EI branches. Future investigations should aim to confirm the results using instruments that cover all of the performance-based ability branches such as the MSCEIT (Mayer et al., 2002).

Thirdly, despite being different diseases, some studies do not differentiate between Type 1 and Type 2 diabetes. Both should be considered separately due to the different life implications of having one type of diabetes or another (Wong et al., 2020). Most studies included in the review have focused on Type 2, which usually appears in adulthood. In contrast, Type 1 diabetes frequently arises in childhood and adolescence. Adolescence is a developmental stage with which diabetes (as a chronic disease) interacts more negatively because the adolescent's self-image is still developing. At this stage, interpersonal relationships become more important and a particular source of stress (Chamorro et al., 2002). In addition, the treatment of Type 1 diabetes adds a stressful condition due to daily blood glucose control, insulin dose adjustment, and the coping and management of hypo- and hyperglycemia, all of which disrupt the daily lives of people with diabetes (Ortiz Parada, 2006). Therefore, future research should analyze how EI improves lifestyles and reduce sources of stress in people with Type 1 diabetes, particularly during this developmental stage. Moreover, and considering the results of

TABLE 5 | Studies analyzing the relationship between EI and psychological adjustment and well-being.

Study	Design and objectives	Sample	Type of diabetes	EI Scale	Outcome measures	Results
Karahan and Yalcin, 2009 Turkey	Randomized Controlled Trial and Cross-sectional study To investigate the relationship between EI and anxiety levels and burnout in Type 2 diabetes patients	36 adults. 50% females Training group $n = 18$ (mean age 53.06 ± 4.43 years) Control group $n = 18$ (mean age 52.22 ± 5.2 years) No medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Intervention before: Mean = 97.0 ± 6.3 Control before: Mean = 96.7 ± 6.0 Intervention after: Mean = 127.1 ± 6.1 Control after: Mean = 97.0 ± 6.1	Anxiety Beck Anxiety Inventory (BAI; Beck et al., 1988) Burnout Maslach Burnout Inventory (MBI; Maslach and Jackson, 1981)	The higher the EI, the lower the emotional burnout and anxiety
Schinckus et al., 2018 Belgium	Cross-sectional study To Investigate if EI reduces diabetes-related distress and increases self-management behaviors and investigate if diabetes-related distress mediates the relationship between trait EI and diabetes self-management behaviors	Study 2: 146 adults. 80.5% females (mean age was 40 ± 14 years) Diabetes was treated mainly by insulin injections only (61%) or combined with oral medication (14.4%); 10.3% took oral medication without insulin and 14.4% had no medication for their diabetes but tried to reach/maintain a healthy lifestyle	Type 1 and 2 diabetes	Study 2: The Trait Emotional Intelligence Questionnaire (TEIQue-SF) Self-report mixed model Mean = 4.81 ± 0.828	Study 2: The Diabetes Self-Management Diabetes Self-Management Questionnaire (DSMQ; Schmitt et al., 2013) Diabetes Distress The Diabetes Distress Scale (DDS; Polonsky et al., 2005)	Diabetes-related distress acted as a mediator between EI and diabetes self-management. Furthermore, EI reduced diabetes-related distress, which improves self-management of the disease
Dehghan et al., 2014 Iran	Cross-sectional study To assess the relationship between attachment styles and EI and marital satisfaction in patients with Type 2 diabetes mellitus	200 married patients (mean age 43.92 ± 12.46 years) and 200 married healthy individuals (mean age 38.09 ± 9.97 years). Male gender, 51.0% vs. 50.0%. Not psychological or medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Diabetes group: Mean = 313.61 ± 22.00 Control group: Mean = 322.08 ± 30.19	Marital Satisfaction The ENRICH questionnaire (Fournier et al., 1983)	EI was positively related to marital satisfaction
Yalcin et al., 2008 Turkey	Randomized Controlled Trial and Cross-sectional study To investigate the relationship between EI and the health-related quality of life and well-being of individuals with Type 2 diabetes	36 adults. 50% females. Study group $n = 18$ (mean age 54.33 ± 7.34 years) Control group $n = 18$ (mean age 51.17 ± 5.81 years) No medical intervention described	Type 2 diabetes	The BarOn questionnaire (EQ-I) Self-report mixed model Intervention before: Mean = 97.77 ± 8.98 Control before: Mean = 98.38 ± 8.89 Intervention after: Mean = 124.27 ± 5.64 Control after: Mean = 98.88 ± 9.31	Quality of Life WHO-Quality of Life (WHOQOL-Bref; Skevington et al., 2004)	Positive relationship between EI and quality of life

EI training in adults, we expect adolescents (who are particularly vulnerable) to benefit significantly from these interventions.

In conclusion, this review offers a starting point for proposing new research that could be beneficial for people with diabetes. At a theoretical level, the data suggest that EI could be a key protective variable for both psychological and biological adjustment in people with diabetes by supplying them with strategies for coping with the disease in daily life. Although further research is needed, the preliminary findings indicate that EI training could be an effective complementary tool for the management of diabetes in this population.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

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AUTHOR CONTRIBUTIONS

AP-F: conceptualization, data research, methodology, validation, investigation, writing – original draft preparation, and visualization. PF-B: term, conceptualization, validation, supervision, project administration, funding acquisition, and supervision. MG-C: term, conceptualization, data research, methodology, validation, writing – review and editing, visualization, and supervision. All authors contributed to the article and approved the submitted version.

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Self-Concept as a Mediator of the Relation Between University Students' Resilience and Academic Achievement

Inmaculada García-Martínez[1], José María Augusto-Landa[2]*, Rocío Quijano-López[3] and Samuel P. León[4]

[1] Department of Didactics and School Organization, Faculty of Education, University of Granada, Granada, Spain, [2] Department of Psychology, Faculty of Humanities and Educational Sciences, University of Jaén, Jaén, Spain, [3] Department of Science Education, Faculty of Humanities and Educational Sciences, University of Jaén, Jaén, Spain, [4] Department of Pedagogy, Faculty of Humanities and Educational Sciences, University of Jaén, Jaén, Spain

Academic achievement is a factor of interest in both psychology and education. Determining which factors have a negative or positive influence on academic performance has produced different investigations. The present study focuses on analyzing the relationship between resilience, emotional intelligence, self-concept and the academic achievement of university students. For this purpose, different self-report tools were administered to a sample of 1,020 university students from Southern Spain. The Structural Equation-based mediational analysis suggests that there is no direct relationship between resilience and academic achievement, nor between emotional intelligence and academic achievement. Likewise, self-concept is positioned as a mediating factor in the relationship between resilience and academic achievement. The findings indicate that university students who exhibit high levels of resilience tend to cope better with difficult moments and understand and value the effort required and invested in study time. This study supports positive beliefs and behaviors for better academic achievement.

Keywords: self-concept, resilience, emotional intelligence, academic achievement, university students

INTRODUCTION

Predicting and explaining academic performance and researching the factors related to students' academic success are highly important topics in the field of education (Ruban and McCoach, 2005). Academic performance is an important predictor of the future achievements in subsequent educational stages, as well as other important occupational outcomes, such as job performance and salary (Kuncel et al., 2005). University students' achievement is affected by different factors, such as social, psychological, economic, environmental and individual factors. All of them affect student achievement and they differ among people and among countries. Among these reasons, the present study is focused on psychological factors, in line with previous studies that have attempted to predict the factors involved in student performance from the field of psychology (Wilson and Buttrick, 2016; Asikainen et al., 2020). Therefore, it can be stated that this study is between the fields of education and psychology. An overview of the scientific literature showed studies that have analyzed the relationships between academic achievement and different psychological constructs, such as self-concept (Dweck, 2006; Susperreguy et al., 2018; Wolff et al., 2018; Sewasew and Schroeders, 2019), resilience (Reynoso, 2008; Hudson, 2009; O'Looney, 2010; Wilkinson, 2012) and

Emotional Intelligence (EI) (Corcoran and O'Flaherty, 2018; Deighton et al., 2018; Piqueras et al., 2019). However, to the best of our knowledge, no study was found to address the contribution of these constructs jointly in the analysis of academic achievement in university students. This idea implies that the main strength of the current study was the joint consideration of several psychosocial factors (resilience, emotional intelligence and self-concept) in the analysis of the prediction of the academic achievement of university students.

The identification of these associations allows for a more reliable understanding of how different psychosocial factors are related to the academic performance of young university students at the same time. In this sense, this knowledge will provide the basis for the implementation of programs that help to improve emotional intelligence, self-concept or resilience in the university environment. Likewise, and more specifically for instructional processes, it will help teachers to take into account the influence of resilience, self-concept and emotional intelligence when they design and implement their teaching practices.

THEORETICAL FRAMEWORK

Resilience and Academic Achievement

Resilience is defined as a process, capacity or result of a successful adaptation during and after an exposure to a risk situation (Luthar, 2006). Other authors define it as the "capacity of a dynamic system" to overcome adverse experiences (Masten, 2014). People who competently cope with difficult situations demonstrate the presence of psychological resilience. Resilience may produce a positive chain reaction that leads to fighting adversity and enhancing favorable outcomes (Daniel and Wassell, 2002). This implies a healthy and stable trajectory of functionality, ranging from returning to a balanced state to developing optimal conditions of functioning (Tedeschi and Calhoun, 2004). From the positive psychology perspective, resilience is an important concept to explain performance at work and in academic environments (Salanova et al., 2009).

Links between resilience and academic achievement remain relatively scarce, but findings from studies in educational settings, such as the one carried out by Kwok et al. (2007) and Liew et al. (2018), suggest that childhood resilience has short- and long-term links to learning and achievement. Regarding studies with university students, Kwek et al. (2013) found that self-esteem and resilience are significant predictors of academic achievement. In this line, the study of Ayala and Manzano (2018) suggests that resilience and engagement should be taken into account at the time of college admission if academic achievement outcomes are sought to be improved. Maintaining resilience in educational settings may help students to reduce the presence of depression or anxiety, thus positively affecting potential academic achievement and their well-being both now and later in life (Challen et al., 2014). On the other hand, some studies do not confirm the relationship between resilience and academic achievement (Sanders and Lushington, 2002; Elizondo-Omaña et al., 2010; Sarwar et al., 2010). Finally, other studies report mixed results. Lee et al. (2012) stated that resilience

is positively related to GPA (grade point average), but not to other indicators such as SAT (previously, Scholastic Assessment Test) and ACT (American College Testing), with different results for different groups of students. Allan et al. (2014) reported similar results, with mixed effects of resilience on academic achievement in United Kingdom university students. This scenario leads us to design studies taking into account other variables in order to clarify the contribution of resilience to academic performance in university students.

Emotional Intelligence and Academic Achievement

The model proposed by Mayer and Salovey (1997) describes Emotional Intelligence as "the ability to accurately perceive, appraise, and express emotions accurately; the ability to access and/or generate feelings that facilitate thinking; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions and promote emotional and intellectual development" (Mayer and Salovey, 1997, p. 10). In education, there is an increasing consensus among educators and researchers on the idea that emotional intelligence is an important skill that students must develop, both for their future well-being and for their future success in the workplace. There is evidence that emotional learning programs in educational contexts are effective (Durlak et al., 2011) and that non-cognitive constructs are powerful predictors of academic achievement (Poropat, 2009; Richardson et al., 2012). High emotional intelligence contributes to increased motivation, planning, and decision making, which positively impact academic performance (Downey et al., 2008). A recent meta-analysis conducted by MacCann et al. (2020) has shown that emotional intelligence is the third most important predictor after Intelligence and Conscientiousness in academic achievement. The authors also propose three mechanisms underlying the emotional intelligence/academic achievement link: (a) regulating academic emotions; (b) building social relationships in the school/university contexts and (c) academic content overlaps with emotional intelligence. The relationship between emotional intelligence and academic performance may be moderated by personality and self-concept. Thus, self-esteem has been found to be positively related to academic achievement (Harter, 2006; Freudenthaler et al., 2008; Pelkonen et al., 2008) and positively related to emotional intelligence (Schutte et al., 2002; Extremera and Fernández-Berrocal, 2004; Sillick and Schutte, 2006). A recent systematic review and meta-analysis undertaken by Akpur (2020) revealed that the mean effect size between emotional intelligence and academic achievement was 0.73. These findings confirm the positive impact of emotional intelligence on academic achievement.

Self-Concept and Academic Achievement

Self-concept is a psychological construct with multiple dimensions that affect "the self's nature of experience, including cognition, emotion, and motivation" (Markus and Kitayama, 1991, p. 224). Self-concept refers to the combination of ideas, feelings, and attitudes that people have about themselves.

Likewise, it refers to the set of perceptions or reference points that the individual has about him/herself: the set of characteristics, attributes, qualities and deficiencies, capabilities and limits, values and relationships that the subject knows and perceives as data referring to his/her identity (Sánchez Moreno and Barrón López de Roda, 2007; Nalah, 2014). Kaur et al. (2009) stated that self-concept has three main elements: self-image or self-identity of an individual, self-esteem or the value that a person instills in him/herself, and the behavioral component, in which self-concept both influences and shapes a person's behavior. Self-concept is different from self-esteem, as it is part of self-learning, predictable, and relevant to one's own mental states and attitudes.

At present, the multidimensional character of self-concept is proven, although doubts remain as to how many factors constitute it and whether there is a relationship between the different factors. Regarding the relationship that the different factors which constitute the self-concept may have with each other, 6 different models have been described:

1. The multidimensional model of independent factors is the antithesis of the unidimensional model, given that it proposes that there is no correlation between the factors of self-concept, although a less restrictive version of it defends the relative absence of such correlation, which has received some empirical support (Soares and Soares, 1977; Marsh and Shavelson, 1985), and less so its more restrictive version (Marsh and Hattie, 1996; Marsh, 1997).
2. The multidimensional model of correlated factors assumes that all factors of self-concept are related to each other, having received much more empirical support than the model of independent factors (Marsh, 1997).
3. The multidimensional multifaceted model (Marsh and Hattie, 1996; Hattie, 2014) has a single facet (the content of the self-concept domains) that presents multiple levels, which are the different domains of self-concept (physical, social and academic).
4. The multidimensional multifaceted taxonomic model differs from the previous model, as it has at least two facets, and each of them has at least two levels (Marsh and Hattie, 1996; Hattie, 2014).
5. The compensatory model described by Winne and Marz (1981) supports the existence of a general facet of self-concept, in which the more specific facets are inversely related and integrated.
6. The multidimensional hierarchical factor model proposes that self-concept is formed by multiple dimensions organized hierarchically, where the general self-concept dominates the structure's apex (Shavelson et al., 1976).

The hierarchical and multifaceted model of self-concept postulates that the overall self-concept has four dimensions: academic self-concept, social self-concept, emotional self-concept, and physical self-concept (Shavelson et al., 1976). Thus, self-concept in relation to academic performance is essential to an individual's activities (Tus, 2020). Students' college experience is strongly linked to their aspects of self-concept

(Osborne and Jones, 2011); for example, their independence, belief and aspiration under the concept of personal/academic self (Rodriguez, 2009), fear of failure (the negative self), the self they want to become (the ideal self) and connection with others under the concept of the social self. The study conducted by Chamundeswari et al. (2014) found a significant correlation between self-concept, academic achievement and students' study habits. Sikhwari (2014) investigated the relationship between motivation, self-concept and academic performance of university students. His results indicated that there was a significant correlation between motivation, self-concept and academic achievement in the sample of university students. Studies in educational contexts have found strong relationships between self-concept, academic motivation and academic achievement (Affun-Osei et al., 2014; Peixoto et al., 2016). Similarly, a meta-analysis (Huang, 2011) that analyzed the relationship between self-concept and academic achievement reported that the strength between these two constructs changed over time (Huang, 2011).

Our Study

Specifically, this study adds to previous research aimed at analyzing the relation between resilience, emotional intelligence, self-concept and the academic achievement of university students. To this end, we propose a structural equation model in which we aim to demonstrate the moderating effect of university students' self-concept on their academic performance. In this manner, the joint contribution of each construct in the attainment of academic achievement in university students would be studied and, according to the data found, it would allow design future training programs based on these constructs to improve academic achievement in these students.

MATERIALS AND METHODS

Participants

The sample was constituted by 1,020 university students who were studying education degrees in Southern Spain. Regarding gender, it was found that 75.78% were women and 24.21% were men. The age of the participants ranged from 17 to 50 years (*M*: 21.52; *SD*: 4.44). Regarding the degree they studied, 42.8% were enrolled in Primary Education, 30.7% in Early Childhood Education, 14.4% in Social Education, 10.4% in a Master's degree in Teaching and 1.7% in Pedagogy. With respect to the academic year they studied, 57.2% were enrolled in the first year, 9.9% in the second year, 18.7% in the third year and 14.2% in the fourth year. Finally, with regard to the region, 56.5% were studying in Jaén, followed by Granada (13.1%), Córdoba (10.4%), Seville (5.5%), Cádiz (5.4%), Málaga (4.2%), Almerìa (2.7%), and Huelva (2.2%).

Instruments
Wong and Law Emotional Intelligence Scale
This scale (Wong and Law, 2002) is composed of 16 short statements used to evaluate four dimensions: Self-Emotion Appraisal (SEA), Other's Emotion Appraisal (OEA), Use of Emotion (UOE), and Regulation of Emotion (ROE). Respondents

are asked to rate their agreement with the statements on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). We used the Spanish version of Extremera et al. (2019), which has shown adequate validity and reliability in Spanish contexts ($\alpha = 0.91$.). This instrument has been previously used in other studies in the Spanish context (Peláez-Fernández et al., 2021; Yudes et al., 2021).

Resilience Scale (RS-14)

This instrument (Wagnild and Young, 1993; Wagnild, 2009, 2010) was designed to assess the extent of individual resilience through equanimity, which refers to a balanced perspective on life and experiences. Consequently, it could be seen as a person's ability to sit back and accept what may happen, thus moderating extreme responses to adversity, which is a construct often related to sense of humor. In this study, we used the RS-14 scale validated by Sánchez-Teruel and Robles-Bello (2015) in order to determine resilience in accordance with previous studies (Sánchez-Teruel et al., 2020; Sánchez-Teruel et al., 2021). It consists of 14 items, distributed in two dimensions: (a) Personal competence and (b) Self-acceptance and life acceptance. The reliability analysis of the scale was $\alpha = 0.93$.

Self-Concept Scale Form-5

This instrument designed by Garcìa and Musitu (1999) has been used in previous similar studies in Spain (Suriá-Martìnez et al., 2019; Cachón-Zagalaz et al., 2020). This test measures the dimensions of academic self-concept, social self-concept, emotional self-concept, family self-concept and physical self-concept. It is composed of 30 items, which are rated with a 5-point Likert scale (Ranging from 1 = Never to 5 = Always). The total reliability of the scale was $\alpha = 0.810$, and for each dimension, we found the following: academic $\alpha = 0.887$; social $\alpha = 0.674$; emotional $\alpha = 0.702$; family $\alpha = 0.849$ and physical $\alpha = 0.735$ (Garcìa and Musitu, 1999).

Academic Achievement

The academic record was established as an objective "measure" that could be obtained and quantitatively evaluated, due to its nature and to the sample size. In this regard, the students were asked to state their average mark of their degree to date (the overall average mark obtained in the course by the student). For this purpose, they had to check their academic record and wrote down the average score that appeared at that moment.

Procedure

In order to simplify the fulfillment of the different scales used in this study, all of them were unified in a single instrument through the Google Form tool. All the researchers attended the classes of the potential participants to explain the purpose of the research. In those cases where this was not possible, the teachers were informed to transfer the information to their students and provide them the Google Form link to complete the questionnaire. In all cases, the emails of the researchers were provided for contact in case of doubts or need for further information. Participation in the study was completely voluntary, based on the Declaration of Helsinki in

1975 and its adjustment of Brazil in 2013. In addition, the study respected the national legislation for clinical trials (223/2004 Law from February 6th), biomedical research (14/2007 Law from July 3rd) and participant's confidentiality (15/1999 from December 13th). Furthermore, this research was approved by the Human Research Ethics Committee of the University of Jaén (code OCT.20/1.TES), regulated by Andalusian Decree 439/2010 of December 14th.

Data Analysis

For all the analyses carried out in the study, we set an α value of 0.05. All the analyses in the study were performed with the R program. The variables treated in the study were Emotional Intelligence (EI), Resilience (Res), Self-Concept (SC) and the students' average mark in their degree (Mark). Prior to the factorial treatment, the data were examined by data screening to analyze the necessary assumptions for the factorial treatment and their distribution. A Confirmatory Factor Analysis (CFA) was performed with each of the resulting data for each scale to verify the validity and internal consistency of these scales. CFA and SEM model analysis was conducted through the r lavaan package (Rosseel, 2012). However, due to the fact that our data were not multivariate normally distributed, the diagonally weighted least squares estimator (DWLS, Finney and DiStefano, 2013) was used. For the study of the reliability of the scales used, Cronbach's alpha and McDonald's ω indices were used (Revelle, 2019). Once the factorial treatment was conducted, the original scores given by the students in each questionnaire was scaled by the standardized factor loading obtained in the CFA (Beaujean, 2014). After scaling, the proposed mediational model was analyzed using structural equation-based analysis (SEM).

RESULTS

Mardia's Multivariate Normality Test was performed to analyze multivariate normality. The obtained results indicated that our data did not maintain a multivariate normal distribution ($Z_{Kurtosis} = 80.77$, $p < 0.01$). We conducted a data screening of the data before the factor treatment to explore their distribution and analyze any assumptions. The correlation of variables to analyze additivity showed that our data did not show multicollinearity ($r > 0.90$), nor uniqueness ($r > 0.95$). In order to analyze linearity, homogeneity and homoscedasticity, we conducted a linear regression with our data and a randomly created data series. Subsequently, we explored the residuals of that regression; if there was any anomaly in the distribution of the residuals, this would be due to the distribution of our data, since the other variable was random (Kline, 2015). The distribution of the residuals did not show any anomaly, ranging most of them between -2 and $+2$.

Analysis of the Subscales

With the aim of analyzing the validity and internal consistency of the scales used in the present study, we conducted a CFA with

each of the data sets obtained with each of the scales. The results of each CFA are presented below.

Self-Concept Scale Form 5 (AF5)

In the analysis of the Self-concept Scale Form 5 (AF5) we found that standardized factor loads varied between 0.159 (SE 0.017) and 0.834 (SE 0.032) (for more details, see **Table 1**). Then, the CFA for the AF5 scale shows an excellent fit (Hair et al., 2010), $\chi^2(387) = 1,400.69$, $p < 0.001$, with the following values: CFI = 0.923, TLI = 0.913, SRMR = 0.060, RMSEA = 0.051 [RMSEA 90% CI (0.048, 0.054)]. The reliability of this scale was Cronbach's α = 0.849 and McDonald's ω = 0.871.

Resilience Scale (RS-14)

For the Resilience Scale (RS-14), the standardized factor loads ranged between 0.377 (SE 0.016) and 0.728 (SE 0.019) (for more details regarding the internal consistency, see **Table 1**). The CFA for the RS-14 scale indicates an excellent fit (Hair et al., 2010), $\chi^2(77) = 279.935$, $p < 0.001$, with CFI = 0.972, TLI = 0.967, SRMR = 0.063, RMSEA = 0.051 [RMSEA 90% CI (0.045, 0.057)]. In addition, the reliability of this scale was Cronbach's α = 0.867 and McDonald's ω = 0.868.

Wong Law Emotional Intelligence Scale

In the case of the WLEIS-S, the standardized factor loads ranged between 0.389 (SE 0.027) and 0.890 (SE 0.024). The complete data on internal consistency are available in **Table 1**. The CFA for the WLEIS-S scale shows an excellent fit (Hair et al., 2010), $\chi^2(98) = 183.180$, $p < 0.001$, with CFI = 0.989, TLI = 0.987, SRMR = 0.041, RMSEA = 0.029 (RMSEA 90% CI (0.023, 0.036)]. The reliability of this scale was Cronbach's α = 0.834 and McDonald's ω = 0.894.

Mediational Analysis

Figure 1 displays the proposed mediation model that the study sought to analyze. Within this figure, the squares represent the values of the scaled variables obtained from each of the scales. The one-way arrows indicates regression relationships. **Table 2** shows the results of the analysis for both direct and indirect regression relationships in the mediational model. **Figure 2** shows the summarized results of the proposed model. The continuous black arrows show the significant relationships, while the dashed gray arrows show the non-significant relationships of the model. As can be observed, all significant relationships in the model involve self-concept. Thus, the only factor that is significantly directly related to the mark is self-concept (β = 0.15, $p < 0.001$). That is, those students with a higher self-concept will show better academic performance. Additionally, self-concept indirectly mediates the relationship between resilience and Mark (β = 0.02, $p = 0.004$), and the indirect mediating relationship between emotional intelligence and mark is very close to significance (β = 0.01 $p = 0.056$). The remaining significant relationships were between self-concept and resilience (β = 0.17, $p > 0.001$) and between self-concept and emotional intelligence (β = 0.10, $p = 0.035$).

These results suggest that, although resilience or emotional intelligence are not able to predict students' academic scores

TABLE 1 | Factor loading.

Scale	Latent factor	Indicator	Estimate	SE	Z	p	Stand. Estimate
RES	res	re1	0.593	0.018	32.326	< 0.001	0.593
		re2	0.492	0.020	24.064	< 0.001	0.492
		re3	0.377	0.016	22.862	< 0.001	0.377
		re4	0.695	0.019	37.464	< 0.001	0.695
		re5	0.719	0.019	37.901	< 0.001	0.719
		re6	0.728	0.019	38.972	< 0.001	0.728
		re7	0.493	0.017	29.496	< 0.001	0.493
		re8	0.499	0.018	27.286	< 0.001	0.499
		re9	0.447	0.018	25.536	< 0.001	0.447
		re10	0.493	0.019	26.391	< 0.001	0.493
		re11	0.701	0.018	37.958	< 0.001	0.701
		re12	0.371	0.018	20.649	< 0.001	0.371
		re13	0.527	0.019	28.026	< 0.001	0.527
EI	sea	ei1	0.702	0.023	30.157	< 0.001	0.702
		ei2	0.800	0.025	32.181	< 0.001	0.800
		ei3	0.761	0.023	32.490	< 0.001	0.761
		ei4	0.544	0.020	26.560	< 0.001	0.544
	oea	ei5	0.666	0.034	19.565	< 0.001	0.666
		ei6	0.778	0.037	20.754	< 0.001	0.778
		ei7	0.389	0.027	14.517	<0.001	0.389
		ei8	0.749	0.036	20.527	<0.001	0.749
	uoe	ei9	0.486	0.021	23.098	<0.001	0.486
		ei10	0.725	0.024	30.758	<0.001	0.725
		ei11	0.845	0.026	33.019	<0.001	0.845
		ei12	0.850	0.026	33.152	<0.001	0.850
	roe	ei13	0.722	0.022	33.002	<0.001	0.722
		ei14	0.847	0.023	36.468	<0.001	0.847
		ei15	0.578	0.020	28.825	<0.001	0.578
SC	aca	sc1	0.674	0.024	27.777	<0.001	0.674
		sc6	0.720	0.022	33.101	<0.001	0.720
		sc11	0.636	0.021	30.869	<0.001	0.636
		sc16	0.535	0.019	28.162	<0.001	0.535
		sc21	0.759	0.023	33.387	<0.001	0.759
		sc26	0.717	0.023	31.746	<0.001	0.717
	emo	sc3	0.622	0.028	22.241	<0.001	0.622
		sc8	0.704	0.03	23.779	<0.001	0.704
		sc13	0.497	0.025	20.036	<0.001	0.497
		sc18	0.375	0.026	14.696	<0.001	0.375
		sc23	0.444	0.026	16.934	<0.001	0.444
		sc28	0.533	0.026	20.238	<0.001	0.533
	fam	sc4	0.265	0.019	14.226	<0.001	0.265
		sc9	0.834	0.029	28.391	<0.001	0.834
		sc14	0.208	0.018	11.703	<0.001	0.208
		sc19	0.763	0.032	24.127	<0.001	0.763
		sc24	0.798	0.028	28.875	<0.001	0.798
		sc29	0.834	0.032	26.002	<0.001	0.834
	phy	sc5	0.543	0.02	27.855	<0.001	0.543
		sc10	0.360	0.019	19.433	<0.001	0.36
		sc15	0.579	0.02	29.401	<0.001	0.579
		sc20	0.602	0.023	26.643	<0.001	0.602
		sc25	0.442	0.02	22.262	<0.001	0.442
		sc30	0.640	0.025	25.530	<0.001	0.64
	soc	sc2	0.682	0.024	28.092	<0.001	0.682
		sc7	0.818	0.028	28.711	<0.001	0.818
		sc12	0.159	0.017	9.551	<0.001	0.159
		sc17	0.791	0.028	28.66	<0.001	0.791
		sc22	0.031	0.015	2.020	0.043	0.031
		sc27	0.630	0.022	29.021	<0.001	0.63

RES, Resilience; SC, Self-concept; EI, Emotional intelligent; sea, Self-Emotion Appraisal; oea, Other's Emotion Appraisal; uoe, Use of Emotion; roe, Regulation of Emotion; aca, Academic; emo, Emotional; fam, Familiar; phy, Physical; soc, Social.
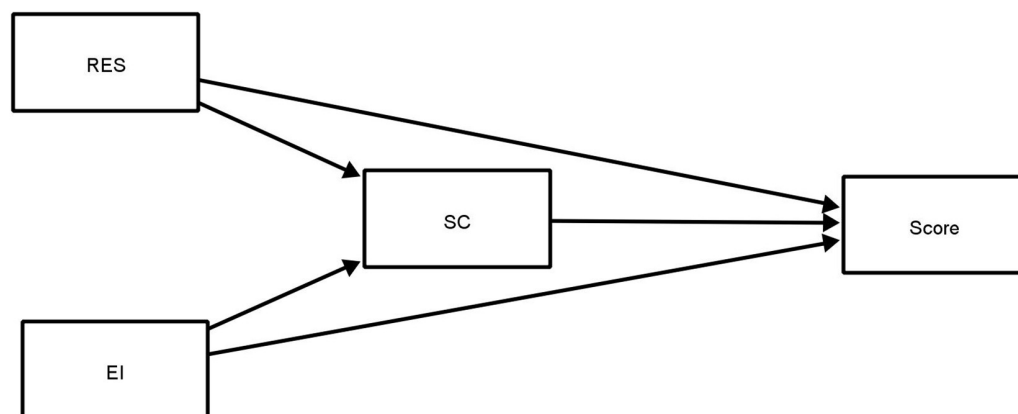
FIGURE 1 | Theoretical mediational model.

TABLE 2 | Indirect and total effects on mediational analysis.

Type	Effect	Estimate	SE	95% C.I.		β	z	P
				Lower	Upper			
Indirect	RES ⇒ SC ⇒ Note	0.06	0.02	0.02	0.10	0.02	2.86	0.004
	EI ⇒ SC ⇒ Note	0.05	0.02	− 0.00	0.09	0.01	1.91	0.056
Component	RES ⇒ SC	0.10	0.03	0.05	0.16	0.17	3.69	< 0.001
	SC ⇒ Note	0.59	0.13	0.33	0.84	0.15	4.54	< 0.001
	EI ⇒ SC	0.08	0.04	0.01	0.15	0.10	2.11	0.035
Direct	RES ⇒ Note	− 0.09	0.12	− 0.33	0.14	− 0.04	− 0.80	0.423
	EI ⇒ Note	0.15	0.15	− 0.15	0.44	0.05	0.98	0.328
Total	RES ⇒ Note	− 0.03	0.12	− 0.27	0.20	− 0.01	− 0.28	0.780
	EI ⇒ Note	0.19	0.15	− 0.11	0.49	0.06	1.27	0.205

RES, Resilience; SC, Self-concept; EI, Emotional intelligent; Note, Academic record.
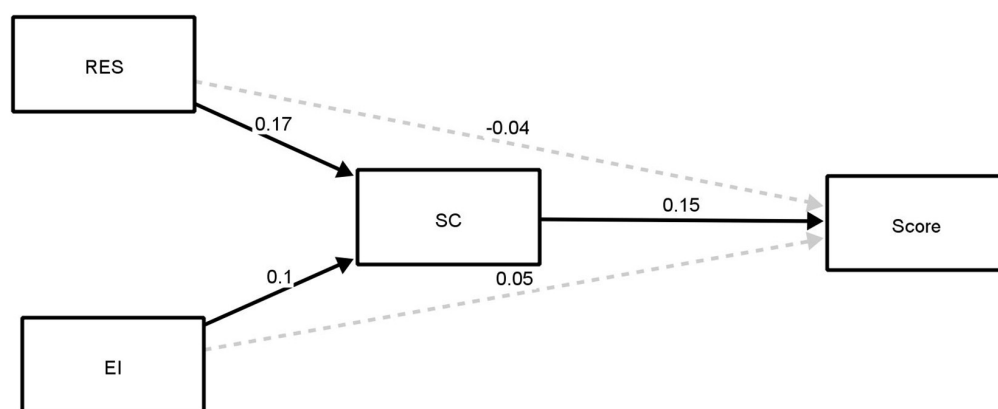
FIGURE 2 | Mediational model results.

directly, they are able to do it through self-concept. Thus, students with high emotional intelligence or resilience and who also show high levels of self-concept will predict high academic grade scores.

Previous studies have shown that the sex variable may unequally affect the relationships between some of the variables in the model. In such case, part of the effects shown in the model could be due to this unequal modulating effect of the sex variable. In order to control for this, the analysis of the model was carried out, but this time the sex variable was introduced as a modulator of the relationships in the model. The results of the analysis indicate that the sex variable did not show a significant

moderating effect on any of the relationships proposed in the model (greater effect EI: Sex $\Rightarrow$ SC $\beta = 0.091$ $p = 0.089$).

DISCUSSION AND CONCLUSION

The present study analyzed the relationship between resilience, emotional intelligence and self-concept on academic achievement in university students. Our study shows that there is no direct relationship between resilience and academic achievement, nor between emotional intelligence and academic achievement. These results differ from those found in other studies. In this regard, a recent meta-analysis by MacCann et al. (2020) pointed out that emotional intelligence is the third most influential factor on academic achievement. Among their findings, they reported that self-assessed emotional intelligence was a stronger predictor of grades than standardized test scores. On the other hand, the research conducted by Haktanir et al. (2021) with university population, whose purpose was to examine the role of psychological constructs on adaptation in first-year students, found significant direct relationships between resilience and academic self-concept, as well as between resilience and university adaptation. Similarly, significant relationships were found between self-concept and college adaptation. In our case, a significant relationship was also found between resilience, self-concept and academic achievement. In other words, self-concept mediates the relationship between resilience and academic achievement. Previous studies have indicated that the self-concept of ability, for instance, the beliefs that students have about their academic performance in different areas of knowledge, are related to their academic achievement (Susperreguy et al., 2018). No significant mediation results were found between emotional intelligence, self-concept and academic achievement. From these data, it is clear that university students who exhibit high levels of resilience tend to cope better with difficult times and understand and value effort. Other studies have also reported the important mediating role of resilience (Garcìa-Martìnez et al., in press) in the mental health and personality factors of college students. This study supports positive beliefs and behaviors for better academic achievement. In this regard, resilient students will be more likely to cope with contextual demands, especially those related to the university setting, and this attitude will determine their academic success. These findings are in line with those found by Hartley (2011), who highlights the importance of resilience in academic achievement. According to previous research (Haktanir et al., 2021) resilience is a significant predictor of self-concept. In this study, our findings revealed that students with higher resilience and self-concept show better academic performance. In this same vein, the data found are in line with the meta-analysis conducted by Huang (2011), where it was found that a high self-concept is related to high academic achievement. Moreover, to some extent, these factors affect students' academic performance. Similarly, the literature suggests that emotional intelligence is directly related to students' academic achievement and indirectly related to academic stress (Garcìa-Martìnez et al., 2021). Likewise, emotional intelligence is related to students' educational

engagement, which, in turn, promotes the attainment of greater academic success among students (Mérida-López et al., 2021).

The fact that the relationship between emotional intelligence and academic achievement is not linear and direct (as it appears in this study) could be due to the influence of other individual characteristics or variables of the students. In a study conducted by Fernández-Berrocal et al. (2003) with high school students, they found connections between school performance and emotional intelligence; specifically, it was found that intrapersonal emotional intelligence influences students' mental health and this psychological balance, in turn, is related to and affects final academic performance. This finding is consistent with the results of previous research, which confirm that individuals with certain deficits (e.g., poor skills, emotional maladjustment, learning disabilities, etc.,) are more likely to experience stress and emotional difficulties during their studies and, consequently, would benefit more from the use of adaptive emotional skills that allow them to cope with such difficulties.

Regarding advances in the field of study, studies on understanding relationships between emotional intelligence, resilience and self-concept in predicting academic achievement components may be beneficial, on the one hand, for students who are inclined toward disciplines that are more likely to succeed. On the other hand, it is also useful for researchers interested in the determining factors of academic success, to address the weaknesses of students coming into the classroom and cultivating the strengths that may help them to perform better academically. Anxiety, stress and emotional deficits are some of the factors that may negatively influence academic achievement, and high emotional intelligence, as well as good resilience, could have a major effect when the demands of a particular situation tend to overwhelm students' intellectual resources.

Practical Implications

In view of the results obtained, it would be advisable to develop and implement intervention programs to help university students with low performance to participate in these programs that develop strategies based on resilience, in order to directly affect the development of self-concept, which may thereby improve the academic development of students. These intervention programs should combine self-improvement and the developmental ability of the individuals should be integrated (Huang, 2011). Several resilience training programs have been put into practice; for instance, Sternberg (2003) proposed the training program called "Another 3R." This program focuses on personal interaction with the environment and how to solve individual issues effectively, and it requires students to learn about reasoning, develop resilience, and be more responsible. Currently, the Resilience Program "Pennsylvania Resilience Program (PRP)" developed by Seligman (2003), is a training program based on cognitive-behavioral theory that focuses on improving students' behavior and cognitive skills (Kumpfer, 1999).

Limitations

This research is not without limitations. Firstly, the design of this study is cross-sectional. This design means that no

causal effect can be established between the study variables. Further studies will have to take into account mediational models through a longitudinal design involving students from the first year to the end of their degree to determine the magnitude and direction of the changes experienced by these students. In addition, there is the limitation regarding the study sample, since the proportion of men and women is unequal. However, this proportion is consistent with that reported by the Spanish Institute of Statistics for university population in Education degrees (Spanish Institute of Statistics, 2020).

Furthermore, all the data collection instruments used to assess the psychological constructs analyzed in the study are based on self-report measures. Future research should consider the use of ability measures (Mayer et al., 2003). As for the measurement of academic performance, students were asked to indicate their current average grade, which may be a non-objective measure, as students may misreport this datum. An objective achievement test could have overcome this limitation, but the sample size and the conditions under which the instruments were administered did not make this possible.

DATA AVAILABILITY STATEMENT

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

ETHICS STATEMENT

This research is approved by the Human Research Ethics Committee of the University of Jaén (code OCT.20/1.TES). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SL, JA-L, RQ-L, and IG-M: conceptualization and supervision. SL and JA-L: methodology. SL: software. RQ-L and IG-M: writing—original draft preparation. SL, JA-L, and IG-M: writing—review and editing. All authors have read and agreed to the published version of the manuscript.

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Do Psychological Resilience and Emotional Intelligence Vary Among Stress Profiles in University Students? A Latent Profile Analysis

Büşra Kökçam*, Coşkun Arslan and Zeliha Traş

Department of Guidance and Psychological Counseling, Necmettin Erbakan University, Konya, Turkey

The coronavirus/COVID-19 pandemic has brought about significant changes in the lifestyle of students. However, despite an extensive study of students' life stress using a non-comprehensive scale and variable-centered approach, it has been little studied with a comprehensive scale and person-centered approach. Using the Student-Life Stress Inventory-revised (SSI-R), we analyzed students' latent stress profiles and examined differences in psychological resilience and emotional intelligence by comparing stress profiles from a sample of 418 undergraduate and graduate students (aged 18–36) in various departments of eight universities in Turkey. We identified five distinct stress profiles, defined as an extremely low stress group (ELSG), a low stress group (LSG), a medium stress group (MSG), a high stress group (HSG), and an extremely high stress group (EHSG). We found that (1) MSG and HSG were similar in terms of emotional intelligence, resilience, and possession of high standards, and they reported higher levels of physiological, emotional, and behavioral reactions than ELSG and LSG; (2) MSG felt more pressure than HSG; (3) ELSG reported higher levels of emotional intelligence (wellbeing, self-control, and emotionality) than others. Also, EHSG reported lower levels of emotional intelligence (specifically self-control) than others; (4) whereas resilience was highly positively correlated to wellbeing, resilience and wellbeing were moderately negatively correlated to stress. Extremely low stress group and LSG reported higher levels of resilience than others. Medium stress group, HSG, and EHSG did not differ with regard to resilience and wellbeing. Our results suggest that, university students are able to maintain their functionality by coping up with stress in some ways, no matter how stressful they are. These findings are discussed in relation to the relevant literature.

Keywords: stress, emotional intelligence, psychological resilience, university students, latent profile analysis

INTRODUCTION

After the outbreak of coronavirus/COVID-19, in-person learning has been suspended in schools affiliated to the Ministry of National Education and universities in Turkey as of March 14, 2019, and the educational process has been resumed with distance learning systems (Eken et al., 2020). Although online education has gradually increased since the pre-pandemic period, the majority

of students were not familiar with distance learning systems at the beginning of the pandemic period. This situation has become even more challenging when combined with problematic home environments and the lack of access to academic resources. Students who resume their learning at home have experienced a distraction due to additional responsibilities brought by other family members and sudden changes in lifestyle. Difficulty focusing on learning, performance anxiety in the online classroom environment, and uncertainties about how to proceed have led students to experience significant academic stress (Aslan et al., 2020; Husky et al., 2020; Li et al., 2020; Moawad, 2020; Patsali et al., 2020; Son et al., 2020; Clabaugh et al., 2021; Grace et al., 2021). Although students are faced with similar situations, there are differences in the degree and type of their reactions. Lazarus and Folkman (1984) examined the way individuals interpret stressful situations cognitively in primary and secondary appraisals. In primary appraisals, a person assesses whether the situation is (a) irrelevant, (b) benign-positive, or (c) stressful. If the situation has no effect on a person's wellbeing, an irrelevant category is selected. If the situation includes harm/loss, threat, and challenge, the stressful category is selected. While negative emotions such as fear and anxiety are at the center of threat appraisals, challenge appraisals focus on the potential for gain or growth, and they are characterized by pleasurable emotions such as eagerness, excitement, perseverance, hope, and confidence. Mostly, these situations are intertwined. In secondary appraisals, a person decides whether they have resources and effective strategies to cope with a stressful situation (pp. 31–33).

Although stress is a widely studied topic, it involves a complex relationship between overlapping and interacting of a large number of stressors and reactions that produce multiple behavior. For instance, physiological reactions may also be emotional or behavioral reactions (Gadzella, 1994). Because stress has a complex structure, which includes many stressors and reactions, necessary to examine it in terms of these variables. However, to deal with it comprehensively, most of the scales used in numerous studies on stress do not seem to be sufficient. Perceived Stress Scale (PSS-10) and Depression, Anxiety, and Stress Scale (DASS), which are the frequently used scales, measure responses to stress but provide a greatly limited measure of stressors (Cohen et al., 1994; Lovibond and Lovibond, 1996; Lee, 2012). Student-Life Stress Inventory developed by Gadzella for university students and later revised, includes five stress categories (frustrations, conflicts, pressures, changes, and self-imposed) and four reactions to the categories of stressors (physiological, emotional, behavioral, and cognitive appraisal) (Gadzella, 1994; Baloğlu and Bardakçı, 2010).

The Frustrations category refers to the frustrations that occur due to delays, daily hassles to reach goals, the lack of resources (e.g., money and books), failures to accomplish goals, feelings of being a social outcast, interpersonal relationship problems, and denial of opportunities in spite of one's qualifications. The Conflicts category points out the conflicts that came out of having two or more desirable and undesirable alternatives and when a goal had both positive and negative alternatives. The Pressures category indicates the pressures that are due to competition, deadlines, work overload, responsibilities, and expectations (e.g.,

interpersonal relationships and work). The Changes category refers to the stress produced by unpleasant or excessive changes that are disruptive to the participant's life/goals. The Self-Imposed category points out the stress that came out of the participant's competitive attitude, desire to be noticed and loved by all, his/her common anxiety, perfectionist, and procrastinative tendencies (Gadzella, 1994). In the reactions to stressors' section, the Physiological Reactions category indicates responses such as sweating, stuttering, hyperventilation, trembling, exhaustion, skin itching, weight loss/gain, and headaches. The Emotional Reactions category refers to fear, anxiety, worry, anger, guilt, depression, and grief. The Behavioral Reaction category points out crying, drug use, smoking, and to be isolated oneself from others. Finally, the Cognitive Reactions category indicates the participant's ability to think about and analyze stressful situations and use the most effective strategies (Gadzella, 1994). According to the study by Bell et al. (2012) on academicians, wellbeing did not decrease as the workload and pressure increased. A lot of studies have shown that some people achieve the best performance under pressure. These people see a stressful situation as an exciting experience (see Ferrari et al., 2009; Grunschel et al., 2013). However, an overwhelming amount of research provides evidence for a negative relationship between stress and wellbeing and for a positive relationship between wellbeing and resilience (Durand-Bush et al., 2015; Li and Hasson, 2020). Fletcher and Sarkar (2013) stated that psychological resilience is the most important and prominent resource in coping with stress.

Luthar (2015) explained psychological resilience based on two basic concepts: adversity and positive adaptation. According to Luthar and Cicchetti (2000), adversity includes negative life circumstances associated with adjustment difficulties (p. 858). Davis et al. (2009) stated that adversity consists of modest disruptions rather than major disasters faced by people in their daily lives. On the other hand, the positive adaptation has been defined as manifesting social competence behaviorally, or meeting stage-salient developmental tasks successfully (Luthar and Cicchetti, 2000, p. 858) or displaying symptoms related to internal wellbeing (Masten and Obradović, 2006, p. 15). Wagnild and Young (1993) defined resilience as a positive personality characteristic that increases emotional stamina, courage, and adaptability in the face of life difficulties. Resilience consists of five components: equanimity, perseverance, self-reliance, meaningfulness, and existential aloneness. Equanimity refers to having a balanced perspective on life, so that one faces stressful situations with calmness and not with heightened reactivity. Despite its adversity or discouragement, perseverance refers to a person's willingness to keep going and to strive to reconstruct one's life. Those who are self-reliant recognize and rely on their personal strengths, capabilities, and past successes. Existential loneliness is defined as the feeling of freedom and authenticity in which each person's life path is unique, some moments are shared with others, but at other times the person continues alone (Wagnild, 2009). Kobasa (1979) remarked that individuals with high psychological resilience see changes and stress in their lives as opportunities, and rely on themselves (belief in their values, goals, and capacities) instead of alienation from

themselves. Despite their difficulties, they are meaning-oriented rather than a nihilism, internal rather than external locus of control, they are aware of the limits of what they can control, and they adopt an active approach instead of a passive approach to solving the problem. Rutter (1985) stated that these people are securely attached to others and have personal or collective goals; see difficulties as a tool to become stronger; and have a success in their personal history, high self-efficacy, and a developed sense of humor. According to the study by Lyons (1991), people with high psychological resilience have high levels of patience, negative effect tolerance, and adaptability in the face of changes. These traits reflect important internal mechanisms to individuals that influence their resilience to stressors. Lots of studies have reported a moderately significant negative correlation between stress and resilience (Durand-Bush et al., 2015; Sanderson and Brewer, 2017; Cooper et al., 2020; Kim et al., 2021; Labrague, 2021). However, in some of these studies, although students reported a high level of stress, their levels of resilience and psychological wellbeing were found to be moderate to high (Durand-Bush et al., 2015; Labrague, 2021).

Troy and Mauss (2011) remarked that due to the presence of highly emotional stressful events, people's ability to regulate their emotions is determinative on their psychological resilience and wellbeing. Salovey et al. (1999) theorized that people with high emotional intelligence are able to perceive and appraise their emotions accurately, know how and when to express their emotions, and can better cope with the emotional demands of stressful encounters because they can regulate their moods effectively (p. 161). Emotional intelligence is structurally defined as two different models, ability and mixed (traits with abilities) (Mayer et al., 2000). Emotional intelligence, as a self-reported personality trait, indicates how emotionally competent one feels. However, emotional intelligence as the ability based on the maximum performance test indicates the cognitive-emotional ability of a person (Petrides, 2009). Petrides et al. (2007) contended that a person's unique emotional experience cannot be measured only through an objective maximum performance test and that self-report measurement tools are needed for assessing emotional intelligence as a personality trait. In the Trait Emotional Intelligence Questionnaire (TEIQue) developed by Petrides, emotional intelligence as a personality trait has 15 facets: adaptability/flexibility, assertiveness, recognizing one's own and others' emotions, expressing one's emotions, regulating their emotions, managing others' emotions (capacity to influence others' emotions), low impulsivity, capacity to maintain personal relationships, self-esteem, self-motivation, social awareness, trait empathy, trait happiness and optimism, and stress management. These facets are grouped into four factors: emotionality, sociability, wellbeing, and self-control. The emotionality factor includes trait empathy, emotion perception, emotion expression, and the maintenance of personal relationships. The sociability factor includes emotion management, assertiveness, and social awareness. In sociability, the focus is on the social context outside one's family or close friends. People with a high level of sociability are good listeners and confidently communicate with people from different backgrounds. The factor of wellbeing includes self-esteem, trait happiness, and optimism, and the factor of

self-control includes emotion regulation, stress management, low impulsivity, adaptability/flexibility, and self-motivation (Petrides and Furnham, 2001; Petrides, 2009). Lots of studies have shown that people with high emotional intelligence cope better with stress (Cejudo, 2016; Enns et al., 2018; Trigueros et al., 2020; Mérida-López and Extremera, 2021; Toriello et al., 2021). However, some studies have reported that some people with high levels of emotional perception and/or emotional sensitivity to angry expressions experience a high level of anxiety (Gutiérrez-García and Calvo, 2017; Schwab and Schienle, 2017; Cui et al., 2021). Also, Ciarrochi et al. (2002) reported that people with high emotional perception of their own emotions are more affected by stress and express higher levels of depression, hopelessness, and suicidal thoughts (p. 205).

The purpose of this study is to examine the stress profiles of university students in terms of psychological resilience and emotional intelligence (emotionality, sociability, wellbeing, and self-control), which are the variables related to wellbeing. Also, it was examined whether some counterintuitive findings referred earlier could be explained based on stress profiles. As far as we know, there are no other studies examining the stress of university students by person-centered analysis, except a recent stress profile analysis study on engineering students (Perkins et al., 2021). The profile analysis groups people based on the similarity of their response patterns, unlike a variable-centered approach that focuses on constructs. In this way, insights can be gained to understand people's attitudes, beliefs, and mindsets. Thus, stress profiles can help tailor interventions to reduce stress as well as to enhance an understanding of the complex mechanism of stress in higher education.

Our research questions (RQ) are: (RQ1) How many homogenous profiles would emerge according to Student-Life Stress Inventory-revised (SSI-R)? (RQ2) To what extent do these profiles differ across the nine categories? (frustrations, conflicts, pressures, changes, self-imposed, physiological reactions, emotional reactions, behavioral reactions, and cognitive reactions)? (RQ3) To what extent do these profiles differ across psychological resilience and emotional intelligence (emotionality, sociability, wellbeing, and self-control)?

MATERIALS AND METHODS

Participants and Data Collection Procedure

After excluding ten respondents with missing responses and three respondents based on extreme outlier patterns, the final sample of this study consisted of 418 participants. The participants' age was 18–36 years ($M = 21.21$, SD = 2.93). Of these participants, 272 (65%) were female and 140 (34%) were male. Six of the participants (1%) did not want to indicate their gender. The majority of participants were undergraduate students (359, 86%) from various faculties (dentistry, education, arts and sciences, engineering, theology, medicine, economics, administrative sciences, etc.), 59 participants (14%) are graduate students from various institutes (health science, social sciences, education sciences, and science and technology). In Turkey, the

length of medical school undergraduate program is 6 years, and the length of dentistry school undergraduate program is 5 years. Among the participants, 78 (19%) were 1st year, 91 (22%) 2nd year, 96 (23%) 3rd year, 59 (14%) 4th year, 22 (5%) 5th year, 13 (3%) and 6th year, 59 (14%) were students enrolled in master's and/or doctoral degree educational programs.

The data were collected in June and July 2021. Given the ongoing restrictions on in-person data gathering, the questionnaires were coded on the online survey platform Google Forms. The link to the survey was sent to academic advisors and/or student representatives in various faculties/institutes at eight universities in Turkey and asked to be shared on online platforms for classroom groups. In the first page of the online survey, it was stated that the data obtained would only be used for scientific articles and participation in the study was completely voluntary and the email address of the first author was provided for contact in case of doubts or need. Those who agreed to participate were asked to click the "I approve" check box in the form and were redirected to the online questionnaire. Anonymity was ensured, and any personal identification, such as IP address, and email IDs were not requested. All procedures followed were in accordance with the standards of the Helsinki Declaration. The research described in this article was approved by the Scientific Research and Publication Ethics Committee of Social and Human Sciences of Uşak University (ref no. 2021–122).

Measures
Student-Life Stress Inventory-Revised
Students' stress was measured using 53 items and two sections (stressors and reactions to stress), which have rated on a 5-point Likert-type scale (from 1 = "*never*" to 5 = "*most of the time*"). The stressors section consists of five categories such as frustrations, conflicts, pressures, changes, and self-imposed, and the reactions to the stressors section consist of four categories such as physiological reactions, emotional reactions, behavioral reactions, and cognitive reactions. The total score is obtained by summing the scores from the items in the two sections. High scores indicate a high level of stress. The scale was adapted into Turkish by Baloğlu and Bardakcı (2010). In this study, Cronbach's alpha was 0.94 for the total scale and the nine categories showed appropriate Cronbach's alphas ranging between 0.86 (conflicts and physiological reactions) and 0.61 (self-imposed).

In the seven previous studies using the Student-Life Stress Inventory, college students were asked to evaluate their own stress levels (mild, moderate, and severe), and the average scores of nine categories of the grouped students were calculated. The mean values of total stress score were in the range between 109.6 and 177.6 (see Gadzella, 2004; Baloğlu and Bardakcı, 2010; Gadzella et al., 2012).

Wagnild and Young's Resilience Scale-Short Version
The Resilience Scale of 25 items, which measures the capacity to bear life stressors that have rated on a 7-point Likert-type developed by Wagnild and Young (1993), was adapted into Turkish as 24 items by Terzi (2006). This scale consists of two factors: Self-Efficacy and Acceptance of Self and Life. Recently, Işık et al. (2019) revised it to obtain a short form of the

scale. The short form has 10 items that is rated on a 7-point Likert-type (from 1 = "*Absolutely Disagree*" to 7 = "*Absolutely Agree*") and has a single-factor structure and measures a similar psychological concept. The short version of RS has good validity and reliability (Işık et al., 2019). In this study, the Cronbach's alpha for the scale was 0.90.

Trait Emotional Intelligence Questionnaire—Short Form
According to Furnham and Petrides (2003), emotional intelligence is a personality trait related to how emotionally efficient an individual feels. The current full form of the scale, which was first developed in 2001, consists of 4 factors, 15 facets, and 153 items (Petrides, 2009). The short form includes 30 items in a 7-point Likert-type, which covers the trait EI factors: emotionality, self-control, sociability, and wellbeing (Petrides and Furnham, 2003). The Turkish version of the short form has a structure consisting of 20 items with 4 factors, which is responded to on a 7-point Likert scale (from 1 = "*Completely Disagree*" to 7 = "*Completely Agree*") (Deniz et al., 2013). The reliability of the total scale in the original study was "g"; alpha = 0.73 (Furnham and Petrides, 2003), in the Turkish adaptation study, Cronbach's alpha was 0.81 for the total scale and the four subscales showed appropriate Cronbach's alphas ranging between 0.72 (wellbeing) and 0.66 (emotionality) (Deniz et al., 2013). Similarly, in this study, Cronbach's alpha was 0.83 for the total scale and the four subscales showed appropriate Cronbach's alphas ranging from 0.67 (wellbeing) and 0.62 (emotionality).

In the three previous studies using TEIQue Short Form in university students, the mean values of global emotional intelligence score were in the range between 92.21 and 97.81. The mean values for wellbeing, self-control, emotionality, and sociability were 19.97–21.94, 17.49–21.01, 18.81–19.93, and 19.29–20.2, respectively (Özer and Deniz, 2014; Bağdiken, 2021; Yağcan et al., 2021).

Statistical Analyses
In the study, a latent profile analysis was conducted to reveal the latent profiles of participants according to their responses to SSI-R. Latent profile analysis is a statistical method used to reveal unobserved subgroups in a population through a set of continuous variables. Instead of *k*-means method of the nonhierarchical cluster analysis methods, a latent profile analysis, which is included in the finite mixture models, was preferred. Finite mixture models represent a mixture or composite of the overall distribution of one or more variables, a finite number of components' (components cannot be observed directly) distributions. Population heterogeneity in a set of observed variables is assumed to result from two or more homogeneous subgroups that are separated from each other (Masyn, 2013). Finite mixture models make clustering based on a probability-based model describing the distribution of the data, while a clustering analysis makes clustering based on an arbitrarily chosen distance measurement (Nylund et al., 2007). A probabilistic clustering approach assumes that each object/case belongs to a class or cluster but takes into account the uncertainty of the object/case's class membership. Although

this makes the latent class analysis conceptually similar to fuzzy clustering methods, whereas in the fuzzy clustering method the class membership of the object/case is the estimated "parameters," in the latent class analysis the probability of an individual's posterior class-membership probabilities are computed from the estimated model parameters and his/her observed scores. This calculation makes it possible to classify other objects/cases in the population from which the sample has been taken. This is not possible with standard fuzzy clustering techniques. Another advantage of model-based clustering is that it does not require making decisions about the scaling of the observed variables, for example, when working with a normal distribution of unknown variances, standardizing the variables will not affect the result. However, scaling is always an issue in nonhierarchical clustering methods. In addition to analyzing the variables measured at different scale types, model-based clustering has other advantages such as deciding on the number of clusters and other model features through more formal criteria (Vermunt and Magidson, 2002, pp. 89–91).

In this study, the latent profile analysis was performed by R (version 4.1.0, R Core Team, 2021) running in Rstudio (version 1.4.1106 used here). There are many R packages with latent class/mixture analytical functionality, but most of these packages focus on analyses with discrete indicator variables or require a lot of coding to define the needed models. Therefore, the more practical "mclust" (Scrucca et al., 2016) and "tidyLPA" (Rosenberg et al., 2018) packages were used. Deciding of how many classes best describe the patterns observed in the data in an latent profile analysis is similar to deciding on the number of factors to retain in an exploratory factor analysis. There is not a single fit index but a set of statistical fit indices. Information criteria, likelihood-based tests and entropy index are among these fit indices. Lower values of information criteria, such as Bayesian Information Criterion (BIC), Sample Size Adjusted Bayesian Information Criterion (SABIC), Akaike Information Criterion (AIC), Consistent Akaike Information Criterion (CAIC), and Integrated Completed Likelihood Criterion (ICL), indicate a better fit of the model. Likelihood-based tests, such as the BLRT, allow the use of the value of p to compare the models with k and k-1 classes. A non-significant value of p provides support for the k-1 class model vs. the k-class model. Thus, it is tested whether there is a statistically significant improvement in model fit by increasing the number of classes (Nylund et al., 2007). The entropy index is an indicator of how well individuals are classified in the model. Values more than 0.80 indicate "good" classification (Clark and Muthén, 2009). In all models, the cluster-specific mean of each k-class is estimated. Each class has its own pattern of mean scores on indicator variables to determine profiles. Model variants are distinguished from each other according to whether a covariance matrix of the indicator variables is allowed to vary within and between the classes (Celeux and Govaert, 1995; Scrucca et al., 2016). The "mclust" package was used to determine an optimal model variant. The best model variant was that the covariances within and between the classes in the model was 0, the variances of the indicator variable vary within the classes but equal between the classes. Because only a set of variances need to be estimated, this

model has been expressed as the most parsimonious model type (Wardenaar, 2021).

After determining the model, to test group differences, the one-way ANOVA was used to compare the differences in the stressors, reactions to stress, psychological resilience, and emotional intelligence between the identified stress profiles. *Post-hoc* tests were performed to identify which groups had statistically significant differences between them. The effect sizes were calculated using the eta-squared index (***n^2) to obtain the magnitude of the observed differences. The ***n^2 index was interpreted as follows: the values between 0.0099 and 0.0588 indicated a small effect size; the values between 0.0588 and 0.1379 a medium effect size; and the values more than 0.1379 a large effect size (Cohen, 1988, pp. 285–288).

RESULTS

Preliminary Analyses

Internal consistency of the scales, descriptive statistics and correlations between the Student-Life Stress Inventory and its nine categories, resilience, emotional intelligence, and its four factors are presented in **Table 1**.

Correlations between emotional intelligence and the stressors, reactions to stressors, and psychological resilience were statistically significant and moderate in most cases. Psychological resilience was moderately negatively correlated with total stress. While resilience and EI were negatively correlated with reactions to stressors (except cognitive reactions), they were moderately positively correlated with cognitive reactions. Whereas EI was highly negatively correlated with total stress, it was highly positively correlated with resilience. The mean values of trait emotional intelligence and its four factors in this study were slightly lower compared to previous studies (see Özer and Deniz, 2014; Bağdiken, 2021; Yağcan et al., 2021).

Stress Profiles

Model fit for solutions with 1–9 latent classes were examined (see **Table 2**). With an increase in the number of classes, the log likelihood and AIC values constantly decreased, and the BLRT indicated significant results in comparisons, which are all the models with k and k-1 classes. Thus, these values did not suggest any solution. In the 9-class model solution, the R program indicated that less than 1% (4 people) of the participants take part in one of the classes, and recommended that the other models were examined. It is seen that the SABIC value suggested to the 8-class solution, while the BIC, CAIC, and ICL values suggested to the 5-class model solution, and the entropy index was 0.95. Allocating each subject in a single class with sufficient certainty is necessary to obtain a useful classification. In this study, the average latent class-membership probabilities were in the range from 0.96 to 0.98 in the 5-class model solution. In the selection of the final model, in addition to these indicators, the principle of parsimony and the meaningfulness and usefulness of the model should also be considered (Masyn, 2013). Thus, it was concluded that the 5-class model was the model that best fits the data.

TABLE 1 | Descriptive statistics and correlations between the study variables.

	TS	F	CON	P	CHG	SI	PR	ER	BR	CR	R	EI	WB	SC	E	S
TS																
F	0.77*															
CON	0.63*	0.52*														
P	0.79*	0.63*	0.42*													
CHG	0.67*	0.58*	0.44*	0.58*												
SI	0.67*	0.47*	0.40*	0.57*	0.38*											
PR	0.85*	0.50*	0.41*	0.57*	0.46*	0.48*										
ER	0.82*	0.55*	0.47*	0.63*	0.49*	0.53*	0.65*									
BR	0.77*	0.55*	0.42*	0.52*	0.47*	0.43*	0.57*	0.65*								
CR	−0.18*	−0.13b	−0.09	−0.12b	−0.00	0.00	−0.07	−0.16b	−0.02							
R	−0.36*	−0.30*	−0.27*	−0.28*	−0.22*	−0.03	−0.27*	−0.32*	−0.24*	0.41*						
EI	−0.55*	−0.50*	−0.39*	−0.46*	−0.37*	−0.23*	−0.39*	−0.48*	−0.40*	0.37*	0.64*					
WB	−0.34*	−0.36*	−0.23*	−0.28*	−0.26*	−0.09	−0.20*	−0.29*	−0.27*	0.35*	0.69*	0.57*				
SC	−0.66*	−0.54*	−0.55*	−0.47*	−0.48*	−0.37*	−0.46*	−0.54*	−0.47*	0.33*	0.47*	0.61*	0.42*			
E	−0.33*	−0.31*	−0.27*	−0.20*	−0.26*	−0.20*	−0.24*	−0.21*	−0.25*	0.14b	0.21*	0.39*	0.22*	0.37*		
S	−0.32*	−0.27*	−0.23*	−0.27*	−0.12b	−0.08	−0.28*	−0.29*	−0.19*	0.26*	0.55*	0.56*	0.34*	0.40*	0.33*	
$\bar{x}$	151.42	20.77	12.46	13.00	8.44	20.25	33.69	13.88	19.84	8.91	51.51	88.91	19.04	16.41	17.57	18.62
sd	32.05	5.00	3.88	3.96	3.08	3.86	11.30	4.05	6.01	2.77	10.86	16.80	4.47	4.75	4.25	4.76
α	0.94	0.76	0.86	0.78	0.84	0.61	0.86	0.81	0.74	0.80	0.90	0.83	0.67	0.64	0.62	0.64

TS = total stress; F = frustrations; CON = conflicts; P = pressures; CHG = changes; SI = self-imposed; PR = physiological reactions; ER = emotional reactions; BR = behavioral reactions; CR = cognitive reactions; R = psychological resilience; EI = emotional intelligence; WB = well-being; SC = self-control; E = emotionality; S = sociability. *p < 0.001, bp < 0.01.

TABLE 2 | Latent profile analysis of stress: Statistical fit indices.

Model	BIC	CAIC	ICL	AIC	SABIC	LL	Entropi	p_{BLRT}
1	72334.96	72440.96	−72334.96	71907.20	71998.59	−35847.60	1.00	
2	68878.18	69038.18	−68897.39	68232.50	68370.46	−33956.25	0.94	0.01
3	68004.71	68218.71	−68029.44	67141.12	67325.63	−33356.56	0.95	0.01
4	67871.88	68139.88	−67900.14	66790.37	67021.44	−33127.19	0.95	0.01
5	67597.52	67919.52	−67627.90	66298.09	66575.72	−32827.05	0.95	0.01
6	67649.50	68025.50	−67681.99	66132.16	66456.35	−32690.08	0.95	0.01
7	67633.98	68063.98	−67671.69	65898.72	66269.47	−32519.36	0.95	0.01
8	67705.97	68189.97	−67744.34	65752.80	66170.11	−32392.40	0.95	0.01
9	67914.88	68452.88	−67950.49	65743.79	66207.65	−32333.89	0.96	0.01

AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; CAIC = Consistent Akaike Information Criterion; ICL = Integrated Classification Likelihood; LL = Log Likelihood; SABIC = Sample-Size Adjusted Bayesian Information Criterion; p_{BLRT} = p-value of the bootstrapped likelihood ratio test for k versus k-1 classes.

The total stress scores of the groups were in the range from 101.55 to 202.31. In the seven previous studies, the total stress score was in the range between 109.6 and 177.6 (see Gadzella, 2004; Baloğlu and Bardakcı, 2010; Gadzella et al., 2012). The group with the lowest average stress score was defined as an "extremely low stress group (ELSG)," and the group with the highest average stress score was defined as an "extremely high stress group (EHSG)." The group with a total stress score higher than ELSG and lower than Class 3 was defined as a "low stress group (LSG)." The group with a total stress score lower than EHSG and higher than Class 3 was defined as a "high stress group (HSG)." The group with a total stress score lower than HSG and higher than LSG was defined as a "medium stress group (MSG)." Extremely low stress group contained 60 (14%), LSG 131 (31%), MSG 134 (32%), HSG 38 (10%), and EHSG 55 (13%) individuals (see **Table 3**).

Extremely low stress group has scored lower levels of stressors, reactions to stressors (except cognitive reactions) compared to the other groups with large effect sizes. Similarly, LSG has scored lower levels of stressors, reactions to stressors (except cognitive reactions) compared to the groups with stress higher than itself. ELSG has scored higher levels of emotional intelligence, wellbeing, self-control, and emotionality compared to the other groups with large and medium effect sizes. LSG showed higher scores of emotional intelligence, wellbeing, self-control, and emotionality compared to the groups with stress higher than itself. ELSG and LSG have scored higher on the sociability factor than MSG, HSG, and EHSG. On the contrary, EHSG showed higher scores of stressors, reactions to stressors (except cognitive and physiological reactions) compared to other groups with large effect sizes. Nonetheless, EHSG has scored lower levels of emotional

TABLE 3 | The differences of five classes in terms of the study variables: Descriptive statistics, results of ANOVAs, and *post hoc* comparisons.

Variables	Class 1 (ELSG; n = 60)		Class 2 (LSG; n = 131)		Class 3 (MSG; n = 134)		Class 4 (HSG; n = 38)		Class 5 (EHSG; n = 55)		ANOVA (4, 413)		*Post hoc* comparisons
	$\bar{x}$	ss	$\bar{x}$	ss	$\bar{x}$	ss	$\bar{x}$	ss	$\bar{x}$	ss	F	η^2	
Total stress[a]	101.55	11.39	133.97	10.36	163.93	11.76	172.55	13.86	202.31	14.71	648.85*	0.91	5 > 4 > 3 > 2 > 1
Frustrations[a]	15.02	3.41	18.77	3.23	22.63	3.82	21.18	4.02	27.02	3.57	100.49*	0.46	5 > 3,4; 4 > 2; 3 > 2 > 1
Conflicts[a]	7.53	2.24	11.98	3.05	13.43	3.22	13.03	3.14	16.22	3.43	63.84*	0.34	5 > 3,4; 4 > 1; 3 > 2 > 1
Pressures[a]	7.92	2.34	11.10	2.68	15.01	2.55	13.11	2.30	18.09	2.02	162.57*	0.55	5 > 4,3; 3 > 4; 4 > 2; 3 > 2 > 1
Changes[a]	5.52	2.26	7.09	2.13	9.43	2.52	8.53	2.37	12.33	2.32	79.29*	0.40	5 > 3,4; 4 > 2; 3 > 2 > 1
Self-imposed[a]	16.60	3.89	18.70	3.19	21.63	2.80	21.32	3.37	23.78	3.09	52.07*	0.34	5 > 3, 4; 4 > 2; 3 > 2 > 1
Physiological reactions[b]	20.37	3.65	28.24	6.12	34.09	6.11	48.00	6.63	50.35	7.93	248.44*	0.75	5,4 > 3 > 2 > 1
Emotional reactions[a]	7.78	1.96	11.95	2.37	16.09	2.39	15.53	2.53	18.62	1.86	227.22*	0.62	5 > 3, 4; 4 > 2; 3 > 2 > 1
Behavioral reactions[b]	12.38	3.07	17.31	3.90	21.94	4.20	24.45	6.06	25.73	5.01	101.81*	0.48	5 > 3 > 2 > 1; 4 > 2 > 1
Cognitive reactions[b]	9.57	3.22	9.18	2.53	8.33	2.53	10.58	2.13	7.82	2.95	8.86*	0.05	1, 2 > 5; 4 > 2, 3, 5
Resilience[a]	58.40	8.51	53.98	9.19	48.84	10.32	50.32	10.65	45.51	12.87	16.10*	0.23	1, 2 > 3,5; 1 > 4
Emotional intelligence[a]	105.22	13.86	94.25	12.76	84.01	13.92	86.26	13.79	72.25	16.02	50.07*	0.43	1 > 2 > 3, 4 > 5
Well-being[a]	21.82	3.85	19.68	3.50	18.15	4.21	19.29	4.39	16.47	5.79	13.89*	0.16	1 > 2 > 3; 1 > 4; 2 > 5
Self-control[a]	21.15	3.38	18.31	3.72	14.83	3.90	15.66	3.50	11.09	3.69	67.70*	0.41	1 > 2 > 3; 2 > 4 > 5; 3 > 5
Emotionality[a]	19.88	3.86	17.72	3.95	17.42	4.10	17.11	4.18	15.42	4.58	8.80*	0.11	1 > 2, 3, 4; 2 > 5
Sociability[a]	21.03	4.77	19.78	4.10	17.63	4.91	17.13	4.58	16.65	4.29	11.58*	0.11	1 > 3, 4, 5; 2 > 3, 4, 5

$p < 0.001$. [a] Scheffe test for post hoc comparisons was used because the variable satisfied the assumption of homoscedasticity. [b] Tamhane's T2 test for post hoc comparisons was used because the variable violated the assumption of homoscedasticity.

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intelligence, and self-control compared to other groups with large effect sizes.

In terms of cognitive reactions, EHSG has scored lower than ELSG, LSG, and HSG. When it comes to MSG and HSG, they differed only with regard to pressures and physiological and cognitive reactions. Spectacularly, whereas MSG has felt more pressure than HSG, HSG has scored significantly higher physiological and cognitive reactions compared to MSG and LSG. In regard to psychological resilience, ELSG has scored higher than MSG, HSG, and EHSG but did not differ significantly from LSG. LSG has scored higher resilience than MSG and EHSG but did not differ significantly from HSG.

The trait emotional intelligence scores of ELSG (0.97 SD) and LSG were higher than the average, while the MSG, HSG, and EHSG (− 0.99 SD) were lower than the average. Similarly, the resilience scores of ELSG (0.63 SD) and LSG were higher than the average, while the MSG, HSG, and EHSG (− 0.55 SD) were lower than the average (see **Figure 1**).

DISCUSSION

As a result of the analysis for RQ1, we explored that five groups were differentiated from each other with a large effect size. Nearly half of the students (about 45%) are in ELSG and LSG. This finding may indicate a positive change in students' level of stress as it was obtained after the first wave of the COVID-19 pandemic (see Goppert and Pfost, 2021). Benham (2020) reported that, while there was no significant difference in the level of stress between Spring 2019 and Spring 2020, there was a significant decrease in the level of stress between Spring 2020 and Summer 2020 in a longitudinal study, which he examined the stress of

college students. The fact that students did not have to get up early to go to university for classes and could watch the recorded lectures whenever they want gave them more flexibility in planning their time. Flexibility in planning time and longer sleep durations (Benham, 2020) may have had a positive effect on students' stress.

As a result of the analysis for RQ2 and RQ3, ELSG, LSG, MSG, and EHSG differ significantly in terms of stressors and most of the reactions to stressors. MSG and HSG significantly differed only in regard to pressures and physiological and cognitive reactions. The level of physiological reactions was highly positively correlated with the stress. The frequencies of physiological reactions of HSG and of those of EHSG are similar. However, interestingly, cognitive reactions of HSG have a significantly higher frequency than those of the other groups except ELSG. Cognitive reactions involve the individual's evaluations about a situation in which one finds oneself. If there is a stressful situation, it helps a person to decide whether she/he has sufficient resources and effective strategies to cope with the situation (Lazarus and Folkman, 1984). Despite its high frequency of cognitive reactions, HSG has scored a high level of stress possibly because the students in this group see a high level of stress as an inevitable part of their lives, regardless of the resources they have or the effectiveness of their coping strategies. Also, HSG has scored a high level of physiological responses to stressors, similar to EHSG. There was a positive and significant relationship between the level of stress and physiological reactions. They seem to have compensated for a high level of stress that they have perceived through somatization (see Hu and Shao, 2016; Shangguan et al., 2021). Furthermore, standards that MSG, HSG and EHSG have imposed on themselves are higher than ELSG and LSG. As noted by
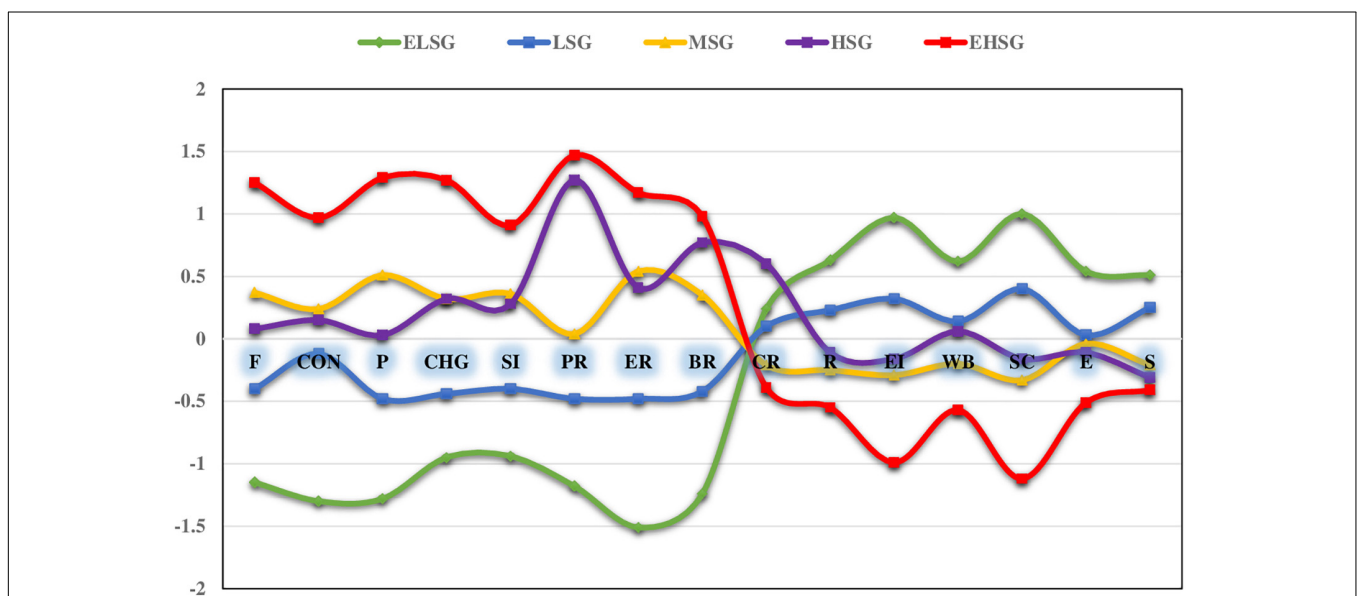

FIGURE 1 | Standardized means of study variables for stress profiles. F, frustrations; CON, conflicts; P, pressures; CHG, changes; SI, self-imposed; PR, physiological reac.; ER, emotional reac.; BR, behavioral reac.; CR, cognitive reac.; R, resilience; EI, emotional intelligence; WB, well-being; SC, self-control; E, emotionality; S, sociability.

Frost et al. (1990), striving to achieve high standards is not pathological in itself. Psychological problems are related to perfectionism, which employs overly critical self-evaluations (p. 450). It is possible that intense somatization experienced by HSG and EHSG is related to negative self-evaluations (Dunkley et al., 2006, p. 65). This relationship has been confirmed by some studies in the literature (Nussbaum and Goreczny, 1995; Hollifield et al., 1999).

In parallel with the previous studies, the relationship between emotional intelligence and stress was found to be negative (Enns et al., 2018; Trigueros et al., 2020; Mérida-López and Extremera, 2021), a significant negative relationship was also found between emotionality (emotion perception and expression) and stress (Ramesar et al., 2009; Salguero et al., 2011; Finlay-Jones et al., 2015). The fact that there were significant differences in emotionality factor in favor of ELSG compared to other groups and in favor of LSG compared to EHSG, which supports the argument that there is a relationship between the capacity to perceive and express one's own feelings and the level of stress. Also, it is seen that emotionality scores decreased as the level of stress increased in other groups, but there was no significant difference. Some studies reported that there is no significant relationship between emotionality/emotion perception and stress (Ciarrochi et al., 2002; Arora et al., 2011). However, in the study by Ciarrochi et al. (2002), although there was no direct relationship between emotion perception and stress, depression, suicidal thoughts, and hopelessness, a group with high emotion perception had significantly higher levels of depression, hopelessness, and suicidal thoughts rather than a low emotion perception group (Schwab and Schienle, 2017; see Gutiérrez-García and Calvo, 2017; Cui et al., 2021). They stated that emotion perception is a moderator variable between stress and mental disorders. This may be because some people with high emotion perception maladaptively focus on their negative emotions. However, because the emotionality factor used in this study includes the ability to express one's emotions as well as being aware of one's own emotions, it is possible to make it easier for the person to meet one's own needs and thus enable one to cope with stress effectively.

In the sociability factor, which includes managing the emotions of others, ELSG and LSG have significantly higher mean scores than the more stressed groups. In line with the findings of previous studies, sociability and the level of stress were negatively correlated (Penley and Tomaka, 2002; Ramesar et al., 2009; Arora et al., 2011). As the level of stress increased, sociability scores decreased, but there was no significant difference in other groups. People who activate the positive moods of others often access a more social support (Ciarrochi et al., 2002, p. 199). Social support plays a critical role in a person's resilience and wellbeing (Yıldırım and Tanrıverdi, 2021). Although sociability is a protective factor against stress, the inclusion of other factors in the formula for coping effectively with stress seems necessary to understand stress groups.

Emotional and behavioral reactions were highly positively correlated to the level of stress and moderately negatively correlated to self-control. The emotion regulation process enables a person to manage stress by regulating one's own emotional state, the importance of the event/situation one is facing, and the behavioral expression of emotion (sometimes by preventing reactions) (Eisenberg et al., 2007, p. 288). The level of stress trended to decrease as groups' level of self-control trended to increase (Finlay-Jones et al., 2015; Mc Gee et al., 2018; Siddiqui et al., 2021).

As the level of stress trended to increase, the level of wellbeing trended to decrease. However, there was no significant difference in the levels of wellbeing of MSG, HSG, and EHSG. The similarity between psychological resilience and emotional intelligence of HSG to MSG may prevent a significant negative effect of stress on the wellbeing and functionality of the HSG. As the frequency of exposure to stressors increased, the level of stress trended to increase. Exceptionally, more frequent pressures were reported in MSG than HSG. People in MSG may find the situations in which they are under pressure unpleasant and threatening compared to those in HSG. However, pressures such as "competition, meeting deadlines, trying to do too many things at once" may be acting to improve performance for HSG (see Ferrari et al., 2009; Bell et al., 2012; Grunschel et al., 2013).

A negative significant relationship was found between the level of stress and psychological resilience (Hou et al., 2017; Zhang et al., 2018; Shangguan et al., 2021; Traunmüller et al., 2021; Yalcin-Siedentopf et al., 2021). However, ELSG and LSG had higher psychological resilience than MSG and EHSG, whereas MSG, HSG, and EHSG did not differ significantly from each other. And, ELSG had higher psychological resilience than HSG, whereas ELSG and LSG did not differ significantly from each other. The resilience of HSG is similar to MSG, which may be due to the fact that the HSG, who experiences high levels of stress, struggles to become more resilient (see Nishi et al., 2010; Um et al., 2014). Fishman (2012) reported that the relationship between resilience and perceived stress of university students was found not to be statistically significant. Similarly, Bitsika et al. (2013) found no significant direct interaction between daily stress and resilience. The study was conducted on parents of a child with an Autism Spectrum Disorder. Parents with high daily stress had significantly higher anxiety and depression than parents with low daily stress. Parents whose resilience scores were low also showed significantly higher anxiety and depression than parents whose resilience scores were high. Resilience did appear to buffer against anxiety and depression, ensuring that parents could continue to meet their children's emotional and physical needs, no matter how stressed they were. Resilience seems to take on the function of preventing intense stress from turning into anxiety and depression in the long run. We can say that stress groups have the capacity to cope with stress in some ways, regardless of the level of stress they experience. Due to the cross-sectional nature of this study, possible divergences between the groups over time could not be observed. A longitudinal study may be useful to observe possible divergences.

The study is limited to university students in Turkey, which may affect the generalizability of this research. Because other factors such as some other personality traits and types (hedonist, spectator, sceptic, openness to experience, conscientiousness, neuroticism, agreeableness, etc.), symptoms

(depression, interpersonal sensitivity, etc.) were not taken into account, an understanding of memberships of stress groups remained limited. A lot of studies on stress and personality traits, other than resilience and trait EI, indicate significant correlations between them (see Tyssen et al., 2007; Afshar et al., 2015; Garbe et al., 2020; Liu et al., 2021). Furthermore, some longitudinal studies have reported counterintuitive findings on the relationship between them (see Yap et al., 2012; Anusic et al., 2014; Hahn et al., 2015; Mitchell et al., 2021). In future studies, stress groups can be investigated in regard to these factors. Because our search for stress groups was exploratory, it is necessary to examine its validity through confirmatory analyses in future studies. By conducting semi-structured interviews with people in different stress groups, a deeper understanding of their stress perceptions (e.g., state and trait), stress types, and reactions can be revealed.

CONCLUSION

We conclude that the COVID-19 pandemic might not have linked to greater perceived stress, and university students may have become resilient to the changes in their lifestyles due to the pandemic. Our results showed that (1) although some stress groups differed from each other with a large effect size in terms of stress, they did not show significant differences with regard to emotional intelligence and resilience (see MSG and HSG); (2) Despite experiencing high levels of stress, some students (see HSG) reported that they were able to effectively cope with stress. Although these students experience more stress than most of others, they reported that they experience low pressure such as "competition, meeting deadlines, trying to do too many things at once." This finding necessitates a study on how students perceive the type of stress they experience (threatening or challenging); (3) Students with a lower level of stress than the average reported higher levels of emotional intelligence (wellbeing, self-control,

and emotionality) and resilience than others. Students with the highest level of stress reported lower levels of emotional intelligence (specifically self-control) than others; (4) Emotional, physiological, and behavioral reactions were highly positively correlated to the level of stress and moderately negatively correlated to self-control; (5) Whereas resilience was highly positively related to wellbeing, resilience and wellbeing were moderately negatively related to stress. However, because MSG, HSG, and EHSG did not differ in regard to resilience and wellbeing, it is shown that they maintain their functionality by coping with stress in some ways, no matter how stressful they are. In future, a longitudinal study can reveal possible divergences that may occur in stress groups. The design of interventions for stress groups will be facilitated.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Scientific Research and Publication Ethics Committee of Social and Human Sciences of Usak University (ref no. 2021-122). All participants were informed about the procedure and provided their electronic consent.

AUTHOR CONTRIBUTIONS

All listed authors have made a substantial, a direct, and an intellectual contribution to this work, and approved it for publication.

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Socioemotional Resources and Mental Health in Moroccan Adolescents: A Person-Centered Approach

Manuel Pulido-Martos[1]*, Daniel Cortés-Denia[1], Karima El Ghoudani[2], Octavio Luque-Reca[3] and Esther Lopez-Zafra[1]

[1] *Department of Psychology, School of Humanities and Sciences of Education, University of Jaén, Jaén, Spain,* [2] *Higher School of Education and Training Berrechid, Hassan Premier University, Settat, Morocco,* [3] *Department of Psychology, School of Health Sciences, Rey Juan Carlos University, Alcorcón, Spain*

Mixture modeling technics are not the one and only to perform person-centered analyses, but they do offer the possibility of integrating latent profiles into models of some complexity that include antecedents and results. When analyzing the contribution of socioemotional resources to the preservation of mental health, it is the variable-centered approaches that are the most often performed, with few examples using a person-centered approach. Moreover, if the focus is on the Arab adolescent population, to our knowledge, there is an absence of such studies. This study aims to extend the research about socioemotional resources by examining: (1) if distinguishable profiles can be identified based on scores about perceptions of different emotional abilities and levels of social support from different sources (e.g., parents, friends, and teachers/counselors); (2) if the identified profiles relate to mental health indicators, such as depression levels and health-related quality of life (HRQoL); and (3) to acknowledge if sociodemographic variables such as age or gender and positive self-views (self-esteem) ascertain the probability of pertaining to the identified profiles. The study was carried out on a large sample of Moroccan adolescents ($N = 970$). We adopted a person-centered approach using latent profile analysis (LPA) to establish whether different socioemotional resources profiles (e.g., emotional intelligence and social support) are present in Moroccan adolescents. Furthermore, we investigated the role of sociodemographic variables and self-esteem as antecedents of these profiles and the association of these profiles with mental health (depression and HRQoL). Results from LPA revealed three patterns of socioemotional resources (i.e., latent profiles): (1) "High socioemotional resources" (43.09%); (2) "Moderate socioemotional resources" (42.68%); and (3) "Low socioemotional resources" (14.23%). Analyses showed that Moroccan adolescents differed significantly in depression (cognitive-affective and somatic dimensions) and HRQoL depending on the profile membership. Profiles with higher levels of resources contributed positively to preserving mental health. Finally, the results show that self-esteem boosted the probability of pertaining to the profiles related to better mental health. Thus, this study extends previous research about socioemotional resources,

highlighting that researchers and health professionals should consider empirically identified profiles of adolescents when explaining mental health outcomes. Therefore, the psychological intervention should be focused on enhancing the self-esteem of adolescents, to favor a high socioemotional resource profile, which results in better mental health.

INTRODUCTION

Socioemotional resources have numerous benefits for the mental health of adolescents. Two main resources for adolescents are emotional intelligence (EI), as an emotional resource, which has been proven to be related to better mental health in adolescence (Davis and Humphrey, 2012) and a better subjective well-being, with lower levels of stress (Cejudo et al., 2018), lower cyber victimization, and suicide risk (Extremera et al., 2018), and social support (SS) from parents, friends, and teachers, which is a social resource that contributes to better mental health with a reduction in the levels of depression (Pössel et al., 2018; Lopez-Zafra et al., 2019; Cortés-Denia et al., 2020). However, the contribution of these socioemotional resources has frequently been analyzed under a traditional variable-centered approach, allowing to analyze the effects produced by one variable on another, thus explaining the relationships between variables (Howard and Hoffman, 2018). Some research considering a person-centered approach, which assumes that there may be diverse unobserved subgroups within a population group and that some relationships among variables may vary across subgroups (Morin et al., 2018), have paid attention to adolescents, mainly regarding their mental health problems in relation to their academic success (Yu et al., 2018; Gonzálvez et al., 2021), their expectations about the university (Araújo et al., 2018), or their socioemotional problems (i.e., alcohol; Fonseca-Pedrero et al., 2020). However, only one study considers Arab adolescents from Saudi Arabia, but only regarding their sociodemographic characteristics as antecedents of academic profiles (Sideridis et al., 2021). Thus, given the necessity to identify protective/risk factors in adolescents (Oropesa et al., 2014), there is a need of deepening on variables that may act as antecedents of mental health, as socioemotional resources named EI and SS, in Arab adolescents, such as Moroccan adolescents, as there is no study addressing this issue. Furthermore, acknowledgment of adolescents' profiles regarding these variables could help academics and practitioners to establish intervention programs to improve the mental health of adolescents'.

Moroccan adolescence implies "approaching" to puberty, and it is defined by two main aspects, namely, its biological determinants (Ibn Manzoor, 2003) and some religious determinants (i.e., the date of first obligatory fast or approaching the date of marriage; Zarhbouch, 2021). Therefore, Tazi (2008) concluded that Moroccan adolescence is not determined only by the age or physical changes of the individuals, as in other countries, but in how they face these changes in which the family and social spheres provoke strong strains. Thus, Tazi

considers that the tense relations among the adolescents and the administration, the teachers, and their peers are crucial to understanding them. In fact, a recent study about Moroccan adolescents' mental health shows that female high school students suffer from higher psychological distress levels than their male counterparts. Moreover, parental alcohol use problems and/or physical/psychological abuse are predictors of Moroccan adolescents' mental health (Zouini et al., 2019). However, not all Moroccan adolescents respond to all these constraints in a similar way, and thus, different profiles may emerge in considering socioemotional resources. Therefore, this study is the first to analyze, from this LPA approach, whether different profiles of socioemotional resources produce different effects on the mental health of adolescents.

From a person-centered approach, EI has been considered as a global construct and has been used as a further indicator, which in combination with other variables, such as other types of intelligence (Ayoub and Aljughaiman, 2016), tourism sustainable hospitality (Carrieri and Fermani, 2018), or psychosocial stressors (Obeid et al., 2020), among others, gives rise to different individual profiles. However, considering EI dimensions against global EI is interesting from a health point of view (Siegling et al., 2013; Fernández-Abascal and Martín-Díaz, 2015; Baudry et al., 2018). This is due to the context's own resources conditioning the effect of the different EI facets on the results (Zeidner and Matthews, 2016; Lopez-Zafra et al., 2019) or that the different theoretical conceptions around the EI and the way to measure the construct make the sub-dimensions not being always the same, and therefore, the explanatory mechanisms involved also differ (Martins et al., 2010).

Most of the studies focusing on EI dimensions to identify profiles have mainly used the Trait Meta-Mood Scale (TMMS; Salovey et al., 2002) in education settings. This 24-item questionnaire identifies three interpersonal factors: emotional attention conveys the degree to which an individual tends to observe and think about their own feelings and moods; emotional clarity or an individual's tendency to discriminate their own emotions and moods; and emotional repair referring to an individual's tendency to regulate their own feelings. In studies with Chilean and Spanish adolescents, virtually identical profiles to the facets of EI have been found. Specifically, four profiles have been identified, namely, *low generalized EI*, *high generalized EI*, *high attention and low repair* (in some cases, this profile included low levels of clarity), and *low attention and high repair* (García-Fernández et al., 2015; Inglés et al., 2017; Díaz-Herrero et al., 2018). These profiles have been related to learning strategies, showing that students with high scores in all

three EI dimensions use more learning strategies than students with high attention and low repair or students with low scores in all three EI components (García-Fernández et al., 2015; Inglés et al., 2017). Moreover, in relation to school absenteeism, high attention and low repair and clarity profiles scored higher in three out of four factors that explained the motives for truancy (Díaz-Herrero et al., 2018). In addition to using TMMS's similar profiles, positive relationships have been found between a profile characterized by high levels of emotional clarity and repair and different indicators of psychological well-being in adults with spinal cord injury (Suriá Martínez, 2017). Furthermore, high levels of emotional attention and low emotional repair profile in teachers are positively related to experiencing burnout, stress, anxiety, and depression (Martínez-Monteagudo et al., 2019). Other profiles, with a higher number of indicators, have been found in nurses using the Emotional Quotient Inventory (EQ-i; Bar-On, 1997). Specifically, female nurses with high EI scores but median scores for the social skills aspect of EI showed the most favorable results related to burnout, whereas female nurses reporting a generally low profile reported the greatest symptoms of burnout (Gerits et al., 2005). Other studies addressing the relationship between EI profiles and health-related outcomes have found that high and low EI profiles have been identified in children and adolescents, as evaluated with the Emotional Intelligence Questionnaire in Physical Education (Cecchini Estrada et al., 2018), with those high in EI obtaining the best results (Méndez-Giménez et al., 2019).

With the exception of Méndez-Giménez et al.'s (2019) study, which analyzes EI profiles regarding adolescents' well-being, no other study focuses on this age group to differentiate EI profiles in health indicators. Moreover, previous studies have used cluster analyses, and thus, the use of more sophisticated techniques, such as latent profile analysis (LPA), with a number of statistical advantages (Spurk et al., 2020) may produce higher quality results. Furthermore, the joint use of EI and other context indicators, as SS, has been shown to be useful (Zeidner and Matthews, 2016; Lopez-Zafra et al., 2019) and may be analyzed by changing the focus from the variables to the intrapersonal resources (person-centered approach).

Regarding SS, studies focused on person approach profiles have found that SS levels may vary between individuals. In this venue, different subgroups may be distinguished according to their degree of perception of support (Mai et al., 2021). However, Ciarrochi et al. (2017) further considered the type of support perceived, such as family support, friends, and teachers. As there may be variations between the levels of support depending on the type of SS perceived, as well as different combinations between them, they considered six different profiles (i.e., high levels of perceived support from parents and teachers, but low levels of perceived support from friends, and vice versa), in which well-being, both physical and psychological, differed. In particular, those with low levels in the three SS sources were adolescents with the worst health, whereas those profiles showing the best SS (from either source) were the healthiest adolescents.

As mentioned, socioemotional resources have an adaptive role in general and in adolescent population. However, it is important to identify variables capable of influencing the level of socioemotional resources of the person. This study pays special attention to self-esteem, a variable included in the so-called self-views that refer to the overall assessment that the person makes about himself/herself (Swann et al., 2007) and which is essential for adaptation to various areas of life (Mruk, 2013). Self-esteem has shown to be positive and significantly related to both the global and the dimensions of EI (Ciarrochi et al., 2001; Rey et al., 2011; Lim et al., 2015). Similarly, in addition to relating to general SS (Kong et al., 2015), adolescents' self-esteem has been associated with several dimensions of SS. In particular, self-esteem correlates significantly with perceived SS from parents/family, friends, and teachers, yielding stronger relations with the former two types of support (Ikiz and Cakar, 2010; Veselska et al., 2010; Tian et al., 2013). To determine whether self-esteem acts as an antecedent or as a consequence of socioemotional resources, Orth et al. (2012) carried out a longitudinal study with participants aged between 16 and 97 years. They found that self-esteem had a significant impact on SS, well-being, and depression. However, these socioemotional results did not influence self-esteem on later evaluations. Moreover, adolescents' self-esteem has shown to be positive and significantly related to both the global and the EI dimensions (Ciarrochi et al., 2001). Several studies explore this relationship, but the results differ. There are studies in which self-esteem predicts EI (Lim et al., 2015), whereas other studies consider that it is an outcome of EI (Rey et al., 2011). However, due to the transversal nature of these studies, it can only be concluded that both variables are significantly related to each other, but the directionality of this relationship cannot be established. The scarce longitudinal evidence available corroborates that, albeit the mutual influence, the main impact, and of greater magnitude, is produced by self-esteem on the perceived effectiveness of the adolescent about his/her ability to manage and express affective states (Caprara et al., 2013). In sum, longitudinal studies suggest that self-esteem is an antecedent of socioemotional resources to a higher extent than a consequence (Orth et al., 2012; Caprara et al., 2013).

As an explanation, some studies suggest that low levels of self-esteem may predispose to avoiding or withdrawing from social situations and that this may end up preventing social reinforcement and, therefore, SS (Murray et al., 2000; Ottenbreit and Dobson, 2004). Furthermore, as EI develops with experience and practice in social interactions (Davies et al., 1998; Mayer et al., 1999), it might be that the lower interaction due to low self-esteem (Murray et al., 2000) also conditions lower EI levels, by exposing the individual to fewer interpersonal situations in which to practice different emotional abilities.

After reviewing how self-esteem can function as an antecedent of different socioemotional resources, and further considering that previous studies find differences in self-esteem levels among different profiles of patients with different psychiatric disorders (Silverstone and Salsali, 2003), this study raises the hypothesis that self-esteem might determine the probability of belonging to different profiles of adolescents (based on their emotional abilities and their perceived SS).

All in all, the objective of this study aims to extend the research about socioemotional resources in adolescents.

Specifically, we proposed to analyze: (1) whether distinguishable profiles can be identified based on scores about perceptions of different emotional abilities and levels of SS from different sources (e.g., parents, friends, and teachers/counselors); (2) if the identified profiles relate to mental health indicators, such as depression levels and health-related quality of life (HRQoL); and (3) to acknowledge if sociodemographic variables, such as age or gender, and positive self-views (self-esteem), ascertain the probability of pertaining to the identified profiles.

MATERIALS AND METHODS

Participants and Procedure

From the initial 1,277 Moroccan adolescents (age range from 13 to 18 years), 34 adolescents were discarded due to incomplete questionnaires. The final sample was composed of 970 adolescents with a mean age of 15.6 years (SD = 1.7); 56.7% were women. Students were enrolled in secondary school in first grade (17.4%), second grade (18.7%), third grade (23.0%), and fourth grade (20.8%); whereas 6.5% of students were enrolled in the first high-school course and 13.6% of students were enrolled in the second high-school course. The researchers obtained ethical permission from the Research and Ethics Committee at the Faculty of Letters and Human Sciences-Dhar el Mehraz of the University of Sidi Mohamed Ben Abdellah in Fez (Morocco). Then, the Regional Academy of Education and Training approved the questionnaire and the procedure to be administered at the public schools and gave written permission to access the public schools. At each school, an internal committee informed the families to obtain parental consent for all participants. All parents verbally consented to allow their children to participate, and schools reported the researchers with this information. In total, 26 schools from the region participated in the study. A group of 26 collaborators (24 women and 2 men) were distributed into two groups (14 and 12 participants, respectively) and received a 2-h seminar to be instructed about the scales, the meaning of items, and the procedure to administer the questionnaires. They were also instructed to follow the ethical procedure guidelines approved by the Ethics Committee and the Regional Academy of Education and Training. Then, the collaborators went to the schools in two sessions to have all the scales completed during school hours. Pupils answered the questionnaires individually in the classroom. The anonymity of the responses and voluntary participation were ensured.

Measures
Sociodemographics
Adolescents reported their sex, age, education level, and the school course they were attending.

Social Support
The Multidimensional Scale of Perceived Social Support Arabic Language—Moroccan Adolescents (MSPSS. AL-MA;

Ramaswamy et al., 2009; adaptation by Cortés-Denia et al., 2021) was used to measure the SS from parents, friends, and teachers/counselors. This adapted version was composed of 12 dichotomous items (answering Yes or No). In this study, McDonald's omega coefficients, for support from parents, friends, and teachers/counselors, were 0.63, 0.65, and 0.62, respectively.

Emotional Intelligence
Wang and Law Emotional Intelligence Scale: Arabic Language—Moroccan Adolescents (WLEIS. AL-MA). The original Wong and Law (2002) Scale was adapted by El Ghoudani et al. (2021) to measure the competencies related to self-emotional appraisal (SEA), others' emotional appraisal (OEA), use of emotions (UOEs), and regulation of emotions (ROEs). This adapted version was composed of 15 items, with a 4-point Likert response format (from 1 = totally disagree to 4 = totally agree). In this study, McDonald's omega coefficients were 0.64, 0.67, 0.69, and 0.72, respectively, for each competence.

Mental Health
The Beck Depression Inventory (BDI-II; developed by Beck et al., 1996) was adapted to the Arabic Language—Moroccan Adolescents (BDI-IA. AL-MA; Alaoui et al., 2021) to measure the depressive symptoms and their intensity. The adapted version was composed of 19 items, with a 4-point Likert response format (from 0 = normal to 3 = most severe), distributed in two dimensions, namely, cognitive-affective symptoms and somatic symptoms. In this study, McDonald's omega coefficients were 0.88 and 0.69, respectively.

Health-Related Quality of Life
The original version by Al-Musawi (2017) was adapted for the Quality of Life Test Arabic Language—Moroccan Adolescents (QALT. AL-MA; Pulido-Martos et al., 2021) to measure the degree of using the opportunities and resources of their environment, checking how they affect to their physical and psychological health. The adapted version was composed of 22 items, with a 5-point Likert response format (from 1 = never to 5 = always). McDonald's omega coefficient was 0.85 in this study.

Self-Esteem
The Rosenberg Self-Esteem Scale (Rosenberg, 1965) was adapted for the Arabic Language—Moroccan Adolescents (RSES. AL-MA; Luque-Reca et al., 2021) to measure the positive overall self-assessment based on self-worth and personal competence. The adapted version was composed of 10 items, with a 4-point Likert response format (from 1 = totally disagree to 4 = totally agree). McDonald's omega coefficient was 0.74 for this study.

RESULTS

Data Analysis
To identify profiles, the score factors of the different scales and sub-scales were used as indicators for the analysis. In doing this,

instead of using observed scale scores, a number of advantages are fulfilled (Morin et al., 2020). We used the automatic three-step procedure for LPA (Asparouhov and Muthén, 2014) in MPlus 8.6. This implies starting from a single profile as a contrast model and increasing the number of profiles to be extracted until an improvement in the fit of the model was achieved (Nylund et al., 2007). We used multiple starting values to help find the global solutions in order to avoid local solutions and to follow the most recent suggestions (Morin et al., 2020; Spurk et al., 2020). Specifically, the default settings in MPlus to START values = 100 20 were increased, or, when necessary, START = 500 200, using them jointly with OPTSEED to speed up analyses time (Asparouhov and Muthén, 2012). Regarding the determination of the model fit, we reported the following statistics: log likelihood, Akaike information criterion (AIC), consistent AIC (CAIC), Bayesian information criterion (BIC), sample size-adjusted BIC (SSA-BIC), Lo-Mendell-Rubin adjusted likelihood ratio test (LMRA), bootstrap likelihood ratio test (BLRT), and entropy. Lowest AIC, CAIC, BIC, and SSA-BIC values indicate a profile solution with a better fit for the $k + 1$ profiles option (Morin et al., 2020; Spurk et al., 2020). We also considered LMRA and BLRT regarding their level of statistical significance ($p < 0.05$). For entropy, values near 1.00 indicate a great precision when classifying subjects in the different profiles. For the determination of the final number of profiles, we also considered their theoretical significance, their sample size, their heuristic value, and their potential relationships with covariate variables (both results and background) (Morin et al., 2020). In the second step, the most likely class membership was obtained based on the posterior distribution from the first step (Wang and Hanges, 2011; Morin et al., 2016).

The last step separately examined outcomes and antecedents in relation to the profile (Lanza et al., 2013) using the BCH and R3STEP commands, respectively (Asparouhov and Muthén, 2014, 2021). Through the BCH analysis, it is possible to analyze differences among the profiles by comparing them in an outcome variable. The R3STEP utilizes multinomial logistic regression to evaluate the changes in the probability of pertaining to a profile over the other profile showing changes in the antecedent variables (to facilitate the interpretation, odds ratios are calculated) (Morin et al., 2016).

Descriptive Statistics

Table 1 presents means, SDs, and correlations between the study variables and the internal consistency indexes.

Differences Among Adolescents' Profiles

In **Table 2**, the indexes for the different profile models are displayed. Although the decrease in the indices does not reverse the trend, not making it possible to identify an ideal number of profiles, we considered a significant MRL statistic ($p < 0.05$) as a criterion in cases where there are no small-size profiles. Thus, and also given to the coincidence with other empirical proposals, we considered three profile solutions as the best.

In **Figure 1**, the profiles are represented according to the average scores for each profile indicator. The profile with the largest number of members (43.1%), named *high socioemotional resources*, gathers those adolescents with high levels of perceived emotional abilities (means are 0.18, 0.15, 0.27, and 0.40 for SEA, OEA, UOE, and ROE, respectively) and high levels of SS (for parents, friends, and teachers/counselors, means 0.13, −0.04, and 0.13, respectively). The profile with the second largest membership (42.7%) includes those adolescents with average levels in perceptions of emotional abilities (means for SEA, OEA, UOE, and ROE are −0.05, −0.06, −0.08, and −0.16, respectively) and average levels of SS from different sources (means for parents, friends, and teachers/counselors are −0.09, 0.01, and −0.03, respectively). This profile is named *moderate socioemotional resources* (43.1%). Finally, the profile with the smallest membership number (14.2%) is characterized by grouping adolescents with low levels in both indicators. In this case, means are −0.40, −0.28, −0.58, and −0.74 for SEA, OEA, UOE, and ROE, respectively, whereas means for SS are −0.56, −0.08, and −0.31 for parents, friends, and teachers/counselors' SS, respectively. This profile is named *low socioemotional resources*.

TABLE 1 | Means, SDs, and correlations between study variables and internal consistency indices.

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. SSP	1.78	0.27	(0.63)										
2. SSF	1.64	0.32	0.04	(0.65)									
3. SST/C	1.41	0.32	0.23**	0.01	(0.62)								
4. SEA	3.20	0.59	0.28**	0.06*	0.19**	(0.64)							
5. OEA	3.06	0.60	0.02	0.19**	0.10**	0.27**	(0.67)						
6. UOE	3.34	0.55	0.33**	−0.00	0.18**	0.45**	0.27**	(0.69)					
7. ROE	2.87	0.72	0.27**	−0.02	0.16**	0.43**	0.13**	0.38**	(0.72)				
8. Cognitive-affective symptoms	9.99	7.53	−0.41**	−0.01	−0.16**	−0.33**	−0.04	−0.31**	−0.31**	(0.88)			
9. Somatic symptoms	2.20	2.29	−0.27**	0.01	−0.16**	−0.23**	0.02	−0.20**	−0.18**	0.56**	(0.69)		
10. HRQoL	4.01	0.54	0.50**	0.22**	0.31**	0.44**	0.28**	0.54**	0.37**	−0.41**	−0.30**	(0.85)	
11. Self-esteem	3.22	0.45	0.35**	0.01	0.14**	0.44**	0.25**	0.59**	0.33**	−0.45**	−0.21**	0.48**	(0.74)

McDonald's coefficients are reported in brackets.
SSP, social support from parents; SSF, social support from friends; SST/C, social support from teachers/counselors; SEA, self-emotional appraisal; OEA, others' emotional appraisal; UOE, use of emotion; ROE, regulation of emotion; HRQoL, health-related quality of life.
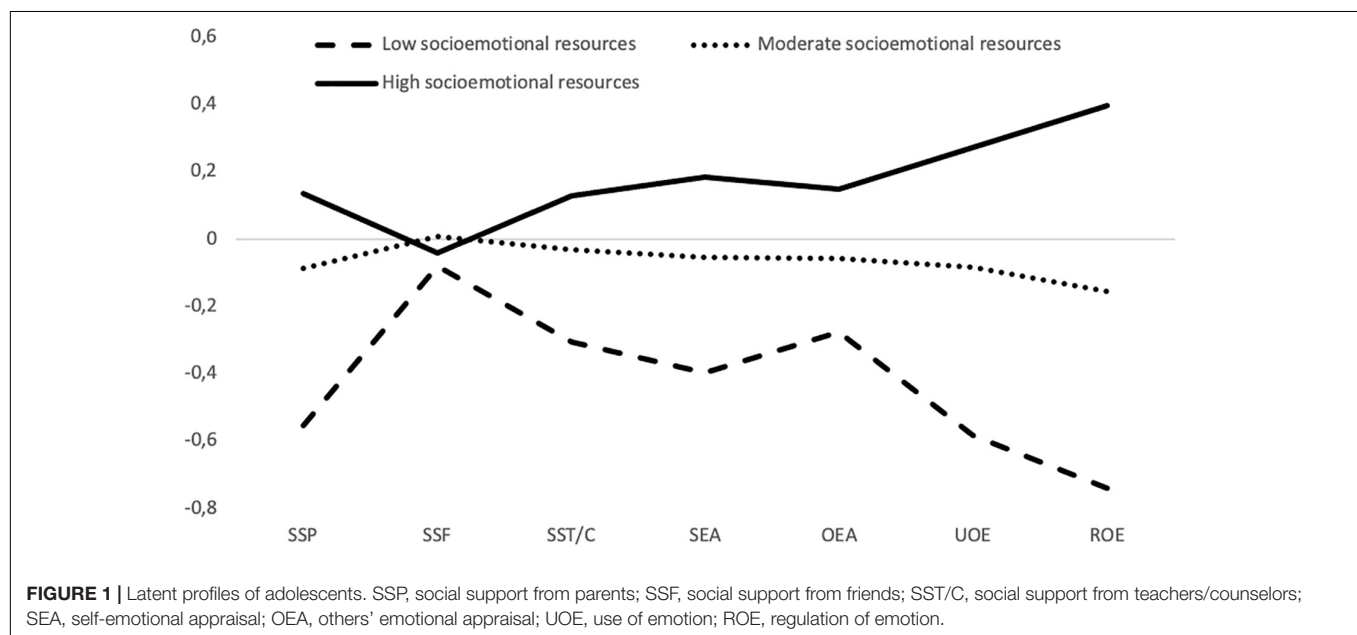**p < 0.05; **p < 0.01.*

TABLE 2 | Latent profiles analysis model fit summary.

Model	Log likelihood	FP	AIC	CAIC	BIC	SSA-BIC	Entropy	Smallest class (%)	LMRA *p*-value	BLRT *p*-value
1	−3,894.54	14	7,817.08	7,844.9	7,885.36	7,840.9	1	970 (100)	–	–
2	−3,174.34	22	6,392.68	6,436.47	6,499.98	6,430.11	0.87	263 (27.1)	<0.001	<0.001
3	−2,892.97	30	5,845.94	5,905.54	5,992.26	5,896.98	0.83	138 (14.2)	0.022	<0.001
4	−2,745.38	38	5,566.75	5,642.25	5,752.09	5,631.4	0.86	44 (4.5)	0.016	<0.001
5	−2,688.72	46	5,469.43	5,560.82	5,693.79	5,547.69	0.87	3 (0.3)	0.002	<0.001
6	−2,641.35	54	5,390.69	5,497.98	5,654.06	5,482.56	0.79	40 (4.1)	0.081	<0.001
7	−2,581.21	62	5,286.43	5,409.61	5,588.82	5,391.91	0.81	3 (0.3)	<0.01	<0.001
8	−2,536.67	70	5,213.34	5,352.42	5,554.75	5,332.43	0.81	3 (0.3)	<0.01	<0.001
9	−2,498.17	78	5,152.34	5,307.31	5,532.77	5,285.04	0.83	3 (0.3)	0.547	<0.001
10	−2,453.66	86	5,079.31	5,239.94	5,498.76	5,225.63	0.82	3 (0.3)	1.000	<0.001

N = 970.
FP, free parameters; AIC, Akaike's information criterion; CAIC, consistent AIC; BIC, Bayesian information criterion; SSA-BIC, sample-size adjusted BIC; LMRALRT,
Lo-Mendell-Ruben adjusted likelihood ratio test; BLRT, bootstrap likelihood ratio test.

FIGURE 1 | Latent profiles of adolescents. SSP, social support from parents; SSF, social support from friends; SST/C, social support from teachers/counselors; SEA, self-emotional appraisal; OEA, others' emotional appraisal; UOE, use of emotion; ROE, regulation of emotion.

Relation With Outcomes

To address the second objective, we analyzed whether the profiles differed in terms of a group of results related to mental health and well-being (i.e., symptoms of depression and HRQoL) (refer to the results shown in **Table 3**). Regarding the depression symptoms, all profiles differed significantly from each other, both in cognitive-affective symptoms and in somatic symptoms (all the comparisons significant at *p* < 0.05). Higher levels of cognitive-affective and somatic symptoms related to the *low socioemotional resources* profile, followed by mid-levels of depressive symptomatology for the *moderate socioemotional resources,* and, finally, the lowest depressive symptoms levels related to *high socioemotional resources.* Also, significant differences among profiles were found regarding HRQoL (refer to **Table 3**). The highest HRQoL levels correspond to the *high socioemotional resources* profile, whereas the lowest levels correspond to the *low socioemotional resources* profile. Adolescents who pertain to the *moderate socioemotional resources*

profile also showed significant differences in HRQoL compared with the *high* (in particular, they report higher HRQoL levels in the latter profile) and *low socioemotional resources* (with lower HRQoL levels) profiles.

Relation With Antecedents

Finally, we aimed to determine whether self-esteem levels, as well as gender and age covariates, contribute to identifying the adolescents' membership to a specific profile. Results are shown in **Table 4**. No results were statistically significant for the gender covariate. Regarding age, the higher the age, the greater the probability to pertain to the low socioemotional resources level (*Low*) vs. the high emotional resources profile (*High*). Specifically, increasing a year unit implies a 1.22 times increment of the probability to pertain to the *low socioemotional resources* profile vs. the *high socioemotional resources* (OR = 1.22; *p* < 0.05).

The differences in the probability of belonging to a certain profile are mostly related to positive self-views (self-esteem). We

TABLE 3 | Three-step results for distal outcomes (BCH).

Outcome	Low socioemotional resources (A)	Moderate socioemotional resources (B)	High socioemotional resources (C)	Chi-square (χ^2)
Cognitive-affective symptoms	0.346[BC]	0.031[AC]	−0.145[AB]	142.06***
Somatic symptoms	0.290[BC]	0.024[AC]	−0.118[AB]	91.91***
Health-related quality of life	−0.391[BC]	−0.030[AC]	0.158[AB]	260.23***

N = 970. The BCH procedure in MPlus uses the full information maximum likelihood estimation. The values per outcome are means. The Chi-squared value reflects the significance of the omnibus difference test. The pairwise comparisons are highlighted through the superscripts, indicating profiles that are significantly different at least at $p < 0.05$ within each row.
***$p < 0.001$.

TABLE 4 | Three-step results for antecedents (R3STEP).

Antecedent	Low vs. high socioemotional resources			Moderate vs. high socioemotional resources			Moderate vs. low socioemotional resources		
	Coef.	SE	OR	Coef.	SE	OR	Coef.	SE	OR
Self-esteem	−6.999***	0.554	0.001	−3.108***	0.381	0.045	3.891***	0.456	48.976
Gender	0.001	0.009	1.001	−0.016	0.012	0.984	−0.018	0.016	0.983
Age	0.198*	0.081	1.219	0.018	0.053	1.071	−0.129	0.076	0.879

Positive coefficient values indicate that higher values on the antecedent make a person more likely to be in the first latent profile of the two being compared; negative values indicate that higher values on the antecedent make a person more likely to be in the second latent profile of the two being compared.
Coef., the estimate (β) from the R3STEP multinomial logistic regression analysis; SE, standard error of the coefficient; OR, odds ratio.
*$p < 0.05$; ***$p < 0.001$.

found that the perception of higher self-esteem levels always facilitates belonging to a more favorable profile in terms of mental health and well-being. Thus, the increment in one unit in the perception of self-esteem levels increases a 0.1% probability of pertaining to the *high* vs. *low socioemotional resources* profile (OR = 0.00; $p < 0.001$) and a 4.5% probability of pertaining to the *high* vs. *moderate socioemotional resources* profile (OR = 0.05; $p < 0.001$). When comparing the probabilities of pertaining to the *moderate* vs. *low socioemotional resources* profile, we observed that an increment in one unit in self-esteem levels increases almost 50 times to pertain to the most favorable socioemotional resources profile (OR = 48.98; $p < 0.001$). In sum, results indicated that self-esteem increases the probability of pertaining to profiles showing a high mental health and HRQoL levels.

DISCUSSION

This study addresses different profiles of Moroccan adolescents considering EI and SS to test their impact on mental health and HRQoL as outcomes, as well as the effect that self-esteem, age, and gender have as antecedents of the profiles. To undertake these analyses, we considered a person-centered approach in which the focus is on the individuals instead of the variables.

Intrapersonal socioemotional resources as EI have proven to be related to health to a higher extent than interpersonal EI dimensions (Baudry et al., 2018). Moreover, within-person discrepancies in emotional abilities are not new (Gohm and Clore, 2000). Furthermore, SS and EI are protective factors for well-being, positively increasing life satisfaction and reducing depression (Lopez-Zafra et al., 2019). However, it remains to be tested whether these resources, both intrapersonal, as EI, and

interpersonal, as SS, could merge into different profiles impacting the final mental health and the HRQoL in adolescents. Finally, self-esteem as an antecedent and gender and age have been profoundly analyzed in adolescents, as they are key variables affecting their way of coping with this age stage constraints. Thus, this study tries to overcome these shortfalls by analyzing the antecedents and consequences of adolescents' profiles regarding socioemotional resources (intra- and interpersonal).

Our LPA results show that three profiles of Moroccan adolescents emerge by combining socioemotional resources (EI and SS) and distributing along the three levels: low, moderate, and high. Regarding EI, the profiles obtained are in line with previous studies (Méndez-Giménez et al., 2019). In fact, these profiles are the result of different levels of EI indicators (from low to high levels). These profiles are different from those obtained when using other instruments such as TMMS to assess EI. This instrument includes the measurement of emotional attention in which the highest scores are not always the most optimal from the point of view of EI (García-Fernández et al., 2015; Inglés et al., 2017; Suriá Martínez, 2017; Díaz-Herrero et al., 2018; Martínez-Monteagudo et al., 2019). Other instruments such as the EQ-i yield a greater number of indicators to create profiles and thus increase their complexity (Gerits et al., 2005).

As for SS, the variable that shows similar levels among the three socioemotional profiles and that seems to be less relevant when belonging to a profile or another is the perceived support from friends. In fact, in the case of SS from friends, the moderate socioemotional resources profile even scores slightly over the high socioemotional resources profile. This result does not occur in any other variable. Moreover, it does not necessarily mean that SS from friends is not relevant to health and well-being, but indicates that, for Moroccan adolescents, their parents'

support at this stage is more important than any other, further implying a cultural issue (CultureGrams, 2020; Blanc et al., 2021). This is contrary to previous studies with European adolescents, confirming that during most of the adolescence, the support received from friends is as comforting as that of parents (Helsen et al., 2000; Bokhorst et al., 2010). Thus, SS from peers is not so determinant for Moroccan adolescents to pertain to a specific profile, as it depends on other sources of SS more than the friends' support.

There is a dearth of LPA studies, and only two of them touch on similar variables. The one by Méndez-Giménez et al. (2019) obtains adolescents' profiles in which higher EI adolescents show the best results, whereas a higher degree of perception of support also yields better results in health dimensions in the study by Mai et al. (2021), indicating that these socioemotional resources should capture more attention. However, previous studies do not include possible antecedents and outcomes in the analysis, and further studies with adolescents and considering different countries' results are needed.

Regarding the relationship between the profiles and outcomes related to mental health and well-being (i.e., symptoms of depression and HRQoL), our study finds a covariation pertaining to a low, moderate, or high socioemotional profile and mental health and well-being levels. In particular, changing from a lower to a higher level of socioemotional resources guarantees higher mental health, with lower levels of depression, and higher well-being levels, given that belonging to one profile or another would be associated with different mental health and well-being conditions. These results corroborate the protective role of socioemotional resources on health and well-being (Davis and Humphrey, 2012; Cejudo et al., 2018). However, our results are in contrast to those from Baudry et al. (2018) who consider intrapersonal emotional abilities to be related to a higher extent to health levels than interpersonal abilities are. In our study, the within-person level covariation in the dimensions was similar.

Once Moroccan adolescents' profiles are clear, we could wonder whether they could be influenced by an antecedent. In this study, we found that self-esteem and age (as a covariate) have an important role in the emergent profile. In fact, self-esteem is found to be related to a high socioemotional level profile, indicating that those adolescents with the highest EI and SS who have a better self-esteem also have the best mental health and HRQoL results. Thus, self-esteem determines belonging to a specific profile boosting the profile with the best mental health (low depression and high HRQoL). In Arab adolescents, this result has been shown to be related to subjective quality of life (Al-Fayez et al., 2012). This is congruent with the longitudinal results by Orth et al. (2012).

In this study, we also considered age and gender as possible covariates. Our results are different from previous results in both variables. In particular, no differences between gender are found to pertaining to a socioemotional profile. However, previous studies consider that girls and women are often higher in EI (Joseph and Newman, 2010; Patel, 2017) and SS (Matud et al., 2003) than boys and men do. However, this could be explained by the cultural constraints in which women could be taught to suppress their emotions, being more similar to

boys (Meshkat and Nejati, 2017). Regarding age, it is interesting to see that the more they age, the higher is the probability to pertain to the low socioemotional resources profiles. This is also incongruent to studies showing that individuals increment their EI (Chen et al., 2016), but once again, this could be interpreted as a cultural result, in which social constraints may impede these adolescents to show their emotions. This trend is changing slowly with the new focus on emotions in Morocco, and maybe it could change over time (Khzami et al., 2020). Thus, it could be of interest for future studies to analyze whether the changes implemented in educational politics also influence these results. However, if we have a closer look at how age and self-esteem levels separately affect the probability of pertaining to a certain profile, we may think that the findings are not so consistent with studies that show positive relationships between age and self-esteem levels (Sánchez-Queija et al., 2017). Therefore, our data show that as the age increases, there is a higher probability to belong to a lower socioemotional resources profile, whereas increases in self-esteem enhance the probability of including in profiles of greater socioemotional resources. This would indicate a possible positive relationship between age and self-esteem levels. The explanation of this relationship would fall in a third variable. Specifically, the importance of variables such as peer social support or SS obtained from other sources could condition that the relationship does not occur in the expected way (Robins and Trzesniewski, 2005).

However, this study also has some limitations. The study design does not allow to determine the temporal sequence in the relations among variables, and thus, antecedents and outcomes considered should be taken with caution. Furthermore, the reliability indices of the MSPSS Scale were not very high, although acceptable. For further details on the psychometric properties of the instruments as well as the validation procedures for the Moroccan adolescent population, it is recommended to consult the publication resulting from the adaptation process, which follows the International Test Commission guidelines and psychometric procedure and indices (Zarhbouch and El Ghoudani, 2021). Moreover, albeit the sample size is enough from a statistical point of view, a larger sample is needed to test complex models including other possible moderator or mediator variables. Thus, for future analyses, it could also be of interest to include other variables proposed by the positive psychology approach in the study of adolescents and the youth to enrich the resources profiles.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Research and Ethics Committee at the Faculty of

Letters and Human Sciences-Dhar el Mehraz of the University of Sidi Mohamed Ben Abdellah in Fez (Morocco). Written informed consent from the participants' legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

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Validity of the Trait Emotional Intelligence Questionnaire (TEIQue) in a Brazilian Sample

Ana Carolina Zuanazzi[1†], Gregory J. Meyer[2†], Konstantinos V. Petrides[3*†] and Fabiano Koich Miguel[4†]

[1] Universidade São Francisco Programa de Pós-Graduação Stricto Sensu em Psicologia, São Paulo, Brazil, [2] Department of Psychology, University of Toledo, Toledo, OH, United States, [3] London Psychometric Laboratory, University College London, London, United Kingdom, [4] Department of Psychology, Universidade Federal de São Carlos, São Paulo, Brazil

The study of the relationship between reasoning and emotional processes is not new in Psychology. There are currently two main approaches to understanding the aspects related to these processes called emotional intelligence: the ability model and the trait model. This study focuses on the latter, analyzing the factor structure, reliability, and validity of the Trait Emotional Intelligence Questionnaire (TEIQue) in a Brazilian sample. 4314 adults with ages ranging from 18 to 60 years (M = 30.37; SD = 9.73) answered the TEIQue and other online instruments measuring emotional regulation, impulsiveness, alexithymia, loneliness, quality of life, positive and negative affect, personality traits, emotional perception, emotional understanding, and reasoning tests. The original four-factor structure of the TEIQue was replicated, Cronbach's alphas ranged from 0.60 to 0.89 for the facets, and from 0.76 to 0.90 for the factors and global score. The correlations followed theoretically expected directions, showing a stronger pattern for self-report measures than for performance tasks. Our results corroborated previous studies with the TEIQue, confirming the psychometric adequacy of the instrument in the Brazilian context. Future studies may focus on participants with lower levels of education and additional external criteria, such as career preferences, job performance, and health.

Keywords: emotional intelligence, psychometric properties, internal consistency, external validity, self-report measure

INTRODUCTION

The study of the relationship between reasoning and emotional processes is not new in Psychology. In the early 20th century, Thorndike (1920) proposed the concept of social intelligence as the ability to correctly understand and interact with other people. Since then, multiple theories and models regarding cognition were developed to better understand this relationship, such as Gardner's (1983) multiple intelligences model that included interpersonal (self) and intrapersonal (others) intelligence. Basically, these theories proposed the ability to understand one's and other's moods, intentions, and motivations and to behave properly in interpersonal relations (for a review, see Salovey and Mayer, 1990). Despite the importance of these theories, the lack of adequate instruments to operationalize them contributed to their abandonment.

In addition, a clearer and more objective conceptualization of a construct that integrated reasoning and emotions was required since the early ones were too broad. In the early 1990's,

Salovey and Mayer (1990) proposed a four-factor emotional intelligence model that defined the construct as the ability to perceive, monitor, and discriminate one's own and others' feelings and emotions, and to use this emotional information to guide one's thinking and actions. The authors subsequently developed performance-based measures to assess these abilities (Mayer et al., 2016) which showed expected associations with reasoning tests as small-to-medium correlations and near-zero correlations with self-reported personality traits (e.g., Olderbak et al., 2018). As a cognitive ability, the construct is currently being studied as a factor in the 2nd stratum of intelligence in the Cattel-Horn-Carrol (CHC) theory perspective (e.g., Schneider and McGrew, 2018).

In parallel, other emotional intelligence models were proposed with different factor structures (e.g., Bar-On, 2005; Petrides, 2010). These models focus on one's perception of their own behaviors or abilities rather than their knowledge about emotional intelligence strategies. Although many of those models are in continuous study, the trait emotional intelligence model (trait EI or trait emotional self-efficacy), developed by Petrides et al. (2016), is arguably the most widely researched (see Pérez-González et al., 2020). Trait EI comprises the affective aspects of personality and is defined as a constellation of emotional perceptions assessed through questionnaires and rating scales (Petrides et al., 2007).

Trait EI has been studied in multiple contexts, including educational, clinical, and organizational settings. In educational contexts, trait EI is positively associated with measures of creativity and negatively related to class absence or violations of school rules. Trait EI is a positive predictor of well-being and mental health and a negative predictor of psychopathology in adults and self-harm in adolescents. In general, it is negatively associated with stress, anxiety, and depression in adults. Finally, it is positively related to job performance, work-related well-being, and job satisfaction in the workplace. It is also negatively associated with job stress and burnout (for a review, see Petrides et al., 2016).

Despite criticism about trait EI having high associations with other personality traits, resulting in construct redundancy (Schulte et al., 2004), a meta-analysis demonstrated the incremental validity of this model measured by two self-report forms, the Trait Emotional Intelligence Questionnaire (TEIQue) and the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF; Andrei et al., 2016). Additionally, other studies showed that trait EI is a distinct and powerful explanatory construct (e.g., Van der Linden et al., 2017).

The TEIQue and TEIQue-SF are part of a set of measures based on the trait EI model that include questionnaires for children, adolescents, and adults (Petrides, 2009). The TEIQue has been adapted to other languages and studied regarding its validity, showing similar results to the original version. International studies include German-speaking Austria (Freudenthaler et al., 2008), Chinese-speaking Hong Kong, English-speaking Hong Kong, and English-speaking UK (Gökçen et al., 2014), Catalan (Aluja et al., 2016), Italian (Chirumbolo et al., 2019), Turkish (Ulutas, 2019), Lebanese (Sanchez-Ruiz et al., 2021), among others. To date, only the short form

of the questionnaire is available in Brazil has been studied (Perazzo et al., 2021). The goal of the present research was to study the Brazilian-Portuguese TEIQue version in a large Brazilian sample, analyzing its factor structure, reliability, and validity by correlating it with other related measures. Considering previous findings, we expected the TEIQue to display moderate to high correlations with self-report measures of personality traits, especially those related to emotional experience, and low correlations with performance measures of emotional intelligence and intelligence.

MATERIALS AND METHODS

Participants

Participants were 4,314 Brazilian individuals, with ages ranging from 18 to 60 years ($M = 30.37$; $SD = 9.73$), 54.6% women. Regarding education, 5.2% had attended up to middle school, 39.5% had attended up to high school, 41.9% had attended up to college, and 13.5% had attended graduate school.

Measures

Trait Emotional Intelligence Questionnaire

The TEIQue comprises 153 items rated on a 7-point Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"). It yields scores on 15 facets, 4 factors, and global trait EI. The Well-being factor includes the facets of Self-esteem (indicating self-confidence), Trait happiness (satisfaction with life), and Trait optimism (hopefulness). The Sociability factor includes the facets of Social awareness (social skills), Emotion management (influencing other people's feelings), and Assertiveness (standing up for one's rights). The Emotionality factor includes the facets of Emotion perception (including self and others), Emotion expression (communication of feelings), Relationships (interpersonal skills), and Trait empathy (taking other people's perspective). Finally, the Self-control factor includes the facets of Emotion regulation (emotional control), Stress management (stress control), and Impulse control (low impulsiveness). In addition, two of the 15 facets are not included in a factor: Adaptability (flexibility and adaptation to new situations) and Self-motivation (will to persist).

Difficulties in Emotion Regulation Scales (DERS-16)

The DERS is a self-report inventory that assesses challenges in the ability to regulate one's emotions, such as non-acceptance of emotional responses, difficulties engaging in goal-oriented behaviors, difficulties controlling impulses, lack of regulation strategies, and low emotional clarity. The scale was adapted and validated in Brazil (Miguel et al., 2017), with empirical evidence supporting both the 36- and 16-item versions. On our sample, Cronbach's alpha for the 16-item DERS global score was 0.92.

Barratt Impulsiveness Scale

The BIS is a 30-item self-report inventory that assesses aspects of impulsiveness, such as non-inhibition of unsuited behavior, imprudent decision taking, and lack of planning. The scale was

adapted and validated in Brazil (Malloy-Diniz et al., 2010). On our sample, Cronbach's alpha for the BIS global score was 0.82.

Toronto Alexithymia Scale (TAS-20)

The TAS-20 is a 20-item self-report inventory that assesses alexithymia, i.e., difficulties in understanding one's own feelings and using symbolic thinking. The scale was adapted and validated in Brazil (Colombarolli et al., 2019). On our sample, Cronbach's alpha for the TAS global score was 0.84.

The Revised UCLA Loneliness Scale

The UCLALS-BR is a 20-item self-report inventory that assesses the experience of negative emotions due to loneliness and social isolation. The scale was adapted and validated in Brazil (Barroso et al., 2016). On our sample, Cronbach's alpha for the UCLALS-BR global score was 0.94.

World Health Organization Quality of Life

The WHOQOL is a 26-item self-report inventory developed by the World Health Organization to assess quality of life in several contexts. The brief version was adapted and validated in Brazil (Fleck et al., 2000). For the purposes of the present research, the Psychological and Social life quality scales were used. On our sample, Cronbach's alpha for the two scales were 0.82 (Psychological) and 0.70 (Social).

Positive and Negative Affect Schedule

The PANAS is an inventory that lists 10 positive and 10 negative emotional states. Participants rate how frequently they felt each emotion recently on a 5-point Likert scale. The scale was adapted and validated in Brazil (Zanon et al., 2013). On our sample, Cronbach's alpha for positive affect was 0.76, and 0.85 for negative affect.

Clinical Dimensional Personality Inventory Version 2

The IDCP-2 is a self-report inventory that assesses pathological personality traits according to Millon's personality theory and DSM-IV-TR's axis II (Carvalho and Primi, 2015). For the present research, only two factors that are specific to emotional experience were used: Mood Instability (frequent changes in mood), and Criticism Avoidance (withdrawal from social contact because of fear of negative emotions). On our sample, Cronbach's alpha was 0.88 for Mood Instability and 0.89 for Criticism Avoidance.

Computerized Test of Primary Emotions Perception

The PEP is a performance measure of emotional perception that displays 38 brief videos of people expressing emotions (with the first three videos used as examples of the task). Participants watch each video and choose which emotions they believe are present, from a list of eight: joy, love, fear, surprise, sadness, disgust, anger, and curiosity. The PEP was developed in Brazil and showed adequate validity (Miguel and Primi, 2014). The test is scored using the Rasch model, and the reliability on our sample was 0.61.

Emotional Understanding (CE, Conhecimento Emocional, in Portuguese)

The CE is a 30-item performance measure of the ability to recognize how emotions arise, blend and change over time. It displays short stories of characters in different situations, and participants must choose the alternative that correctly displays the sequence of experienced emotions (Peixoto et al., 2019). On our sample, Cronbach's alpha for this measure was 0.68.

Battery of Reasoning Tests (BPR-5)

The BPR-5 is a set of five intelligence tasks. For the present research, we used two tests: abstract reasoning (AR), which assesses fluid intelligence, and verbal reasoning (VR), which assesses both fluid intelligence and vocabulary (Primi and Almeida, 2000). On our sample, Cronbach's alpha for AR was 0.78 and for VR it was 0.68.

Procedures

The English version of the TEIQue was translated by two researchers with previous experience in test development and adaptation. The researchers reviewed their translations, resolving discrepancies, until a final Brazilian-Portuguese version of the TEIQue was obtained.

All tests were adapted for online use (except for PEP, which was originally designed to be administered online) and uploaded to a specific domain for the research. The research was approved by the State University of Londrina's Ethical Committee (approval number 64469717.6.0000.5231), and participation in research followed the committee, the International Test Commission and Helsinki Declaration guidelines. Participants were invited from a popular social media platform (Facebook) and were shown the Consent Form. If they agreed to participate, they created a unique user account, to avoid duplicate responses. Due to the high number of instruments, administrations followed an alternating method. The TEIQue was always presented first; the order of the other assessments was changed periodically, while still being able to answer all tests, if they wanted. Because of this, not all participants completed all assessments. In fact, only 9% of participants answered more than two assessments in addition to the TEIQue. This design was preferred in order to reduce fatigue effects. The number of participants that answered each assessment individually is displayed in **Table 4**. In accordance with the Ethical Committee's guidelines, no incentives were offered to the participants, and all had the option of opting out of participation.

Data Analyses

Exploratory factor analysis was conducted using the TEIQue facets in a principal component factoring with Oblimin rotation. We retained factors based on parallel analysis, considering

TABLE 1 | Parallel analysis results.

Component	Eigenvalue	Cumulative variance explained	Parallel analysis
1	6.43	42.87%	1.10
2	1.69	54.13%	1.08
3	1.17	61.96%	1.06
4	1.06	68.99%	1.05
5	0.84	74.58%	1.04

TABLE 2 | Factor pattern matrix for the TEIQue facets.

	Well-being	Sociability	Emotionality	Self-control
Happiness	**0.90**	−0.11	−0.06	0.03
Optimism	**0.85**	−0.07	−0.06	0.07
Self-motivation	0.68	0.13	−0.01	0.11
Self-esteem	**0.64**	0.31	0.06	0.14
Emotion management	−0.20	**0.85**	−0.15	0.12
Assertiveness	0.26	**0.78**	0.21	−0.04
Social awareness	0.18	**0.64**	−0.22	0.15
Empathy	−0.09	−0.05	**−0.84**	0.13
Emotion expression	0.26	0.28	**−0.60**	−0.24
Relationships	0.33	−0.18	**−0.55**	0.23
Emotion perception	0.13	0.36	**−0.52**	0.06
Emotion regulation	−0.01	0.15	0.13	**0.88**
Stress management	0.04	−0.07	−0.05	**0.85**
Impulse control	0.08	−0.06	−0.03	**0.68**
Adaptability	0.06	0.10	−0.14	0.52

Keyed factor loadings (see Petrides, 2009) are presented in bold.

15 variables, 4,314 participants, and 100 randomly generated correlation matrices. Despite the fact that this factor structure has already been established in other studies, we chose exploratory over confirmatory factor analysis for the sake of consistency and replication since the former approach has been used in most international studies with the TEIQue. In addition, exploratory factor analysis allowed us to verify any configuration different than the other international studies.

Reliability for facets, factors, and the total score were estimated through Cronbach's alpha. To investigate the relationship of the TEIQue with other measures, Pearson correlations were calculated. Correlation coefficients were interpreted as low around 0.10, moderate around 0.30, and strong around 0.50 (Cohen, 1992).

RESULTS

The exploratory factor analysis showed a KMO index of 0.89, indicating data adequacy. **Table 1** shows the eigenvalues from the factor analysis along with those from the parallel analysis (only the first five components are displayed).

Four factors were obtained, replicating the original four-factor structure. In addition, Self-motivation and Adaptability, two facets that traditionally are not included in the factors, presented considerable loadings on Well-being and Self-control, respectively. Factor loadings are presented in **Table 2**.

Descriptive statistics for the TEIQue scores are displayed in **Table 3**, including reliability information, and means and standard deviations broken down by sex. Cronbach's alphas for the facets ranged from 0.60 to 0.89, while alphas for the factors and global score ranged from 0.76 to 0.90. The means of facets and factors tended to be around 4.50 with standard deviation around 1.00. Sex differences were mostly small (with Cohen's ds below 0.19), except for the facets of Emotion regulation and Stress management, and the factor of Self-control, where men scored moderately higher ($d = 0.49, 0.49, 0.43$, respectively).

TABLE 3 | Descriptive statistics (means and standard deviations) for the TEIQue variables.

	Cronbach's alpha	Global sample	Skewness (SE)	Kurtosis (SE)	Women's mean and SD (n = 2353)	Men's mean and SD (n = 1890)
Facets						
Adaptability	0.65	4.18 (0.90)	−0.14 (0.04)	−0.04 (0.07)	4.12 (0.92)	4.25 (0.89)
Assertiveness	0.64	4.53 (0.94)	−0.13 (0.04)	−0.09 (0.07)	4.48 (0.97)	4.60 (0.92)
Emotional expression	0.85	4.11 (1.36)	0.06 (0.04)	−0.67 (0.07)	4.20 (1.38)	3.98 (1.34)
Emotional management	0.75	4.62 (1.07)	−0.14 (0.04)	−0.38 (0.07)	4.53 (1.07)	4.73 (1.07)
Emotional perception	0.77	4.55 (1.08)	−0.3 (0.04)	−0.39 (0.07)	4.57 (1.09)	4.53 (1.08)
Emotional regulation	0.80	4.17 (1.03)	−0.07 (0.04)	−0.18 (0.07)	3.95 (1.01)	4.45 (1.00)
Impulse control	0.76	4.18 (1.14)	−0.05 (0.04)	−0.43 (0.07)	4.13 (1.15)	4.25 (1.11)
Relationships	0.60	4.81 (0.96)	−0.32 (0.04)	−0.16 (0.07)	4.85 (0.98)	4.76 (0.92)
Self-esteem	0.80	4.60 (1.07)	−0.47 (0.04)	−0.3 (0.07)	4.54 (1.07)	4.68 (1.06)
Self-motivation	0.76	4.62 (1.04)	−0.22 (0.04)	−0.31 (0.07)	4.65 (1.06)	4.59 (1.02)
Social awareness	0.82	4.59 (1.10)	−0.19 (0.04)	−0.27 (0.07)	4.54 (1.09)	4.66 (1.10)
Stress management	0.83	4.04 (1.21)	−0.10 (0.04)	−0.59 (0.07)	3.79 (1.21)	4.36 (1.14)
Trait empathy	0.74	4.97 (1.02)	−0.53 (0.04)	0.38 (0.07)	5.05 (0.99)	4.87 (1.05)
Trait happiness	0.89	4.92 (1.42)	−0.56 (0.04)	−0.39 (0.07)	4.95 (1.43)	4.88 (1.40)
Trait optimism	0.83	4.82 (1.24)	−0.46 (0.04)	−0.34 (0.07)	4.86 (1.26)	4.78 (1.23)
Factors						
Well-being	0.86	4.78 (1.10)	−0.54 (0.04)	−0.22 (0.07)	4.78 (1.12)	4.78 (1.09)
Self-control	0.79	4.13 (0.95)	−0.03 (0.04)	−0.26 (0.07)	3.96 (0.95)	4.35 (0.91)
Emotionality	0.76	4.61 (0.85)	−0.04 (0.04)	−0.17 (0.07)	4.67 (0.85)	4.54 (0.85)
Sociability	0.80	4.58 (0.88)	−0.13 (0.04)	−0.14 (0.07)	4.52 (0.88)	4.66 (0.88)
Global trait EI	0.90	4.51 (0.72)	−0.08 (0.04)	−0.17 (0.07)	4.48 (0.74)	4.56 (0.70)

The TEIQue's four factors and global score were correlated with the other instruments. In addition, as theoretically expected (Petrides, 2009), the TEIQue factor scores were strongly intercorrelated. Results are presented in **Table 4**. Correlations with self-report measures were all significant, displaying moderate-to-strong effect sizes. In contrast, correlations with the performance tasks tended to be low and mostly non-significant, although the comparatively lower reliabilities for the latter set of measures ought to be taken into account in the evaluation of these results.

DISCUSSION

The goal of this research was to investigate the psychometric properties and validity of the Brazilian adaptation of TEIQue. The factor structure and reliability indices we found were similar to those reported in other international studies (Freudenthaler et al., 2008; Gökçen et al., 2014; Aluja et al., 2016). Alpha indices tended to be lower at the facet than the factor level, suggesting a more robust assessment using the TEIQue factors of the full form. In addition, the Brazilian means for the facet, factor and global score tended to be similar to those from other countries, indicating a similar distribution of the trait level across Western cultures. Similar results for the short form of Brazilian Portuguese TEIQue was found for the factor and global score (Perazzo et al., 2021). In the same line from those international studies, we found gender differences for some factors, suggesting distributions of emotional regulation, stress management and self-control that are different between men and women.

We studied TEIQue's factor structure using exploratory factory analysis, which showed a structure that is similar to that found in other international studies. While a confirmatory factory analysis could have been conducted, given that the factor structure was previously established, we decided to use the exploratory method for the sake of replicability. Furthermore, although the analysis supported the general structure, a surprising result was also found, which perhaps could not have been found with confirmatory analysis. The facets of Self-motivation and Adaptability loaded on the factors of Well-being and Self-control, respectively. Similar results were reported by Aluja et al. (2016); Catalan adaptation and by Freudenthaler et al. (2008); German adaptation. However, in their samples, those facets also showed moderate loadings on other factors, while in our sample the cross-loadings were low. In fact, Self-motivation even showed a slightly higher loading on the Well-being factor than Self-esteem, suggesting that persistence and determination could also be considered specific aspects of Well-being. Likewise, flexibility to new situations could be considered a specific aspect of emotional control. This result is corroborated by other studies that have shown dispositional optimism and motivation are related to well-being (Hanssen et al., 2015), and that the ability to select from several coping strategies (flexibility) is an important aspect of emotional regulation (Aldao et al., 2015). Nevertheless, following the standard TEIQue scoring procedures, we did not include

TABLE 4 | Correlations between key variables in the study.

	Well-being	Sociability	Emotionality	Self-control	Global trait EI
TEIQue (N = 4,314)					
Well-being		0.50**	0.59**	0.52**	0.85**
Sociability			0.53**	0.32**	0.72**
Emotionality				0.43**	0.82**
Self-control					0.72**
DERS-16 (n = 311)	−0.58**	−0.38**	−0.42**	−0.64**	−0.65**
BIS (n = 283)	−0.41**	−0.21**	−0.32**	−0.65**	−0.51**
TAS-20 (n = 252)	−0.52**	−0.44**	−0.62**	−0.38**	−0.64**
UCLALS-BR (n = 283)	−0.59**	−0.38**	−0.41**	−0.35**	−0.57**
WHOQOL (n = 294)					
Psychological	0.79**	0.39**	0.43**	0.53**	0.70**
Social	0.53**	0.28**	0.42**	0.27**	0.49**
PANAS (n = 250)					
Positive	0.55**	0.46**	0.37**	0.23**	0.54**
Negative	−0.54**	−0.34**	−0.33**	−0.41**	−0.53**
IDCP-2 (n = 243)					
Mood instability	−0.73**	−0.21*	−0.27**	−0.67**	−0.65**
Criticism avoidance	−0.58**	−0.36**	−0.47**	−0.37**	−0.62**
PEP (n = 386)	−0.04	0.03	0.00	−0.02	−0.02
CE (n = 316)	0.01	0.05	0.19*	0.06	0.10
AR (n = 389)	−0.01	−0.01	0.05	0.21**	0.07
VR (n = 437)	0.05	0.11*	0.08	0.13*	0.11*

*p < 0.01; **p < 0.01.

these two facets in the calculation of the factors, although future studies (which may include confirmatory analysis of different structures) may consider including them, as our results suggest a possibly – albeit slightly – different factor configuration in the Brazilian population.

All TEIQue factors showed strong intercorrelations, with the exception of the correlation between Sociability and Self-control, which was moderate. Still, taking these results together with the factor and reliability analyses, it is evident that the TEIQue displayed adequate internal consistency, replicating the same factor structure found in previous studies.

Our results also corroborated previous studies that showed trait emotional intelligence as measured by the TEIQue correlates mildly or strongly with other measures of personality traits (Petrides et al., 2016; Van der Linden et al., 2017). While all TEIQue correlations with personality variables were statistically significant, they did vary in magnitude. As expected, measures of emotional dysregulation and impulsiveness showed strong negative correlations with the TEIQue Self-control factor, which concerns control of impulses and stress. Alexithymia also correlated strongly with the Emotionality factor, which concerns perception and expression of emotions. Loneliness, quality of life, and frequency of positive and negative affects correlated strongly with TEIQue Well-being factor, which concerns happiness and general positivity.

Finally, our results were also in agreement with research showing that trait emotional intelligence correlates to a low degree with performance measures of emotion and reasoning.

The only exception was in the correlation between abstract reasoning and the TEIQue Self-control factor ($r = 0.21$), which broadly echoed findings of low-to-moderate, yet statistically significant, associations between fluid intelligence and neuroticism (emotional stability), reported in other studies (e.g., Di Fabio and Palazzeschi, 2015).

A few limitations of this study should be considered. Although our sample was representative of all 26 Brazilian states and federal districts, the participants' level of schooling was considerably higher than average. Further studies should verify the validity of the TEIQue in samples with lower levels of education, considering that nearly half of Brazilian population have not completed high school.

In addition, our study was conducted purely online, with no use of paper-and-pencil instruments. Although most studies show that online and printed versions of inventories tend to show almost identical psychometric parameters (Weigold et al., 2013), a formal equivalence study is advised. Finally, we also recommend further studies with other external criteria from the domains of career choice, work, and health, among others. The results of our study strongly suggest that this further recommended research can be confidently conducted with the current Brazilian adaptation of the full form of the Trait Emotional Intelligence Questionnaire (TEIQue).

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because the regulations on research with humans by the Brazilian ethics councils prevent collected data from being made public without a specific request. Requests to access the datasets should be directed to AZ, anacarolina.zf@gmail.com.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by participation in research followed guidelines from the State University of Londrina's Ethical Committee and the International Test Commission and followed Helsinki Declaration guidelines. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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Ability Emotional Intelligence, Attachment Models, and Reflective Functioning

Anna Maria Rosso*

Department of Education, University of Genoa, Genoa, Italy

Previous studies have reported a significant positive association between ability emotional intelligence (EI) and attachment security. However, these studies may, to some extent, be misleading because they relied on self-report measures of attachment security. Furthermore, to our knowledge, no study has yet investigated the relationship between ability EI and mentalization, operazionalized as reflective functioning (RF), although EI and RF were assumed to be "conceptual cousins." In an attempt to overcome some of the limitations of the previous research, the current study investigated the relationships between ability EI, attachment security, and mentalization measured *via* the Adult Attachment Interview (AAI). Ninety-three volunteer participants from an Italian community population (49.5% males), aged from 27 to 55 years ($M = 39.44$; $SD = 6.84$), took part in the study. Significant positive correlations were found between ability EI, attachment security, and RF. The results shed some light on the relationship between different attachment strategies and ability EI. Hyperactivating attachment strategies correlated negatively with ability EI, while the correlation between ability EI and attachment deactivating strategies depend on which defensive strategy is used: avoiding the painful emotional contact with the memory of unpleasant childhood attachment experiences positively correlated with experiential EI, whilst the resort to derogation of the attachment needs correlated with impairment in EI. Findings from the current study suggest that future studies in developmental psychology are needed to investigate the development of the ability EI in relation to the quality of the attachment models more in-depth.

Keywords: ability EI, attachment models, reflective functioning, mentalization, emotion regulation

INTRODUCTION

Emotional intelligence (EI) is defined as a mental ability which makes it possible "to perceive emotions accurately, to use emotions to accurately facilitate thought, to understand emotions and emotional meanings, and to manage emotions in themselves and others" (Mayer et al., 2016, p. 291).

Allen and Fonagy (2006, p. 11) defined emotional intelligence and mentalization "conceptual cousins" in that both constructs pertain to identifying emotions in oneself as well as in other individuals, using emotions to organize thinking, understanding, and regulating emotions. In addition, both emotional intelligence and mentalization were found to be predictive of psychological health, the quality of the social relationship, and wellbeing (e.g., Lopes et al., 2003;

Schutte et al., 2007; Martins et al., 2010; Zeidner et al., 2012; Karim and Shah, 2014; Ballespí et al., 2021). To our knowledge, despite the conceptual links between the two constructs, no empirical study has ever been carried out.

Within the multifaceted realm of mentalizing, Reflective Functioning (RF) is a specific construct related to the ability to be aware of the nature of mental states, to make an explicit effort to tease out mental states underlying behavior, to recognize the developmental aspects of mental states, and the mental states in relation to the interviewer in the context of autobiographical interviews which elicit the attachment system (Fonagy et al., 1998). From a developmental point of view, RF and secure attachment develop in close association (Fonagy et al., 2008), and moreover, mentalization was found to be significantly associated with attachment in childhood (Szpak and Białecka, 2020). A vast array of studies support the relationship between reflective functioning and attachment security (for a review, Luyten et al., 2019), while to date, the association between EI and attachment models has only been scarcely explored.

As Luyten et al. (2019) reported, the different attachment models are associated with distinct patterns of mentalization. Secure attachment has been associated with both high levels of mentalizing even in high arousal situations and with a rapid recovery of mentalization after its momentary loss, while preoccupied individuals, relying on attachment hyperactivating strategies, tend rather frequently in arousal contexts to lose mentalizing, after which they have a slow recovery (Luyten and Fonagy, 2015). Dismissing individuals, using attachment deactivating strategies, only apparently maintain controlled mentalizing longer and recuperate it rapidly after momentary failure (Vrtička et al., 2012), while actually, their performance in mentalizing measures depends on the level of the arousal brought out by the task. In this regard, it has been reported (Luyten et al., 2019) that the Adult Attachment Interview (AAI; Main et al., 2003) is a task which raises the level of arousal thereby putting a strain on the interviewee's deactivating strategies by posing questions related to highly emotional autobiographical issues.

The few previous studies regarding the relationship between EI and attachment security (Kafetsios, 2004; Lanciano et al., 2012; Cherry et al., 2013; Altaras Dimitrijević et al., 2020) have reported that individual differences in ability EI are associated with quality of attachment, showing that securely attached individuals perform better on ability EI tasks, however, these studies might be flawed because they rely on self-report measures of attachment security. Kafetsios (2004) and Lanciano et al. (2012) used the four-item Relationship Questionnaire (RQ; Bartholomew and Horowitz, 1991), while Cherry et al. (2013) administered a short form of the Experiences in Close Relationships (ECR-SF; Wei et al., 2007), and Altaras Dimitrijević et al. (2020) used both the Modified Experiences in Close Relationship-Revised (M-ECR-R; Fraley et al., 2000) and the Revised Questionnaire for Attachment Assessment (QAA-R; Hanak, 2004, 2010). In addition, findings from these four studies are rather controversial; Kafetsios (2004) reported a positive correlation between ability EI and both secure and avoidant attachment, Lanciano et al. (2012) and Altaras Dimitrijević et al. (2020) found a significant and negative association between ability EI and both Anxiety and Avoidance

attachment dimensions, whereas Cherry et al. (2013) found that attachment avoidance was significantly negatively correlated with total EI ability scores.

To overcome some of the limitations of the previous research, the current study investigated the relationships between Ability EI, attachment models, and mentalization measured *via* the AAI and the Reflective Functioning Scale (RFS). Based on the previously cited studies (Vrtička et al., 2012; Luyten and Fonagy, 2015), a negative association between EI and hyperactivating attachment strategies was expected, whereas the present study was exploratory regarding the association between ability EI and RF given that it is the first one investigating it. However, on the basis of the theoretical model outlined by Luyten et al. (2019), a positive significant relationship between ability EI and RF might be expected.

MATERIALS AND METHODS

Participants
One hundred volunteer participants from an Italian community population agreed to participate in the current study, seven of whom were excluded from the analyses because of missing data or technical problems in recording the interview. The remaining group was made up of 47 females and 46 males ranging in age from 27 to 55 years ($M = 38.58$; $SD = 7.67$), with a level of education varying from 13 to 18 years ($M = 15.60$; $SD = 2.50$).

Measures
The Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2002) was administered to assess ability EI.

The MSCEIT is a 141-item ability measure of EI that consists of four branches: (a) emotion-recognition (this subscale includes 48 problems that require the subject to identify the emotion being expressed in photographs of faces or being evoked by photographs of landscapes); (b) emotion-facilitation (a subscale comprising 30 problems requiring the subject to identify the usefulness of a specific emotion in performing an activity, or the sensations associated with an emotion); (c) emotion-understanding (a subscale made up of 32 problems asking the individual to identify the cause of emotional reactions and to label complex emotions resulting from blended basic emotions); and (d) emotion-management (a subscale composed of 31 problems requiring the subject to choose effective ways to manage one's own and others' emotions in specific hypothetical situations).

The Mayer–Salovey–Caruso Emotional Intelligence Test provides five scores, one for each branch and one for total EI. Two additional scores can be used: an Experiential Emotional Intelligence (EEI) score which provides a measure of the ability to perceive emotions and to use them to facilitate thought, and a Strategic Emotional Intelligence (SEI) score which is an index of the ability to understand emotions and to use them purposefully for planning and self-management. SEI is regarded as a second order ability EI in that it implies more integrated and more cognitively complex abilities (Mayer et al., 2016).

Mayer et al. (2003) reported full-test split-half reliabilities of 0.91. The EEI and SEI reliabilities were 0.88 and 0.86, respectively. The reliabilities of the four branch scores (perceiving, using, understanding, and managing emotions) were between 0.76 and 0.91. In the current study, split-half reliability was 0.71 for full-test, 0.64 for EEI, 0.54 for SEI, 0.73 for Branch 1, 0.62 for Branch 2, 0.51 for Branch 3, and 0.44 for Branch 4.

The Adult Attachment Interview (AAI), rated in terms of both the Berkeley AAI System (Main et al., 2003) and the Reflective Functioning Scale (RFS; Fonagy et al., 1998), was administered.

The AAI is a semi-structured, hour-long interview designed to classify the state of mind with respect to early attachment experiences. The protocol consists of 18 questions. The interview begins by asking the subject to describe his/her relationship with their own parents in childhood. Then, the subject is requested to provide five adjectives that depict the relationship with each parent and for specific memories that would support the chosen adjectives. The next questions invite the subject to talk about their experiences of emotional distress, physical injury, illness, and separation from parents during their childhood. The subject is further requested to talk about possible experiences of rejection, abuse, maltreatment, and loss. The interviewees are also asked to reflect upon the impact of their childhood experiences on their personality and the mental states underlying their parents' behavior. Finally, the interview shifts to the subject's current relationship with his/her parents and the present relationship with his/her children, if any. The last question requires the individuals to say how experiences of being parented impact on their parenting.

The AAI includes nine nine-point scales for assessing relatively patterned or organized states of mind: coherence of transcript, idealization for the parent, insistence upon lack of recall, involved/involving anger, passivity of discourse, fear of loss, dismissing derogation, metacognitive monitoring, and overall coherence of mind.

Two additional scales assess unresolved/disorganized states of mind with respect to experiences of loss as well as experiences of abuse (including physical, sexual abuse, and extreme threats) by attachment figures. Disorganization and/or disorientation in thinking or discourse during discussion of a loss or an abuse are indexes of unresolved/disorganized states of mind.

A dimensional approach to the AAI was utilized, as suggested by recent studies (Bakermans-Kranenburg and van IJzendoorn, 2009; Whipple et al., 2011; Rosso and Airaldi, 2016) being the subscales "Idealizing toward mother," "Idealizing toward father," "Overall derogation of attachment," "Derogation toward mother," "Derogation toward father" markers of the dismissing state of mind, and the subscales "Passivity," "Involving anger toward mother," and "Involving anger toward father" indicative of the preoccupied state of the mind, while "Coherence of the mind" was considered the global index of security of attachment.

The RFS was designed to evaluate the capacity of mentalization in the AAI narrative since some questions in the AAI require reflective functioning (e.g., "Why do you think your parents behaved how they did during your childhood?"), while other questions permit reflective functioning (e.g., " Could you describe your first separation from your parents?").

According to the scoring guidelines, "Awareness of the nature of mental states," "Explicit effort to tease out mental states underlying behavior," "Recognizing developmental aspects of mental states," and "Mental states in relation to the interviewer" are the four markers of reflective functioning. After rating each identified passage of the AAI, an overall classification is assigned to the interview ranging from −1 (negative RF) to 9 (exceptional RF).

Validation studies of the RFS (Fonagy et al., 1998) showed discriminant and predictive validity, good inter-rater reliability, low correlations with education level, and no correlation with socioeconomic status and age. In this study no correlation emerged between participants' RF and their education level (Spearman's $rho = 0.191$, $p = 0.143$).

Procedure

Examiners included four psychology graduate students trained by the author in administering the measures. Each examiner recruited 25 participants using a solicitation letter (available on request) written by the first author. The letter, which also served as an informed consent form, identified the project as one investigating the ability to recognize and manage emotions in autobiographic narrative as well in a non-autobiographic task.

In agreement with the statement in the letter, participants who signed the informed consent form were subsequently called by another examiner, who was not acquainted with them, to make an appointment.

Measures administration occurred at a time and place convenient for the participant. Examiners expressed gratitude for agreement to participate in the study, briefly described the project, assured the participant of confidentiality, and collected demographic data (age and education). The data were collected anonymously, each subject was assigned an identification number, and no compensation was provided.

The AAI and the MSCEIT were administered in a counterbalanced order during two sessions.

The Mayer–Salovey–Caruso Emotional Intelligence Test scoring was carried out online at the licensed publisher's site, while the AAI protocols, which were initially audio-recorded and later transcribed verbatim, were rated in terms of both the Berkeley AAI System (Main et al., 2003) and the RFS (Fonagy et al., 1998) by the author as well as by an independent rater, both of whom were blinded to the MSCEIT scores. The inter-rater reliability was calculated: Pearson's r for the AAI Scales for State of Mind ranged from 0.80 for the scale "Idealization of the relationship with the father" to 0.93 for the scale "Coherence of mind" (see **Table 1**). The inter-rater agreement for the overall classification of the RF scale was excellent with $k = 0.86$. All disagreements about overall classifications between the two raters were later discussed and clarified.

The approval of the ethics committee was not required because when the study was designed the local ethics committee had not yet been established. Even currently in the local institution the request for approval from the ethics committee is optional. All the procedures followed in the study were in accordance with the Helsinki Declaration of 1975, as revised in 2013, and in

conformity with Italian law as established by the National Board of Italian Psychologists' Code of Ethics.

RESULTS

Preliminary analyses of the data indicated that the study variables, except "Involving anger" and "Derogation," were normally distributed with skewness and kurtosis values falling within the accepted range of ± 2 (George and Mallery, 2010), thus appropriate for parametric statistical tests. Non-parametric statistical tests were used for the AAI Scales "Involving anger" and "Derogation."

A general linear model was used to investigate the association of the variables of interest (MSCEIT, AAI, and RFS scores) with background variables (gender, age, and years of education). No significant correlation was observed between variables of interest, age, and level of education. Females obtained higher scores than males on MSCEIT, specifically on total scores, Experiential EI, Strategic EI, and Branch 4 "Managing emotion" with effect sizes in the moderate range. A large effect size was found regarding RFS scores with males reporting significantly lower scores than females. Descriptive statistics and comparisons by gender are reported in **Table 1**.

In the entire sample, Coherence of mind regarding attachment experiences correlated positively with MSCEIT total score, and with Experiential and Strategic EI, while all the AAI scales indicating the resort to hyperactivating attachment strategies (i.e., "Passivity of thought processes," "Involving anger toward father," and "Involving anger toward mother") correlated negatively with MSCEIT total score. Scores on AAI scales, which are markers of the deactivating attachment strategies (i.e., "Insistence on lack of recall," "Overall derogation," "Derogation toward father," "Derogation toward mother," "Idealizing toward father," and "Idealizing toward mother"), did not correlate with MSCEIT scores with the exception of "Derogation toward mother" which was found to be associated in the expected direction with MSCEIT total score, Strategic EI, and branch 4 "Managing emotion."

Significant positive correlations were also found between RF and all ability EI scores but "Managing emotions" branch.

Since a significant association was found between gender and the variables of interest, correlation analyses were additionally performed separately for females and males. In the female subsample significant correlations were found in the expected direction between the AAI subscale "Passivity of thought processes," the MSCEIT total score, the Experiential EI, and the Branch 1 "Perceiving Emotion." The AAI subscale "Involving anger toward mother" correlated with the Strategic EI, and the Branch 1 "Perceiving Emotion." The AAI Scale "Coherence of Mind" correlated with Strategic EI and Branch 3 "Emotion understanding." A significant positive correlation was found

TABLE 1 | Descriptive statistics, comparisons by gender, and inter-rater reliability.

	N = 93		Females (n = 47)		Males (n = 46)				
	M	**DS**	**M**	**SD**	**M**	**SD**	**p**	**d**	**r**
Age	38.59	7.67	39.0	8.09	38.15	7.29	n.s.	n.s.	
Education	15.60	2.50	15.38	2.5	15.83	2.51	n.s.	n.s.	
EIT	87.42	9.30	90.29	9.18	84.57	8.62	0.003	0.64	
EEI	92.99	12.57	96.17	12.67	89.80	11.77	0.014	0.52	
SEI	86.32	5.93	88.17	5.64	84.43	5.67	0.002	0.66	
Branch 1	97.94	12.11	100.34	12.56	95.48	11.23	0.052	0.41	
Branch 2	90.24	13.33	93.15	13.42	87.26	12.69	0.032	0.45	
Branch 3	83.11	7.49	84.47	6.60	81.74	8.16	0.079	0.37	
Branch 4	91.06	7.45	93.04	6.70	89.04	7.61	0.009	0.56	
RF	3.34	1.31	4.00	1.10	2.67	1.16	<0.0001	1.18	
Coherence of mind	5.34	1.41	5.72	1.42	4.95	1.30	0.007	0.57	0.93
Passivity	2.27	1.74	2.26	1.74	2.28	1.76	n.s.	n.s.	0.88
Involving anger F	1.29	0.85	1.22	0.67	1.37	0.98	n.s.	n.s.	0.85
Involving anger M	1.68	1.27	1.87	1.45	1.48	1.03	n.s.	n.s.	0.89
Lack of recall	2.40	1.17	2.07	1.08	2.73	1.18	0.007	−0.58	0.91
Overall derogation	1.68	1.35	1.38	1.05	1.99	1.55	0.030	−0.47	0.89
Derogation F	1.39	1.12	1.15	0.67	1.63	1.40	0.040	−0.46	0.87
Derogation M	1.58	1.23	1.30	0.91	1.86	1.44	0.027	−0.48	0.91
Idealizing F	2.86	1.50	2.99	1.42	2.74	1.58	n.s.	n.s.	0.80
Idealizing M	3.39	1.65	3.16	1.57	3.63	1.72	n.s.	n.s.	0.89

M, mean; SD, standard deviation; p, p-value; d, Cohen's measure of effect size (| d| < 0.20: negligible; | 0.20| < d < | 0.50| : small; | 0.50| < d < | 0.80| moderate; d > | 0.80| : large); r, Pearson inter-rater reliability; EIT, MSCEIT total score; EEI, Experiential Emotional Intelligence score; SEI, Strategic Emotional Intelligence score; Branch 1, Perceiving Emotions; Branch 2, Facilitating Thought; Branch 3, Understanding Emotions; Branch 4, Managing Emotions; RF, Reflective Functioning Scale score; Passivity, Passivity of thought processes; Involving anger F, Involving anger toward father; Involving anger M, Involving anger toward mother; Lack of recall, Insistence on lack of recall; Derogation F, Derogation toward father; Derogation M, Derogation toward mother; Idealizing F, Idealization toward father; Idealizing M, Idealization toward mother.

between the AAI scale "Insistence on lack of recall" and Experiential EI, while RF correlated significantly and positively only with Branch 3 "Understanding emotions."

Regarding the male subsample, the AAI scale "Involving anger toward father" correlated negatively with MSCEIT total score, Experiential EI, Branch 2 "Facilitating thought," and Branch 3 "Emotion understanding." The AAI scale "Involving anger toward mother" correlated negatively with MSCEIT total score, Strategic EI, Branch 3 "Emotion understanding," and Branch 4 "Managing emotions." Results are displayed in **Table 2**.

To explore the gender differences on RF and attachment model validity in predicting MSCEIT scores, a hierarchical

multiple regression was performed, including gender as a dummy-coded variable (male = 0; female = 1) and its interaction terms with RF and attachment variables.

The MSCEIT score was the dependent variable (Total EI, EEI, and SEI), with gender at Step 1; RF, "Involving anger toward mother," and "Insistence on lack of recall" at Step 2; and the three interaction terms gender × RF, gender × "Involving anger toward mother," and gender × "Insistence on lack of recall" at Step 3. Scores of RF, "Involving anger toward mother," and "Insistence on lack of recall" were mean centered before creating the product term.

TABLE 2 | Correlations between MSCEIT scores, AAI, and RFS scores.

	EIT	EEI	SEI	Branch 1	Branch 2	Branch 3	Branch 4
Total sample (N = 93)							
RF	0.296**	0.256*	0.311**	0.214*	0.219*	0.304**	0.135
Coherence of mind	0.277**	0.230*	0.289**	0.182	0.197	0.309**	0.107
Passivity of thought	−0.232*	−0.224*	−0.207*	−0.254*	−0.083	−0.088	−0.161
Involving anger F	−0.258*	−0.221*	−0.236*	−0.123	−0.234*	−0.208*	−0.135
Involving anger M	−0.237*	−0.185	−0.254*	−0.238*	0.020	−0.187	−0.212*
Lack of recall	0.035	0.120	−0.122	0.167	0.021	−0.139	−0.050
Overall derogation	−0.143	−0.072	−0.146	−0.014	−0.132	−0.144	−0.135
Derogation F	−0.130	−0.056	−0.160	0.012	−0.147	−0.202	−0.079
Derogation M	−0.216*	−0.132	−0.214*	−0.068	−0.180	−0.165	−0.225*
Idealizing F	0.017	−0.015	0.060	−0.090	0.087	0.084	0.001
Idealizing M	−0.070	−0.062	−0.066	−0.031	−0.113	−0.056	−0.044
Females (N = 47)							
RF	0.259	0.164	0.110	0.180	0.110	0.340*	0.200
Coherence of mind	0.221	0.171	0.298*	0.158	0.136	0.298*	0.053
Passivity of thought	−0.306*	−0.321*	−0.073	−0.345*	−0.130	−0.073	−0.216
Involving anger F	−0.077	−0.016	−0.172	−0.059	0.010	−0.034	−0.108
Involving anger M	−0.226	−0.183	−0.300*	−0.288*	0.110	−0.160	−0.247
Lack of recall	0.178	0.320*	−0.075	0.286	0.220	−0.113	−0.006
Overall derogation	0.038	0.049	0.047	0.006	0.078	−0.005	−0.031
Derogation F	0.147	0.132	0.149	0.067	0.107	−0.008	0.159
Derogation M	−0.072	−0.046	−0.052	−0.084	0.007	−0.060	−0.137
Idealizing F	−0.200	−0.239	−0.048	−0.190	−0.132	−0.094	−0.003
Idealizing M	−0.097	−0.043	−0.085	0.029	−0.170	−0.089	−0.110
Males (N = 46)							
RF	0.081	0.142	0.046	0.079	0.142	0.179	−0.175
Coherence of mind	0.203	0.176	0.196	0.105	0.155	0.257	0.018
Passivity of thought	0.170	−0.128	−0.197	−0.161	−0.033	−0.100	−0.120
Involving anger F	−0.371*	−0.357*	−0.252	−0.149	−0.427**	−0.312*	−0.096
Involving anger M	−0.389*	−0.248	−0.380**	−0.269	−0.206	−0.292*	−0.341*
Lack of recall	0.088	0.091	0.000	0.189	−0.040	−0.078	0.056
Overall derogation	−0.150	−0.047	−0.164	−0.037	−0.221	−0.183	−0.152
Derogation F	−0.190	−0.074	−0.232	0.026	−0.236	−0.263	−0.199
Derogation M	−0.201	−0.063	−0.236	0.017	−0.237	−0.202	−0.232
Idealizing F	0.172	0.153	0.109	−0.028	0.262	0.187	0.014
Idealizing M	0.031	−0.018	0.037	−0.036	0.001	0.014	0.078

*p < 0.05. **p < 0.01. EIT, MSCEIT total score; EEI, Experiential Emotional Intelligence score; SEI, Strategic Emotional Intelligence score; Branch 1, Perceiving Emotions; Branch 2, Facilitating Thought; Branch 3, Understanding Emotions; Branch 4, Managing Emotions; RF, Reflective Functioning Scale score; Passivity of thought, Passivity of thought processes; Involving anger F, Involving anger toward father; Involving anger M, Involving anger toward mother; Lack of recall, Insistence on lack of recall; Derogation F, Derogation toward father; Derogation M, Derogation toward mother; Idealizing F, Idealization toward father; Idealizing M, Idealization toward mother.*

TABLE 3 | Hierarchical multiple regressions.

Measures	EIT Step 1 F = 9.484 p < 0.01 β	p	EIT Step 2 F = 6.896 p ≤ 0.0001 β	p	EIT Step 3 F = 4.250 p ≤ 0.0001 β	p	EEI Step 1 F = 6.245 p = 0.014 β	p	EEI Step 2 F = 5.711 P < 0.0001 β	p	EEI Step 3 F = 3.437 p = 0.003 β	p	SEI Step 1 F = 10–130 p = 0.002 β	p	SEI Step 2 F = 6.662 p ≤ 0.0001 β	p	SEI Step 3 F = 4.272 p < 0.0001 β	p
Gender	0.31	0.003	0.27	0.02	0.27	0.02	0.26	0.14	0.20	0.07	0.21	0.07	0.32	0.002	0.29	0.01	0.28	0.01
Step 2																		
RF			0.26		0.28	0.04			0.32	0.02	0.33	0.02			0.14	0.30	0.16	0.22
Anger			–27		–29	0.01			–16	0.11	–18	0.10			–0.33	0.00	–0.37	0.00
Lack			0.19		0.20	0.09			0.32	0.01	0.33	0.01			–0.04	0.72	–0.04	0.73
Step 3																		
Gender × RF					0.09	0.42					0.04	0.76					0.11	0.32
Gender × Ang					0.15	0.15					0.09	0.41					0.15	0.15
Gender × Lack					0.08	0.47					0.12	0.29					0.01	0.96
R2	0.10		0.24		0.26		0.07		0.21		0.22		0.10		0.23		0.26	
ΔR2			0.14		0.02				0.14		0.01				0.13		0.03	

Results are displayed in **Table 3**. The model explained 26.2, 22.3, and 26% of the variance of total EI, EEI, and SEI scores, respectively, while gender accounted for 9.5, 6.5, and 10%, respectively. "Involving anger" was the best predictor of both total EI and SEI, while "Insistence on lack of recall" was the best predictor of the SEI score. No moderating effect of gender on the relationship between RF, attachment models, and MSCEIT scores was found.

DISCUSSION

The current study aimed to investigate the relationships between ability EI, attachment models, and Reflective Functioning since they are conceptually related psychological constructs (Allen and Fonagy, 2006). A significant negative association between attachment insecurity and ability EI was expected, especially with reference to the preoccupied attachment model, because preoccupied individuals resort to hyperactivating attachment strategies which lead to impairment in emotion regulation. The study was instead exploratory regarding the association between EI and RF, given that it was the first one in this field.

The further novelty of the current research is that it is the first study to apply the Adult Attachment Interview, which represents the gold standard for comprehensively assessing attachment strategies in adults.

Findings from the present study showed that RF correlated positively with all the MSCEIT scores supporting the hypothesis according to which they are distinct, albeit correlated, constructs.

No such correlations were observed in the male group after conducting the analyses separately for females and males. This result could be due to three possible, not mutually exclusive, explanations: (a) Correlation between RF and ability EI, albeit present, is weak; (b) The smaller sample size may have reduced the statistical power; (c) Males showed low RF scores and low MSCEIT scores, so in this group the variability was lower than in the female group.

In the female group, RF correlated with the ability to understand emotions ($r = 0.340$), that is the awareness of how emotions may change and combine. This finding could suggest that this ability implies an in-depth, authentic and embodied awareness of emotions, rather than mere intellectual knowledge. Thus, individuals who have greater access to their internal emotional life, being less defensive against them, might perform better on these tasks.

The gender differences both in RF and in ability EI, with males scoring lower than females, that was found in the current study replicated results recently reported by other scholars (e.g., Cabello et al., 2016; Jessee et al., 2016; Köber et al., 2019). Gender was a significant predictor of MSCEIT scores, however, no moderating effect on the relationship between RF, attachment models, and MSCEIT scores was found. Findings showed that "Involving anger toward mother" was the best predictor of both MSCEIT total and SEI score, while "Insistence on lack of recall" was the best predictor of EEI score, a finding which will be commented later.

After dividing the sample, it was found that in females the coherence of the mind regarding attachment experiences, which is the best index of attachment security, was positively and significantly associated with Strategic EI, and, particularly, with the ability to understand emotions. The same tendency was also observed in the males, but in this group correlations did not reach statistical significance. These expected findings corroborate the theoretical assumptions (for a review, Luyten et al., 2019) and replicated results from previous studies (Kafetsios, 2004; Altaras Dimitrijević et al., 2020). Again, the greater emotional openness that develops in (and is facilitated by) the context of the early secure attachment relationships, may provide, in adulthood, the possibility to access a greater range of emotions without the defensive need to avoid painful or overly exciting emotions.

Ability EI, both in males and in females, resulted more impaired in individuals who resort to preoccupied attachment strategies. During the AAI, they make the interviewer feel how intensely they are involved in their feelings of anger when talking about their childhood experiences and the relationship with their parents, so much so that it is difficult for them to maintain clear, fluent and coherent speech. Their sentences are often long and grammatically convoluted since their intense emotional involvement makes it difficult for them to express themselves clearly and concisely.

This expected finding was in line with some previous studies (Lanciano et al., 2012; Altaras Dimitrijević et al., 2020).

The unexpected result was that a dismissing strategy, namely, the insistence on lack of recall, correlated positively with experiential EI in the female group and, as stated above, was the best predictor of EEI in the entire sample. In the AAI, the interviewee insists on her inability to recall childhood episodes in an effort to block further queries. It is a defense aimed at avoiding the painful emotional contact with the memory of unpleasant experiences. This finding, although unexpected, was coherent with Luyten et al. (2019), who reported that dismissing individuals might lead clinicians to erroneously attribute a mentalizing ability to them because they are able to pseudomentalize (i.e., to perceive and use emotions at a mere cognitive level), while a more in-depth clinical observation makes it clear that, although their narrative can make extensive use of the mental state talk, it really lacks any affective grounding. In this regard, it is not surprising that "Insistence on lack of recall" scores correlated with Experiential EI but not with Strategic EI, being the former the lowest hierarchical level of ability EI (Mayer et al., 2002).

Findings from the current study could be useful to explain similar results obtained by Kafetsios (2004) and Lanciano et al. (2012). Conversely, Cherry et al. (2013) found a negative correlation between attachment avoidance and total EI scores. Unfortunately, a comparison between our findings and results obtained in previous studies is hardly possible as a vast array of studies have indicated an absence of relationship between self-reports of attachment styles and attachment organization as assessed by the AAI (for a review, Hesse, 2008; Crowell, 2014). Nevertheless, it could be argued that the correlation between ability EI and dismissing attachment strategies might depend on which dismissing strategies individuals prevalently resort to. Interestingly, our study showed that another dismissing strategy, namely, derogation toward attachment needs in relation to the childhood relationship with the mother, in the whole sample correlated negatively and significantly with EI total score, Strategic EI, and, specifically, with the highest level EI ability branch, i.e., "Managing emotions." It could be argued that, while the insistence on lack of recall might be considered a more unemotional defensive strategy, derogation could imply a sort of "cold" anger that leads one to appear to be emotionally detached, but to actually be, on a more profound level, full of resentment which could not be expressed and felt at a conscious level, while still compromising the ability to manage the emotions.

On the basis of this supposition, the controversial findings that emerged from the previous studies about the correlations between dismissing attachment and ability EI could possibly be explained.

In conclusion, these results shed some light on the relationship between different attachment strategies and ability EI. Hyperactivating attachment strategies correlated negatively with ability EI, while the correlation between ability EI and attachment deactivating strategies depends on which defensive strategy is used: the avoidance of the painful emotional contact with the memory of unpleasant childhood attachment experiences positively correlated with experiential EI, whilst the resort to derogation of the attachment needs correlated with impairment in EI.

Findings from the current study suggest that future studies in developmental psychology are needed to investigate the development of the ability EI in relation to the quality of the attachment models more in-depth.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

AR designed the study, performed the analyses, wrote the manuscript, contributed to the article, and approved the submitted version.

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Lower Avoidant Coping Mediates the Relationship of Emotional Intelligence With Well-Being and Ill-Being

Carolyn MacCann, Kit S. Double* and Indako E. Clarke

School of Psychology, The University of Sydney, Darlington, NSW, Australia

Emotional intelligence (EI) abilities relate to desirable outcomes such as better well-being, academic performance, and job performance. Previous research shows that coping strategies mediate the effects of ability EI on such outcomes. Across two cross-sectional studies, we show that coping strategies mediate the relationships of ability EI with both well-being (life satisfaction, psychological well-being) and ill-being (depression, anxiety, stress). Study 1 ($N = 105$ first-year university students, 78% female) assessed EI with the Situational Test of Emotion Understanding (STEU) and Situation Test of Emotion Management (STEM). Avoidant coping significantly mediated the relationship of both the STEU and STEM with depression, anxiety, stress, and psychological well-being. EI was associated with lower avoidant coping, higher well-being and lower ill-being. Study 2 ($N = 115$ first-year university students, 67% female) assessed EI with the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT). Avoidant coping mediated the relationship between EI and ill-being, but not the relationship between EI and well-being. These effects were significant for three of the four EI branches—emotion perception, understanding, and management. We discuss possible reasons why avoidant coping may be an active ingredient by which lower EI relates to lower well-being. We also discuss a possible application of our findings—that EI training programs might benefit from including content aimed at reducing avoidant coping.

Keywords: emotional intelligence, depression, anxiety, coping, wellbeing

INTRODUCTION

Emotional intelligence (EI) consistently shows a positive relationship with a range of valued life outcomes, including job performance, academic performance, mental health, and subjective well-being (Schutte et al., 2007; Joseph and Newman, 2010; Martins et al., 2010; Sánchez-Álvarez et al., 2016; MacCann et al., 2020b). While it is clear that high EI confers benefits to those who possess it, it is not entirely clear what high-EI people do to obtain these benefits. That is, the mechanisms underpinning these relationships are not yet well specified. However, there is evidence that the way that high-EI people cope with stress may account for some of these

relationships between EI and valued outcomes. Specifically, coping strategies significantly mediate the relationship between EI and academic performance, marital satisfaction, adolescent depression, well-being, and disruptive behaviors (MacCann et al., 2011; Davis and Humphrey, 2012; Zeidner et al., 2013; Extremera et al., 2020). The current studies add to this body of research by testing whether coping strategies mediate the known relationships of EI abilities with both well-being and ill-being. Across two studies, we examine whether coping strategies mediate the relationship of EI with well-being (psychological well-being, life satisfaction) and with ill-being (anxiety, depression, stress). In the paragraphs below, we define the key concepts we examine (EI, coping, well-being, and ill-being) and provide evidence for our expected associations among EI, coping, and well-being to justify our proposed mediation model (**Figure 1**).
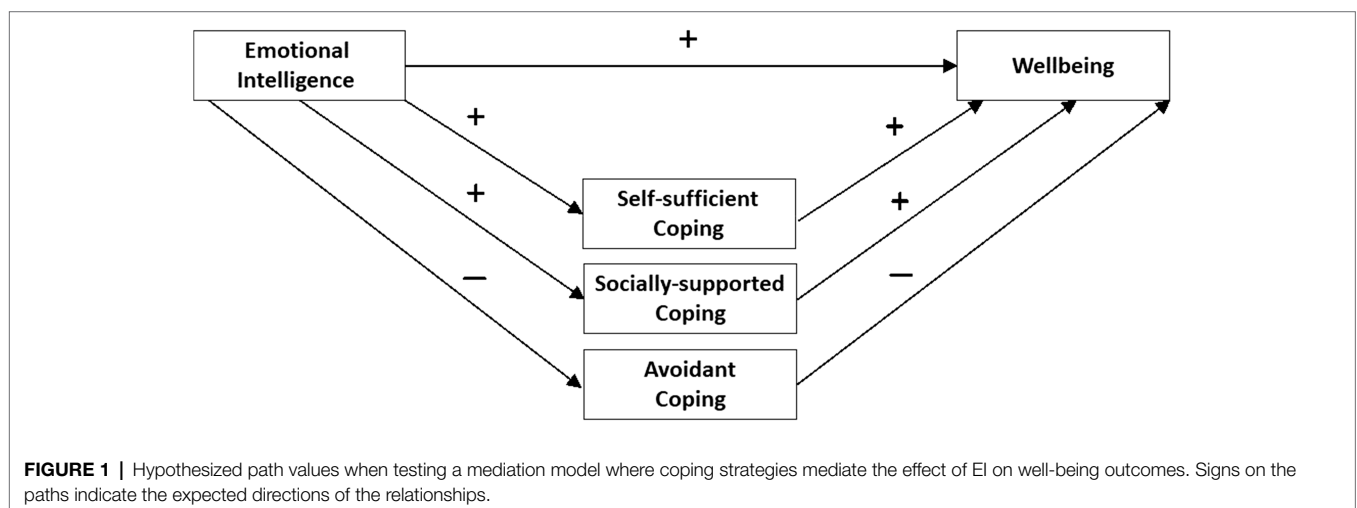
EMOTIONAL INTELLIGENCE

EI was first proposed by Salovey and Mayer (1990) as a set of cognitive skills that allow people to accurately appraise, express, use, and regulate their emotions. Following the publication of Goleman's (1995) book "Emotional Intelligence," the rapid growth in the popularity of EI led to multiple differing perspectives on how to conceptualize and measure EI. These multiple perspectives can be classified into two main "types" of EI: a) ability EI (knowledge and information processing of emotions and emotion-related information) and b) trait EI (a set of character traits that underpin social and emotional functioning). Ability EI assessments use objective, maximum-performance tasks (e.g., rating the degree of sadness in a facial expression), whereas trait EI assessments are typical-performance rating scales (e.g., rating one's agreement with statements like "I can deal well with other people"). Despite sharing the same label, ability EI and trait EI are distinct concepts with minimal empirical and conceptual overlap (e.g., Joseph and Newman, 2010). There is substantially less research on ability EI as compared to trait EI. Meta-analytic summaries report that ability EI research comprises only 22% of studies on EI and

coping, 15% of studies on EI and well-being, and 10% of studies on EI and ill-being (Martins et al., 2010; Peña-Sarrionandia et al., 2015; Sánchez-Álvarez et al., 2016). Largely because ability EI is under-studied relative to trait EI, we choose to focus on ability EI in the current research.

For ability EI, there is a single dominant theoretical model—the four-branch hierarchical model of EI (Mayer et al., 2016). The four branches of this model are: (1) *emotion perception*: the ability to accurately perceive the emotions present in facial expressions, tone-of-voice, body-language, or evocative artwork; (2) *emotion facilitation:* the use of emotions to facilitate or aid problem-solving; (3) *emotion understanding*: understanding the way that emotions combine and change over time, and having a good vocabulary of emotional terms; and (4) *emotion management*: successfully regulating the emotions of oneself and others to increase personal well-being or achieve one's goals. In this paper, we use two different assessments of ability EI to ensure that results generalize across instruments. Study 1 uses the Situational Test of Emotion Understanding (STEU) and the Situational Test of Emotion Management (STEM), which assess the emotion understanding and management of emotions branches of EI (MacCann and Roberts, 2008). Study 2 uses the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) which assesses all four branches of ability EI (Mayer et al., 2003). Our mediation model (**Figure 1**) proposes that ability EI is associated with greater well-being and lower ill-being.

COPING STRATEGIES

Coping refers to the way people respond to stressful situations to reduce their distress. Coping may involve both thoughts (cognitive responses) and actions (behavioral responses) which arise from appraisals of the situation's personal significance and of one's capacity to manage it (e.g., a situation may be interpreted as a threat, harm, or challenge to the individual, and this interpretation determines the coping response the individual will make; Folkman, 2013). In this manuscript, we consider habitual ways of coping with daily stressors, assessing

FIGURE 1 | Hypothesized path values when testing a mediation model where coping strategies mediate the effect of EI on well-being outcomes. Signs on the paths indicate the expected directions of the relationships.

individual differences in dispositional coping (i.e., the tendencies to use certain types of coping across multiple situations). We distinguish between the habitual use of three different groups of strategies (Litman, 2006; Litman and Lunsford, 2009). First, *self-sufficient strategies* are intrapersonal strategies that can be implemented independently of other people. These include active coping (taking practical actions to change the situation/stressor, similar to the concept of problem-focused coping) and positive reappraisal (changing the way you think about the situation so that it is less threatening). Second, *socially supported strategies* are interpersonal strategies that involve reaching out to other people for help. These include seeking emotional support (seeking empathy and understanding from others) and instrumental social support (seeking out others' help to solve a problem). Third, *avoidant strategies* involve disengaging from the situation by ignoring it, withdrawing from it or otherwise avoiding the problem or emotions arising from the situation. These include denial (refusing to acknowledge the reality of a challenging situation) and self-blame (blaming oneself for the situation).

WELL-BEING AND ILL-BEING

While a thorough review of the well-being literature is beyond the scope of the current study (for more comprehensive reviews, see Deci and Ryan, 2008; Dodge et al., 2012), psychologists and economists generally make two key distinctions when describing well-being. First, well-being and ill-being constitute two separate dimensions rather than opposite ends of the same continuum (Headey et al., 1984, 1985). Ill-being includes the experience of anxiety, depression and other negative emotional states representing psychological distress and can be considered the absence or reduced presence of mental health (e.g., Ryff et al., 2006). In contrast, well-being includes the experience of personal fulfilment and positive affective states. Second, there are two distinct aspects of well-being: *eudaimonic well-being* (the psychological well-being tradition; Ryff and Singer, 2008) and *hedonic well-being* (the subjective well-being tradition; Kesebir and Diener, 2008). Hedonic well-being is the experience of pleasure. It can be further divided into *cognitive* elements (such as life satisfaction) and *affective* elements (such as the experience of positive emotions; Diener et al., 1999). Eudaimonic well-being involves self-fulfillment, personal meaning, and feeling that one has reached one's potential and is often referred to as psychological well-being (Keyes et al., 2002). The two studies in this manuscript both include assessments of hedonic well-being (life satisfaction), eudaimonic well-being (psychological well-being), and ill-being (depression, anxiety, and stress).

EI AND WELL-BEING

Our mediation model (**Figure 1**) proposes that EI should relate to higher levels of eudaimonic and hedonic well-being but lower levels of ill-being. We outline the evidence for these relationships below.

EI and Hedonic Well-Being

Sánchez-Álvarez et al.'s (2016) meta-analysis found that ability EI was significantly related to subjective well-being ($r = 0.22$, $k = 4$), but showed a stronger relationship with cognitive well-being ($r = 0.25$, $k = 3$) than with affective well-being ($r = 0.14$, $k = 1$). Fernández-Berrocal and Extremera's (2016) narrative review similarly concluded that there was stronger evidence for a relationship of ability EI with cognitive than affective well-being. However, there may be differences across the four branches of EI. Of the four branches, emotion management consistently displays the strongest relationship with cognitive well-being (e.g., Bastian et al., 2005; Law et al., 2008; Ruiz-Aranda et al., 2014). Moreover, emotion management may also show stronger relationships with affective well-being. Meta-analytic findings show that emotion management is the only one of the four branches significantly associated with higher positive affect (MacCann et al., 2020a). In summary, ability EI is significantly associated with hedonic well-being, and effects are stronger for: (a) cognitive versus affective well-being and (b) emotion management versus the other three EI branches.

EI and Eudaimonic Well-Being

Ability EI is positively associated with eudaimonic well-being (psychological well-being; Brackett and Mayer, 2003; Brackett et al., 2006; Burrus et al., 2012). This association was stronger in a study that used the STEM ($r = 0.54$; Burrus et al., 2012) than in two studies that used the MSCEIT total scores ($r = 0.28$ and 0.19; Brackett and Mayer, 2003; Brackett et al., 2006). There are two possible explanations for this difference: (a) psychological well-being is more strongly related to emotion management than to the other three branches of EI (a construct effect); or (b) psychological well-being is more strongly related to the STEM test than to the MSCEIT test, regardless of the construct (a test effect). By using both the STEM and the MSCEIT in the current research, we can examine whether differences in effect are due to differences among EI branches or differences among tests. We expect that EI will be positively associated with psychological well-being.

EI and Ill-Being

Two meta-analyses have examined the relationship between EI and mental health (Schutte et al., 2007; Martins et al., 2010). Both considered symptoms of anxiety and depression as indicators of lower mental health and found a small negative relationship between ability EI and these indicators. Schutte et al. (2007) found that the effect was small and nonsignificant ($r = -0.11$, $k = 4$), whereas for Martins et al. a slightly larger and significant effect was observed ($r = -0.17$, $k = 11$). Fernández-Berrocal and Extremera's (2016) narrative review also found support for a relationship between ability EI and lower depression. In the current studies, we use the 21-item Depression Anxiety Stress Scale (DASS; Lovibond and Lovibond, 1995) as a measure of ill-being. Previous research has found significant correlations between all three DASS scales (depression, anxiety, and stress) and ability EI (MacCann and Roberts, 2008; Doherty et al., 2017; Extremera et al., 2020). Based on the findings discussed

above, we expect a small to moderate significant negative association of EI with each of anxiety, depression, and stress.

EI AND COPING

Our mediation model (**Figure 1**) proposes a positive relationship between EI with both self-sufficient and socially supported coping strategies and a negative relationship between EI with avoidant coping strategies. In the paragraphs below, we outline the evidence for associations of each of these types of coping with ability EI.

This assumption that EI influences the coping strategies people use and the successful implementation of these strategies was assumed in early EI theory (Salovey et al., 1999). In fact, Zeidner et al. (2006) described coping as "emotional intelligence in action" (p. 104), suggesting a link between EI and appraisal-based coping processes, where emotionally intelligent people may cope more effectively due to faster and more accurate processing of emotional material.

Peña-Sarrionandia et al.'s (2015) meta-analysis summarized the associations of ability EI with several coping strategies. They reported significant positive associations of ability EI with self-sufficient and socially supported coping but significant negative associations with avoidant coping. Effect sizes were small for self-sufficient coping strategies ($d = 0.21$ with positive reappraisal and $d = 0.23$ with problem-solving) and moderate for socially supported coping strategies ($d = 0.50$ with social support seeking) and avoidant coping strategies ($d = -0.41$ with denial and $d = -0.43$ with behavioral disengagement). More recent empirical studies report similar findings. Mestre et al. (2017) examined the emotion management branch of ability EI only, finding significant positive associations with active coping strategies such as positive reappraisal and re-focus on planning. Curci et al. (2017) found that ability EI was not significantly associated with a self-sufficient coping strategy (problem-focused coping) but showed significant negative associations with strategies indicative of avoidance coping (emotion-focused and avoidant coping). Both Goldenberg et al. (2006) and MacCann et al. (2011) found that the associations of ability EI with coping strategies were largest for the emotion management branch.

COPING AND WELL-BEING

While different types of strategies are useful in different situations (e.g., Aldao et al., 2015), evidence suggests that some strategies are more effective than others *on average*. Specifically, self-sufficient and socially supported strategies are generally effective and are linked with positive outcomes, whereas avoidant strategies are generally ineffective and are linked with negative outcomes (Stowell et al., 2001; Abbott, 2003; Moos and Holahan, 2003; Litman, 2006; Litman and Lunsford, 2009). Meta-analytic results suggest that: a) self-sufficient and socially supported coping are associated with greater well-being and lower ill-being, whereas b) avoidant

coping strategies are associated with lower well-being and greater ill-being. We summarize these meta-analytic findings below.

For well-being, there are two meta-analyses examining links to coping, one with clinical populations only (Kraiss et al., 2020) and one in general populations (both clinical and non-clinical, Kato, 2015). Kato found that well-being showed a moderate association with self-sufficient coping strategies (active coping and positive re-framing) and socially supported coping but a small negative relationship with well-being. Kraiss et al. found that a self-sufficient coping strategy (positive reappraisal) showed a small to moderate positive association whereas avoidant coping showed a moderate negative association.

For ill-being, meta-analyses by both Aldao et al. (2010) and Kato (2015) examined the relationship of coping strategies to depression and anxiety. Both found a consistent negative relationship between self-sufficient coping strategies (reappraisal, problem-solving, active coping) with all ill-being indices, which varied in size from small to moderate. Kato found little relationship between self-sufficient coping to ill-being. Both found consistent positive relationships of avoidant coping with all ill-being indices that ranged from moderate effect size to moderate to large effect size.

THE CURRENT RESEARCH

We propose a conceptual model in which coping strategies mediate the relationship between EI and well-being. The current studies will extend previous studies by examining the link between EI, coping, and well-being by using a broader range of coping strategies, well-being, and ill-being than previously examined. This work will therefore provide a better understanding of how EI impacts a wide range of well-being outcomes, and whether the habitual coping strategies used by high-EI individuals may account for such relationships. The path model shown in **Figure 1** indicates the expected directions of the interrelationships among the constructs of interest.

In brief, both the current studies test the same hypotheses, outlined below.

1. **EI will significantly predict coping**, showing positive relationships with self-sufficient coping and socially supported coping (Hypothesis 1a), and a negative relationship with avoidance coping (Hypothesis 1b).
2. **EI will significantly predict well-being and ill-being**, showing a positive relationship with well-being (psychological well-being and life satisfaction; Hypothesis 2a) and a negative relationship with ill-being (depression, anxiety, and stress; Hypothesis 2b).
3. **Coping will significantly predict well-being and ill-being**, with self-sufficient coping predicting greater well-being and lower ill-being (Hypothesis 3a), socially supported coping likewise predicting greater well-being but lower ill-being (Hypothesis 3b), but avoidance-focused coping strategies predicting lower well-being and greater ill-being (Hypothesis 3c).

4. **There will be significant indirect effects of coping on the relationship of EI to both well-being and ill-being**. Specifically, there will be a positive indirect effect through self-sufficient coping (Hypothesis 4a), socially supported coping (Hypothesis 4b), and avoidant coping (Hypothesis 4c).

STUDY 1

Study 1 was designed to examine the extent to which the relationship between emotional intelligence and well-being is mediated by coping. We consider both well-being (psychological well-being and life satisfaction) and ill-being (the DASS subscales of depression, anxiety, and stress). We expect that EI will be positively associated with psychological well-being and life satisfaction and negatively associated with psychological distress.

In many of the commonly used instruction sets for coping measures, participants are asked what they would usually do when they are under stress (e.g., Carver et al., 1989) or about a specific stressor that they have experienced in their lives (e.g., McCrae and Costa, 1986). However, different people have different amounts and types of stress in their lives and may therefore be responding in terms of different conceptualizations of what "being under stress" means. For example, the stress of a young child continually absconding from school is a qualitatively different form of stress from job insecurity, which is different again to the stress of a major health or pain condition. In this study, we tried to control for this variation by situating the coping responses within hypothetical situations. Keeping the situation content consistent across all participants effectively controls for variance due to the level of stress people experience in their daily lives. We argue that when the context for coping is held constant, individual differences in dispositional coping can be captured more accurately. This study, therefore, uses 5 scales of the brief COPE as applied to 30 different vignettes (Carver et al., 1989).

This study assesses two of the four branches of EI using two non-proprietary tests of emotional intelligence—the Situational Test of Emotion Understanding (STEU) and Situational Test of Emotion Management (STEM; MacCann and Roberts, 2008) and the measure of coping described below to test whether coping mediates the effect of EI on well-being outcomes. We focus on these two strategic emotional intelligence branches because prior research has demonstrated that these higher branches (and particularly emotion management) show the strongest relationships with coping and well-being (Goldenberg et al., 2006; MacCann et al., 2011, 2020; Ruiz-Aranda et al., 2014).

MATERIALS AND METHODS

Participants

Participants were 105 Australian undergraduate psychology students from The University of Sydney (78.1% female; $M_{age} = 19.13$, SD = 3.56, range = 17 to 51; self-reported ethnicities

were 50% White, 46% Asian, 6% other or unspecified). An additional nine participants who took part in the study were excluded from the final analyses due to meeting one or more of the following exclusion criteria: (a) did not complete all of the coping items; (b) endorsed the same response (e.g., "4—Agree") for all items on a scale (except for the DASS, where endorsing "0" for all items was considered a feasible response); (c) completed the entire test-battery in less than 15 min (a completion time < 15 min was unrealistic and indicative of non-serious responding); or (d) reported speaking English "not at all" or "not well," such that scores on the EI tests may represent English-language ability rather than EI.

MEASURES

Emotional Intelligence
Situational Test of Emotional Management
In this 44-item test, participants are presented with a vignette describing an emotional situation and must rate the effectiveness of each of four strategies for managing that situation (MacCann and Roberts, 2008). For example, "*Evan's housemate cooked food late at night and left a huge mess in the kitchen that Evan discovered at breakfast. How effective are each of the following actions? (a) Tell his housemate to clean up the mess; (b) Ask his housemate that this not happen again; (c) Clean up the mess himself; (d) Assume that the housemate will clean it later.*" Items were scored based on expert consensus.

Situational Test of Emotional Understanding
In this 42-item test, participants must select which of five emotions a protagonist is feeling in a particular situation (MacCann and Roberts, 2008). For example, "*An irritating neighbor of Eve's moves to another state. Eve is most likely to feel? (a) Regret; (b) Hope; (c) Relief; (d) Sadness; (e) Joy*" (correct answer = relief). Items are scored according to the theoretically correct answer based on Roseman's appraisal theory (Roseman, 1991).

Coping
Coping (30 Vignettes)
For each of 30 vignettes describing an everyday stressful situation, participants rated how likely they would be to use 10 possible coping responses on a scale from 1 ("Not at all") to 9 ("Extremely"). These 10 coping responses were taken from five of the brief COPE scales: active coping, denial, use of emotional support, positive reframing, and self-blame, i.e., each strategy had two items (Carver et al., 1989). In keeping with the taxonomy proposed by Litman (2006), the active coping and positive reframing items were averaged to create a "self-sufficient" coping score. The two emotional support coping items were averaged to create a "socially supported" coping score. The denial and self-blame items were averaged to create an "avoidant-oriented" score. An example vignette is "*You have been given a new person to supervise at work. They are not*

making any progress. Your boss says that you need to use better management skills to help them progress. This person takes up a lot of your time and does not listen to you." All 30 vignettes are provided in the open science framework page for this project (https://osf.io/46v9t/). For each vignette, participants rated how they would cope in the situation (6 items). Participants also rated how they would feel in this situation (3 items), but these ratings were not used in the current study.

Psychological Distress
Depression Anxiety Stress Scale (DASS-21)
This 21-item instrument assesses self-reported depression (e.g., "I found it difficult to relax"; 7 items), anxiety (e.g., "I felt I was close to panic"; 7 items) and stress (e.g., "I found it difficult to relax"; 7 items; Lovibond and Lovibond, 1995). Participants responded to each item on a 4-point scale (0 = did not apply to me at all, 3 = applied to me very much, or most of the time) in reference to the past week.

Well-Being Outcomes
Ryff's Scales of Psychological Well-Being
The 18-item version of this instrument assesses aspects of well-being associated with autonomy, personal growth, relationships, meaning, self-acceptance, and environmental mastery (e.g., "For me, life has been a continuous process of learning, changing, and growth"; Ryff, 1989). Participants responded to each item on a 6-point scale (1 = "Strongly Disagree," 2 = "Disagree somewhat," 3 = "Disagree slightly," 4 = "Agree slightly," 5 = "Agree somewhat" and 6 = "Strongly Agree").

Satisfaction With Life Scale
This 5-item scale measures global life satisfaction. Items are rated on a 5-point scale from 1 = "Strongly Disagree" to 7 = "Strongly Agree" (e.g., "I am satisfied with my life"; Diener et al., 1985).

Procedure
Participants made an appointment to attend the in-laboratory study after viewing a study ad on the online experiment participation system (SONA). After reading a participant information form in the laboratory, participants provided written consent to take part in the study. During proctored testing sessions of up to 10 participants, students completed demographic questions and the measures outlined above on university computers. All protocols were programmed in Qualtrics. Students received course credit (2% of their psychology mark that semester) in exchange for participation. This study received ethics approval from The University of Sydney (2014/292).

Transparency and Openness
Data, scripts, output, and full study protocol are available as electronic supplementary materials at https://osf.io/46v9t/ for both Study 1 and Study 2.

ANALYTIC STRATEGY

Hypotheses 1 to 3 were tested with correlation coefficients. Hypothesis 4 was tested as a series of mediation models, performed using the "laavan" R package (Rosseel, 2012). We ran separate mediation models for each of the five DVs (depression, anxiety, stress, psychological well-being and life satisfaction) and ran these separately for emotion understanding and emotion management as predictors. Each model had three mediators (self-sufficient, socially supported and avoidant coping). Standardized beta values are reported in the tables below and path diagrams are available in the supplementary material.[1] All analyses were performed with R version 3.4 (R Core Team, 2017). We interpret the effect size of correlations and standardized regression coefficients using Cohen's (1988) guidelines on correlations for what constitutes a small (0.10), medium (0.30) or large (0.50) effect. For the indirect effects, we interpret the effect size in terms of the square root of the *ab* pathway, given that *ab* is a compound effect of *a* and *b* (i.e., small, medium, and large values of *ab* would be 0.01, 0.09, and 0.25, given that small, medium and large values of *a* and *b* would be $r = 0.10$, 0.30, and 0.50).

RESULTS

Descriptive Statistics
Descriptive statistics and correlations are presented in **Table 1**. All scales showed good reliability (Cronbach's alpha range 0.73 to 0.98).

Hypothesis Testing
Hypothesis 1: EI Predicts Coping
Hypothesis 1 received partial support. Avoidant coping showed significant negative associations with both the STEU ($r = -0.40$) and the STEM ($r = -0.33$). However, there were no significant relationships between EI and either self-sufficient or socially supported coping. These results support Hypothesis 1b but not 1a.

Hypothesis 2: EI Predicts Well-Being Outcome
Both the STEU and STEM were significantly negatively correlated with depression, anxiety, and stress ($r = -0.24$ to -0.48) and significantly positively correlated with psychological well-being ($r = 0.25$ and 0.29) but relationships between EI and life satisfaction were not significant. Results were strongest for anxiety (with a large effect size for the STEU and moderate effect size for the STEM), consistent with MacCann and Roberts (2008). These results support Hypothesis 2a and 2b (prediction of DASS subscales and psychological well-being) but not 2c (prediction of life satisfaction).

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[1]https://osf.io/vr2zb/

TABLE 1 | Descriptive statistics, reliability, and correlations among EI, coping, ill-being, and well-being outcomes, Study 1 (N = 105).

Variable	M	SD	α	1	2	3	4	5	6	7	8	9
1. Emotion understanding	0.61	0.13	0.73									
2. Emotion management	0.49	0.08	0.76	0.68**								
3. Self-sufficient coping	5.62	1.04	0.96	0.07	0.18							
4. Socially supported coping	4.66	1.39	0.96	−0.07	0.06	0.46**						
5. Avoidant coping	3.19	1.21	0.98	−0.40**	−0.33**	0.19	0.42**					
6. Depression	13.05	4.96	0.90	−0.25*	−0.24*	−0.16	0.03	0.31**				
7. Anxiety	11.61	4.09	0.83	−0.48**	−0.38**	0.06	0.20*	0.48**	0.54**			
8. Stress	14.26	4.47	0.84	−0.28**	−0.28**	−0.02	0.18	0.36**	0.46**	0.70**		
9. Psychological well-being	4.16	0.60	0.78	0.25*	0.29**	0.30**	−0.04	−0.41**	−0.64**	−0.39**	−0.23*	
10. Life satisfaction	4.34	1.34	0.88	0.07	0.05	0.30**	0.06	−0.10	−0.55**	−0.26**	−0.18	0.60**

*p < 0.05; **p < 0.01.

Hypothesis 3: Coping Predicts Well-Being Outcomes

Hypothesis 3 received partial support. Self-sufficient coping significantly predicted both well-being variables but none of the ill-being variables, providing partial support for Hypothesis 3a. Socially supported coping significantly predicted only *greater* anxiety (i.e., the opposite direction to hypotheses), providing no support for Hypothesis 3b. Avoidant coping significantly predicted four of the five outcomes in the expected direction (life satisfaction being the exception), providing some support for Hypothesis 3c. Specifically, avoidant coping was significantly associated with higher scores on the three DASS subscales (with a large effect for anxiety and moderate effects for depression and stress) and with lower psychological well-being (with a moderate to large effect size). There was no significant association with life satisfaction. Self-sufficient coping significantly predicted higher levels of life satisfaction and psychological well-being (with moderate effect size) but was not significantly associated with the DASS scores.

Hypothesis 4: Coping Mediates the Effect of EI on Well-Being and Mental Health Outcomes

For each model, **Table 2** shows the point estimates for each indirect effect and the total indirect effect of all three coping strategies. Results are described below for emotion understanding and emotion management.

Emotion Understanding

Total indirect effects were significant in four cases (for depression, anxiety, stress and well-being, but not life satisfaction). In all four cases, the indirect effect was significant for avoidant coping but not for self-sufficient coping or socially supported coping. Significant indirect effects ranged in magnitude from moderate (ab = 0.11 for stress) to a moderate-to-large effect size for well-being (ab = 0.18). That is, mediation occurred through avoidant coping only. These results support Hypothesis 4c (but not 4a or 4b).

Emotion Management

Total indirect effects were significant for depression, anxiety, well-being, and life satisfaction (but not stress), and the indirect effect of avoidant coping was significant for four of the five outcome variables (all but life satisfaction). The effect size for the indirect effect of avoidant coping was moderate in all cases. Again, these results support Hypothesis 4c (but not 4a or 4b).

STUDY 1 DISCUSSION

The results of Study 1 generally support hypotheses for avoidant coping but not for either of the active forms of coping (self-sufficient coping and socially supported coping). EI predicted lower ill-being and greater psychological well-being (but not greater life satisfaction), and the effect of EI on these outcomes was significantly mediated by avoidant coping. That is to say, the mechanism by which EI affects well-being may be due to less frequent use of ineffective coping strategies rather than more frequent use of effective coping strategies.

	Depression	Anxiety	Stress	PWB	Life satisfaction
	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)
Emotion understanding					
Direct effect	−0.11	−0.35**	−0.16	0.03	−0.03
Total indirect effect	−0.14*	−0.13**	−0.12*	0.22**	0.09
Self-sufficient coping	−0.01	0.01	−0.01	0.03	0.02
Socially supported coping	0.01	−0.01	−0.01	0.01	0.01
Avoidant coping	−0.12*	−0.13**	−0.11*	0.18**	0.07
Emotion management					
Direct effect	−0.10	−0.26**	−0.19	0.08	−0.07
Total indirect effect	−0.14**	−0.12*	−0.09	0.21**	0.12*
Self-sufficient coping	−0.04	0.01	−0.02	0.07	0.06
Socially supported coping	0.01	0.01	0.01	−0.01	−0.01
Avoidant coping	−0.10*	−0.12*	−0.09*	0.15**	0.06

*$p < 0.05$; **$p < 0.01$.

STUDY 2

The aims of Study 2 were to extend the findings of Study 1 to all four major branches of EI (i.e., to include emotion perception and emotion facilitation, as well the branches of emotion understanding and management used in Study 1). Study 2, therefore, uses the MSCEIT instead of the STEM and STEU (Mayer et al., 2003). The outcome variables are the same as in Study 1, and we test the same hypotheses described above.

MATERIALS AND METHODS

Participants

Participants were 115 undergraduate psychology students from The University of Sydney, participating in exchange for course credit. The sample was 61.7% female with a mean age of 20.10 ($SD = 3.56$), range 17–40. Self-reported ethnicities were 74% White, 21% Asian, 5% more than 1 ethnicity, and 2% other or unspecified. An additional six participants completed some or all study protocols but were excluded using the same exclusion criteria adopted by Study 1 ($n = 4$), or because they had not completed the MSCEIT ($n = 2$).

Materials

Measures of depression, anxiety, stress, psychological well-being, and life satisfaction were the same as in Study 1. To reduce time demands on participants, we used an abbreviated version of the coping measure in this study, utilizing only 12 vignettes, rather than 30. Four vignettes represented an anxiety-inducing situation, four represented sadness or loss, and four represented irritation/anger.

Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT)

Emotional intelligence was assessed using a 141-item ability-based assessment of the four branches of emotional intelligence (emotion perception, emotion facilitation, emotion understanding, and managing emotions; Mayer et al., 2003). There were two

subtests for each of the four branches. For perception, facilitation, and management sub-tests, participants used a 5-point rating scale (rating the presence of emotion, helpfulness of an emotion, similarly of an emotion to a physical sensation, or effectiveness of response). The emotion understanding tasks are multiple-choice, where participants select one of four options. Consensus scoring was used for all 8 subtests.

PROCEDURE

As in Study 1, participants made an appointment to attend an in-laboratory proctored testing session after viewing a study ad on the online experiment participation system (SONA). All measures were completed online on university computers, in sessions of up to 10 participants. The coping and well-being assessments were programmed in Qualtrics, and the emotional intelligence assessment was completed *via* the Multi-Health Systems online portal. Students received course credit (2% of their psychology mark that semester) in exchange for participation. This study received ethics approval from The University of Sydney (2013/761).

RESULTS

All analyses were performed in the same fashion as Study 1. Mediation models were performed separately for each of the four branches of the MSCEIT. Path diagrams are available in the supplementary materials.[2]

Descriptive Statistics

Descriptive statistics, internal consistency reliability, and correlations for all variables are presented in **Table 3**. All reliability estimates were reasonable, ranging from 0.68 (for the MSCEIT Facilitation branch) to 0.97 (for socially supported coping). All four MSCEIT branches were positively related ($r = 0.19$ to $r = 0.56$).

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[2]https://osf.io/vr2zb/

Hypothesis Testing
Hypothesis 1: EI Predicts Coping
Only one of the four branches (emotion management) was significantly related to self-sufficient and socially supported coping, with a small effect size. All EI branches except emotion facilitation were significantly related to lower avoidant coping, with medium effect sizes for the three branches. These results support hypothesis 1b but not 1a, replicating Study 1.

Hypothesis 2: EI Predicts Well-Being
EI was significantly related to depression (except understanding emotions), anxiety, and psychological well-being (perceiving and managing emotions) in the expected directions. Two of the four branches (understanding and managing emotions) predicted lower stress, and only one of the four branches (perception) predicted high life satisfaction. Results were moderate for anxiety, small or moderate for depression, small or moderate for psychological well-being, and small for stress and life satisfaction. These results are largely similar to Study 1—the strongest effect occurred for anxiety, with inconsistent relationships to life satisfaction or stress. In general, there was mixed support for Hypotheses 2a and 2b.

Hypothesis 3: Coping Predicts Well-Being
As in Study 1, avoidant coping predicted significantly greater depression, anxiety, stress, and significantly lower psychological well-being but not lower life satisfaction. Self-sufficient coping predicted greater psychological well-being and life satisfaction. Socially supported coping was not significantly related to any outcome. In general, results support Hypothesis 3b with much weaker support for 3a.

Hypothesis 4: Coping Mediates the EI/Well-Being Relationship
The mediation analyses testing Hypothesis 4 are presented in **Table 4**. For all four branches of EI: (a) neither self-sufficient coping nor socially supported coping were significant mediators of any outcome, except self-sufficient coping which mediated the EI-psychological wellbeing relationship (b) avoidant coping was a significant mediator in 10 of the 20 analyses (effect sizes were moderate; $ab = 0.08$ to 0.11); and (c) the total indirect effect of EI was significant in 12 of the 20 analyses. These results are largely consistent with Study 1 and largely support Hypothesis 4. Significant results for each branch are given below.

Emotion Perception
Avoidant coping was a significant mediator for all three DASS scores but not psychological wellbeing or life satisfaction. Total indirect effects were significant for all three DASS scores (but not for psychological well-being or life satisfaction).

Emotion Facilitation
Avoidant coping was a significant mediator for stress and no other criterion variable. Total indirect effects were only signficant for stress and no other criterion variable.

Emotion Understanding
Avoidant coping was a significant mediator for all DASS scores, but not psychological well-being or life satisfaction. Total indirect effects were significant for the DASS scores.

Emotion Management
Avoidant coping was a significant mediator for all three DASS scores, but not life satisfaction or psychological well-being. Indirect effects were significant for all three DASS scores.

STUDY 2 DISCUSSION

The results of Study 2 largely replicated Study 1. Avoidant coping, rather than the two forms of active coping, mediated the relationship between EI and well-being outcomes. The results differed somewhat by branch (with emotion understanding showing the strongest effects), and the clearest results were obtained for the DASS, with much less support for the mediation model using life satisfaction and psychological well-being as the outcomes.

GENERAL DISCUSSION

There is considerable evidence that EI abilities predict greater well-being and lower ill-being (e.g., Schutte et al., 2007; Martins et al., 2010; Sánchez-Álvarez et al., 2016; MacCann et al., 2020a). Our results suggest that the EI/well-being relationship can be at least partly accounted for by differences in dispositional coping. Specifically, emotionally intelligent people habitually used less avoidant coping, which was related to lower anxiety, depression and stress, and higher psychological well-being. Across the two studies, there was a consistent indirect effect through avoidant coping that held for all models of ill-being and most models of psychological well-being. There was little empirical support for the effects on life satisfaction or for effects of the other two coping strategies examined (self-sufficient coping and socially supported coping) as mediators.

Avoidant Coping Is the Critical Ingredient Linking EI to Ill-Being
Across both studies, all branches of EI tended to be related to lower avoidant coping, but were not significantly related to self-sufficient or socially supported coping (except for MSCEIT Management). It is therefore unsurprising that there were consistent significant indirect effects of EI through avoidant coping, but not through self-sufficient or socially supported coping. This is important for understanding the mechanisms linking EI to valued outcomes. There is substantial evidence that the use of avoidant-orientated coping strategies (self-blame, denial) is maladaptive, with a link between the use of these strategies and mood and anxiety disorders well established (e.g., Garnefski et al., 2001; Aldao and Nolen-Hoeksema, 2010). Our results suggest that it is not the adaptive coping strategies high EI people use, but rather the maladaptive coping strategies they do *not* use that

TABLE 3 | Descriptive statistics, reliability, and correlations among EI, coping, ill-being, and well-being, Study 2 (N = 115).

Variable	M (SD)	α	1	2	3	4	5	6	7	8	9	10	11
1. Perceiving emotions	0.56 (0.09)	0.85											
2. Using emotions	0.47 (0.07)	0.68	0.51**										
3. Understanding emotions	0.54 (0.06)	0.74	0.19*	0.26**									
4. Managing emotions	0.39 (0.07)	0.73	0.31**	0.38**	0.56**								
5. Self-sufficient coping	5.99 (1.15)	0.95	0.03	0.08	0.01	0.21*							
6. Socially supported coping	5.28 (1.77)	0.97	0.03	0.16	0.09	0.19*	0.49**						
7. Avoidant coping	2.99 (1.08)	0.96	−0.25**	−0.17	−0.24**	−0.28**	0.07	0.22*					
8. Depression	5.24 (5.00)	0.91	−0.30**	−0.24**	−0.17	−0.26**	−0.17	−0.04	0.34**				
9. Anxiety	3.75 (4.08)	0.83	−0.24*	−0.27**	−0.31**	−0.30**	−0.12	0.05	0.44**	0.68**			
10. Stress	7.34 (5.22)	0.87	−0.17	−0.16	−0.20*	−0.18*	−0.13	0.00	0.38**	0.63**	0.75**		
11. Psychological well-being	13.42 (1.54)	0.69	0.22*	0.14	0.13	0.30**	0.48**	0.15	−0.18*	−0.50**	−0.23*	−0.22*	
12. Life satisfaction	4.55 (1.31)	0.87	0.22*	0.14	−0.04	0.16	0.29**	0.14	−0.14	−0.45**	−0.16	−0.16	0.58**

*p < 0.05; **p < 0.01.

relates to their lower ill-being. Specifically, high-EI people *do not* habitually use avoidant coping whereas low-EI people do. This was the major difference and accounted for a significant amount of the relationship between EI with well-being and with ill-being.

There are four possible reasons why avoidant coping may be the critical ingredient linking EI to well-being outcomes. We discuss each of these possible reasons below.

1. **Avoidant coping may be confounded with stressor intensity.** It may well be that avoidant coping (disengaging from the stressor) signifies that the stressor is particularly distressing/unresolvable, such that the intensity of the stressor is the confounding variable linking avoidant coping to lower well-being. For example, individuals who experience highly intense affect tend to use avoidant coping more (Flett et al., 1996) However, we obtained ratings averaged across multiple stressors (12 or 30) that were the same across all individuals so that individual differences in dispositional coping (as we measured it) would not be confounded with individual differences in the severity or type of stressor.

2. **Avoidant coping relates to stress appraisals.** It may be that avoidant coping (disengaging from the stressor) relates to individual differences in stress appraisal. People with low EI may appraise stressors as uniformly lower in coping potential, an appraisal bias thought to underlie hopelessness, helplessness, and potentially anxiety (Scherer, 2009) and so link to avoidance. In both studies, the strongest association of EI with any outcome variable was for emotion understanding with anxiety, which is consistent with this idea (as emotion understanding explicitly involves situational appraisals). Future research could explicitly test whether appraisal biases associated with low EI are the cognitive mechanism linking EI abilities to coping responses.

3. **Other strategies (but not avoidant coping) may require skilled implementation to confer benefit.** It may be that the usefulness of the more active forms of coping (self-sufficient coping and socially supported coping) relies on effective *implementation* of the coping strategy to a greater extent than less active forms of coping (such as avoidant coping). That is, people need to have the *ability* to self-sufficiently cope, not simply the dispositional tendency to do so, for self-sufficient coping to affect well-being. Evidence supports the idea that coping efficacy affects outcomes for active coping but not for avoidant coping (e.g., Frydenberg and Lewis, 2009). In the case of socially supported coping, well-being would also logically be related to the quality and availability of social support (Prati and Pietrantoni, 2009). That is, while it is always helpful to reduce avoidant coping, the helpfulness of self-sufficient and socially supported coping depends on the available resources. Self-sufficient coping is helpful if you have the skills to implement the strategies effectively, and socially supported coping is helpful if you have social support available.

TABLE 4 | Indirect effects of EI on ill-being and well-being through coping (fully standardized estimates shown), Study 2, N = 115.

	Depression	Anxiety	Stress	PWB	Life satisfaction
Perceiving emotions					
Direct effect	−0.22*	−0.13	−0.07	0.17*	0.18
Total indirect effect	−0.08*	−0.11*	−0.10*	0.05	0.04
Socially supported coping	0.01	0.01	0.01	0.01	0.01
Self-sufficient coping	−0.01	0.01	0.01	0.01	0.01
Avoidant coping	−0.08*	−0.10*	−0.09*	0.04	0.03
Using emotions					
Direct effect	−0.18*	−0.21*	−0.07	0.17*	0.09
Total indirect effect	−0.07	−0.07	−0.10*	0.06	0.05
Socially supported coping	0.01	0.01	0.01	−0.01	0.01
Self-sufficient coping	−0.02	−0.01	−0.01	0.04	0.02
Avoidant coping	−0.06	−0.07	−0.09*	0.03	0.03
Understanding emotions					
Direct effect	−0.10	−0.23*	−0.12	0.10	−0.10
Total indirect effect	−0.09*	−0.10*	−0.10*	0.05	0.06
Socially supported coping	0.01	0.01	0.01	−0.01	0.01
Self-sufficient coping	0.01	0.01	0.01	0.01	0.01
Avoidant coping	−0.09*	−0.10*	−0.10*	0.05	0.05
Managing emotions					
Direct effect	−0.13	−0.18*	−0.05	0.17	0.05
Total indirect effect	−0.13*	−0.13*	−0.14*	0.14*	0.11*
Socially supported coping	0.01	0.01	0.01	−0.02	0.01
Self-sufficient coping	−0.04	−0.03	−0.03	0.11*	0.06
Avoidant coping	−0.09*	−0.11*	−0.11*	0.04	0.04

*p < 0.05; **p < 0.01.

4. **Avoidant coping is known to mediate the effect of personal resources on well-being.** If EI represents a personal resource people can draw from, our results may add to the growing number of findings that avoidant coping mediates the effect of personal resources on well-being. People with greater personal resources are less likely to habitually use avoidant coping, which has positive effects on their well-being. In fact, there is evidence from multiple contexts that avoidant coping mediates the effect of personal resources (or personal burdens) on health and well-being (e.g., Gomez, 1998; Jose and Huntsinger, 2005; Manne et al., 2005; Mausbach et al., 2006; Polman et al., 2010; Boals et al., 2011; Pacella et al., 2011; Cheng et al., 2015; Li et al., 2016; Brooks et al., 2019). In many cases, the indirect effect is found only for avoidant coping and not for other more active forms of coping (Jose and Huntsinger, 2005; Polman et al., 2010; Boals et al., 2011; Brooks et al., 2019). Like other personal resources, an individual's ability EI may relate to higher well-being through lower use of avoidant coping behaviors (rather than through greater use of particularly active or effective coping strategies).

PRACTICAL IMPLICATIONS OF STUDY FINDINGS

If EI exerts its effects on ill-being through avoidant coping, there are implications for EI training programs. There is clear meta-analytic evidence that EI training programs increase ability EI (Hodzic et al., 2018; Mattingly and Kraiger, 2019), and emerging evidence that they also affect secondary outcomes such as well-being and psychological health (Kotsou et al., 2019). Often, the ultimate goal of EI training is the change to secondary outcomes—decreases in employee stress, student misbehavior, workplace incivility, or a more positive institutional climate. Bluntly put, organizations pay for EI training because they expect that higher EI will have flow-on effects to increased well-being and the identifiable financial benefits associated with this increase (e.g., Mikolajczak and Van Bellegem, 2017). Our results suggest that well-being outcomes could be maximized by including a focus on avoiding sub-optimal responses (i.e., what not to do—avoidant coping) to complement or replace training activities that focus on optimal or ideal responses (i.e., self-sufficient and socially supported coping strategies). Case studies, role plays, and reflection activities might include worst-case scenarios that illustrate the damaging effects of avoidant coping strategies (such as self-blame or denial). While our study did not provide causal evidence of the link between avoidant coping and well-being, Sikkema et al.'s (2013) randomized control trial provides causal evidence that decreasing avoidant coping leads to increases in well-being. In a randomized control trial of a coping intervention, Sikkema et al. (2013) found that training reduced avoidant coping and this reduction completely accounted for the decreases in traumatic stress. The major importance of our research for practitioners is therefore to suggest that emotional intelligence training programs include content on "what not to do," as lower use of maladaptive coping strategies (such as avoidant coping) may have the strongest effect on well-being and ill-being outcomes.

LIMITATIONS AND FUTURE DIRECTIONS

Both studies used a cross-sectional design with convenience samples of predominantly female psychology undergraduates, which may limit the generalizability of findings. Future research could replicate this model in more diverse samples to test whether results are similar in older samples or to disaggregate by gender to test whether results differ for males and females. Future research could also replicate this model in different contexts (e.g., employment, competitive sport, romantic relationship, or family relationship contexts), and use stronger designs. For example, future research could examine context-specific coping strategies in the EI/well-being relationship as the situation unfolds over time, as coping is a dynamic within-person process (Roesch et al., 2010). Our studies were also limited by the sole reliance on self-ratings of coping and outcome variables, rather than other forms of data (e.g., informant ratings or physiological indices of stress such as cortisol or heart rate variability).

In conclusion, the current studies supported a mediation model whereby EI relates to reduced use of avoidant coping which relates to increased well-being and reduced ill-being. These associations suggest some possible mechanisms by which EI produces greater emotional well-being.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found on the Open Science Framework at: https://osf.io/46v9t/.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Sydney Human Ethics. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CM conceived the study. KD and IC performed the analysis. All authors contributed to the article and approved the submitted version.

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