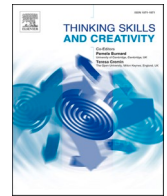


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Emotional intelligence and academic performance: A systematic review and meta-analysis

Alberto Quílez-Robres^a, Pablo Usán^b, Raquel Lozano-Blasco^{b,*}, Carlos Salavera^b

^a Department of Science Education, Faculty of Human Sciences and Education, University of Zaragoza, 22003 Huesca, Spain

^b Department of Psychology and Sociology, Education Faculty, University of Zaragoza, 22003 Zaragoza, Spain

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ABSTRACT

Numerous studies have related emotional intelligence to academic performance, because education and its regulation play an important role in the cognitive processes involved in attention and in situations that require management and self-control. The main aim of this meta-analytical study is to investigate the relationship between academic performance and emotional intelligence. The study also addresses the role played by certain moderating factors, such as age, sex, country, geographical region, type of performance and psycho-developmental stage of individuals. A thorough review of the existing literature was undertaken, comprising 27 articles, 28 samples and 13,909 participants. The study was based on PRISMA protocols and consensus between the participating scientists. The results suggest that emotional intelligence is a valuable variable to predict academic performance, as it was shown to have a significant moderate-high effect size ($r = 0.390$ and $p < 0.001$). In addition, although none of the regression models applied to moderating variables yielded relevant results, significant differences between geographical regions and type of performance measured were detected. It is concluded that setting up programmes to stimulate emotional intelligence at the school level can improve the personal development of individuals and also their academic performance.

1. Introduction

Emotional intelligence (thereafter EI) is the ability to perceive, manage and regulate emotions, promoting adaptive thinking and the understanding of the meaning and consequences of emotions. This process of management, regulation and adaptation allows the person to develop intellectually, socially and emotionally (Brackett & Salovey, 2006). In consequence, according to the principles of educational psychology and learning, these skills should be correlated with academic performance, being an important tool against academic failure (Goleman, 1998). In addition, EI is a valuable predictor of wellbeing, health and quality of life (Martins et al., 2010; Mikolajczak et al., 2015; Peña-Sarrionandia, 2015). It is for this reason that specific EI learning allows the individual to better understand their own emotions and those of others, contributing to social adaptation (Brackett & Salovey, 2006; Chew et al., 2013; Lievens, et al., 2022).

Emotional intelligence is strongly correlated with academic performance, as emotions play a key role in human cognition (Dolev & Leshem, 2017; Ebinagbome et al., 2011; Mudiono, 2019; Suberviola, 2012). According to learning and teaching psychology, evolutive development and the school of positive psychology, this correlation is strong, as EI the former facilitates mental processes,

* Corresponding author.

E-mail address: rlozano@unizar.es (R. Lozano-Blasco).

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concentration and self-control in stressful situations, as concluded by Puertas-Molero et al.'s (2020) meta-analysis.

However, opinions are not unanimous. Some researchers advocate for a strong and direct relationship (El-Adl & Alkharusi 2020; Khalaf, 2016; Monica & Ramanaiah 2019; Mudiono 2019; Njega, Njoka, & Ndung'u, 2019; Preeti, 2013), to the point of arguing that EI plays a moderating role in personality factors that encourage more efficient approaches to school tasks (Gil-Olarte et al., 2006; Lyons & Schneider, 2005; Romanelli et al., 2006; Song et al., 2010). Other studies, while admitting that the relationship exists, argue for a moderate or weak correlation, claiming that EI moderates academic performance, but it is not the most valuable predictor of it (Brackett & Mayer, 2003; Festus, 2012; Rode et al., 2007). Finally, other studies conclude that the relationship is non-existent or non-significant (Hansenne & Legrand, 2012; Kashani et al., 2012; Pope et al., 2011). Therefore, there is no academic consensus concerning the moderating or predictive value of EI concerning academic performance.

Although the scientific literature generally argues for a moderate relationship between EI and academic performance, this relationship can be mediated by other psychological constructs like self-efficacy (Burnette et al., 2013; El-Adl & Alkharusi, 2020; Monica and Ramanaiah, 2019), locus of control (Duckworth & Seligman, 2005; Mavroveli et al., 2008; Sunil & Rooprai, 2009; Umaru & Umma, 2015; Yahaya et al., 2012; Zarezadeh, 2013), self-esteem (Sepahi et al. 2015; Ugwuanyi et al., 2020) and motivation (Bembenutty, 2021; Lewin, 2021; Perera, 2015; Rode et al., 2008; Wilson & Stupnisky, 2021), which lead to more adaptive behaviour (Petrides et al., 2004; Roeser & Eccles, 2000). No consensus exists, however, as to whether EI should be regarded as a dependant or an independent variable with regard to academic performance and the psychological variables noted above (Njega et al. 2019; Nwaukwu et al., 2019; Oyuga et al., 2019). It is also important to keep in mind that some studies reject that there is a correlation between both constructs (Korkmaz et al., 2018).

On the other hand, social skills play an essential role in the process of mediation between EI factors and academic performance. In this way, students with a high EI tend to display good social skills and this leads to good relationships with their peers, being popular and efficient support networks, with positive effects on academic performance (Argyle & Lu, 1990; Brackett et al., 2011; Berndt, 1999; MacCann et al., 2011; Schutte et al., 2001).

There is no scientific consensus concerning the role played by age and sex in this relationship. Soma et al.'s (2021) meta-analysis concludes that age plays no significant role, but other studies reach different results, arguing that EI plays a moderating role during the early university degree years, but not during the final years (Brackett & Salovey, 2006; Joseph & Newman, 2010). It is concluded that final-year students have a much better grip of theoretical principles, and tackle difficulties from a problem-solving rather than an emotional perspective. It is, however, plausible that the moderating role of EI is greater in younger students, as it has been found it plays a greater role amongst primary school students than amongst secondary school students (Perera & DiGiacomo, 2013). Camacho-Morles et al.'s (2021) meta-analysis argue that emotions acquire an essential moderating role during adolescence. However, for some authors the relationship between EI and academic performance is greater at primary school level (Billings et al., 2014; Cazalla-Luna & Molero, 2014). It is even more interesting to see that cognition in children improve as they develop the emotional skills appropriate to their age (Billings et al., 2014; Cazalla-Luna & Molero, 2014). On the other hand, Soma et al.'s (2021) meta-analysis found that sex plays a partial moderating role in the relationship. It must be taken into account that, although many studies point out sex differences in EI levels, these are often explained in terms of different education strategies being applied to men and women, responding in fact to gender stereotypes (Brackett & Salovey, 2006; Brackett et al., 2011; Ceron Perdomo et al., 2021; Kundi & Badar, 2021; Melguizo-Ibáñez et al. 2021; Pulido & Herrera, 2016; Santesso et al., 2006; Soriano & González, 2013). Other studies suggest that the differences are rooted in self-evaluation and self-assessment (Deary et al., 2007; Mestre et al., 2006). Finally, it is worth pointing out that Goleman's classic (1998) research did not find differences between sexes in terms of EI.

On the other hand, it must be kept in mind that school is a cultural tool forged by specific societies (Menter, 2022); Fortin et al. (2015) and MacCann et al. (2020) suggest that women participate more in class, present their doubts and arguments more often and play in general a more active role than men. This leads to better academic results. In other words, it is possible that there are differences in the way families and schools instil emotional skills in women and men (Brackett & Salovey, 2006; Kundi, & Baar, 2021; Melguizo-Ibáñez et al. 2021). It is important to stress the role played by the context and the school environment, because this has a direct effect on the students' skills. In this sense, if the school promotes favourable emotions, interest for learning increases and the results improve (Bosman et al. 2018; Mayer & Salovey, 1997; Nasir & Masrur, 2010; Pullu & Gömleksiz, 2021). Although no correlations seem to exist between public/private schools, the development of emotional skills, and school performance (Cherchye et al., 2010), it has been pointed out that a late arrival to the school system and learning a new language can be a source of learning difficulties (Pulido & Herrera, 2016; Siques & Vila, 2014). In these instances, both students with special needs and those with a normotypical profile can benefit from IE- and school performance-related projects (Li & Xu, 2019; Rodríguez-Ledo et al., 2018; Viguer et al., 2017). It is also important to improve teaching methodologies and promote teachers taking an active role (Austin et al., 2017; Moriña & Biagiotti, 2021; Weissberg & O'Brien, 2004). Roorda et al.'s (2021) meta-analysis emphasised the importance of the teacher as the guide that points the students in the right direction, getting them directly involved in their learning.

The aim of this meta-analytical study is to analyse the mediating role played by EI over academic performance, shedding light on the moderating variables in this relationship through the assessment of their statistical entity.

2. Materials and method

2.1. Search protocol and inclusion criteria

Several search strategies were implemented, following the criteria set out by Botella and Sánchez Meca (2015). The first phase of the study was undertaken in August and September 2021. The databases consulted were Scopus, Web of Science and PubMed.

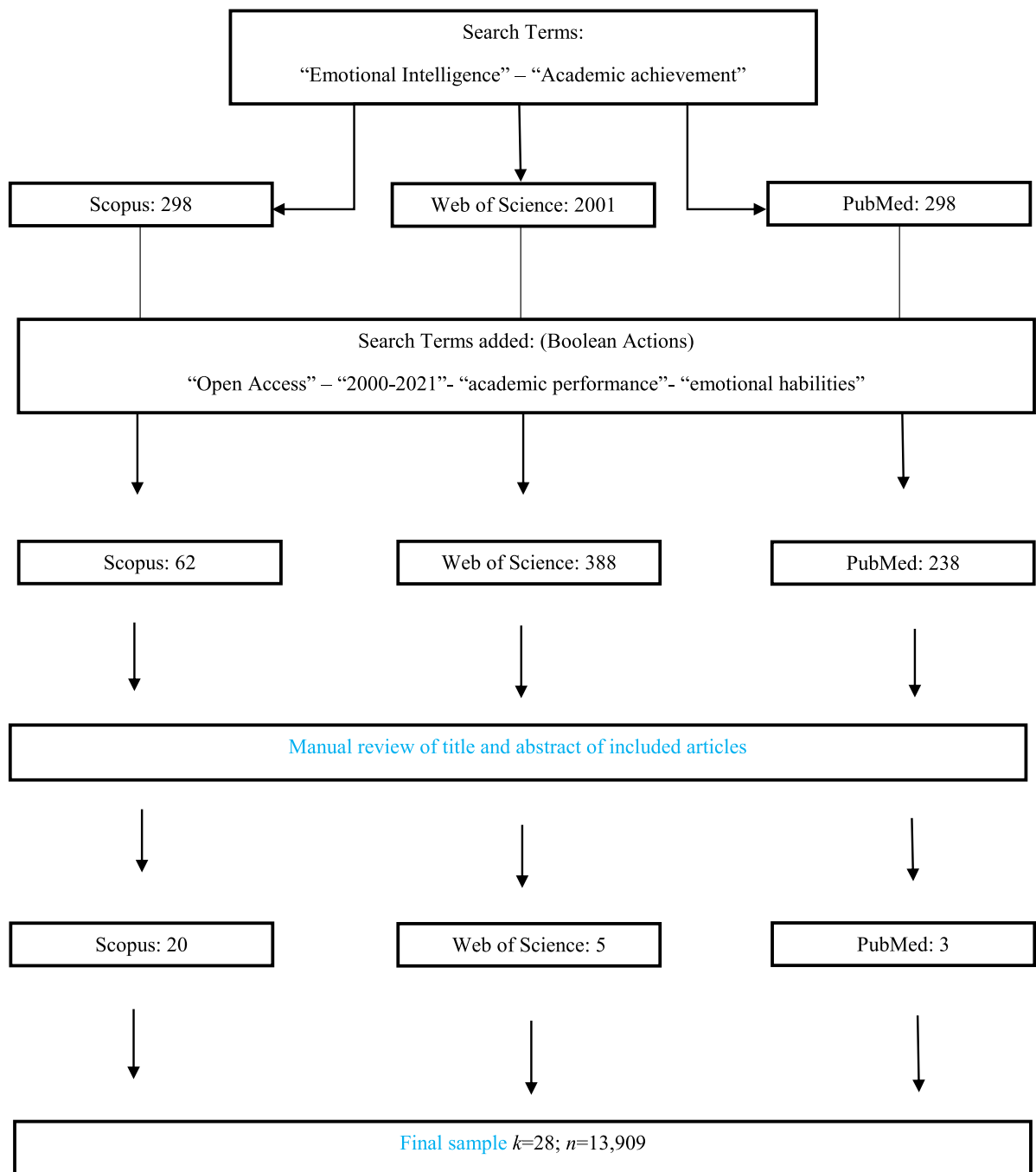


Fig. 1. Flowchart of the search strategy.

According to Botella and Sánchez-Meca (2015), at least two scientifically-relevant databases are to be consulted for the first phase of meta-analysis: search and selection. The reputation of the databases selected is widely recognised, and they cover a wide selection of languages and disciplines. This guaranteed that the search base would be broad, avoiding selection bias.

The initial search terms were “emotional intelligence” and “academic achievement”. Afterwards, the search was narrowed by including the search term “open access”, including only papers in English and Spanish published in the period 2010–2021. The decision to use the open Access filter is based on an accessibility criterion established by Moreau and Gamble (2020). This decision responds to the need for transparency and reproducibility of the research, detailed by López-Nicolás, López-López, and Rubio-Aparicio (2022). It is also an applicable recommendation of the Open Science Collaboration (2015). Following the first search, Boolean searches were undertaken, including different search terms such as “academic performance” and “emotional abilities”. Finally, title and abstracts were manually revised, and the selected titles were included in a table to be ran by a group of experts.

The inclusion criteria were as follows: (a) inclusion of correlation statistics between EI and academic performance; (b) publication date in the period 2010–2021; (c) age range of respondents between 9 and 25 years; (d) academic performance was expressed in standard terms and marks. The exclusion criteria were as follows: (a) the sample comprised a population group with an atypical developmental profile; (b) lack of quantitative data suitable for meta-analysis through Jasp software; (c) partial approach to EI, that is, studies that addressed only one of its factors or dimensions. The selection process turned out 27 studies, comprising 28 samples and 13,909 participants (Fig. 1).

2.2. Selection and codification of the study

Codification followed the PRISMA (2015) guide and point 1.2.2 of *Manual for Systematic Reviews of Interventions, Cochrane 5.1*, specifically, the protocol set out by Higgins and Green (2011). This allowed for targets to be set and previously selected (using eligibility criteria) search terms to be used. The search and selection process was undertaken by two researchers and divided into four phases, in all of which both researchers participated actively. This protocol yielded a near-perfect level of consensus (0.81) in the selection of the final sample (Landis & Koch, 1977). In addition, the score for the variable “EI”, which in some articles appears aggregated and in others broken down into factors, was homogenised. In the latter case, a weighted average, turning effect size into Z values to ensure their stability, was calculated. Similarly, global teacher assessments were used to evaluate academic performance (89.46% of the sample). For the remaining 10.54%, subject-specific values (Language, Maths) were used. Finally, the treatment of the remaining data was analysed using the PICOS method set out in PRISMA. As such, a unified criterion was used for the literature review (Hutton et al., 2016).

2.3. Statistical analysis

For the statistical analysis, comprehensive meta-analysis (CMA) software was used, with the EZAnalyce (Microsoft Excel, 2013) complement for the descriptive analysis. Although these analyses are explained in more detail in the following sections, it is worth emphasising that the study was aimed to calculate the effect size in the relationship between EI and academic performance, as well as the possible effect of age and sex as moderating variables. Pearson’s r was used to determine the effect size. Afterwards, the heterogeneity and variability of the sample was calculated to detect possible bias error, which was later confirmed through Funnel Plot analysis and Egger’s test.

2.3.1. Calculation of effect size

A total of 112 effect sizes were codified, using Pearson’s correlation index as reference. The associated standard errors and confidence intervals were also calculated. All the effect sizes were revised twice and those that required averaging and weighing were recalculated. Similarly, in order to stabilise the data and avoid the final values resulting only from sample size all effect sizes were turned into Fisher’s Z values. After this, following Cohen (2013), effect size was regarded as large for correlations above 0.50, medium for values ranging from 0.30 to 0.49, and small for values ranging from 0.10 to 0.29.

2.3.2. Heterogeneity, variability and publication bias

Concerning variability, Cochran’s Q values were analysed to test the null hypothesis homogeneity of the studies selected, and I^2 values to test the proportion of variability. Following Higgins et al. (2003), I^2 values of up to 25% are regarded as low, values of 26%–50% are regarded a moderate, and values above 75% are regarded as high. This variability can be due to a real variability in effect size and variance, to the influence of a moderating variable and, finally, to sampling error, potentially leading to bias error, which must be cleared through Egger’s test.

2.3.3. Moderation analysis

In order to ascertain the moderating effect of variables such as age and sex several meta-analytical tests were carried out, considering both variables as covariants to establish the possible significance of the meta-analytical models which included them, and therefore, to determine whether these variables play a moderating role in the relationship between EI and academic performance (Borenstein et al. 2021).

3. Results

3.1. General description of the studies selected

This section describes the specific characteristics (sample, geographical region, age and sex) of the studies selected for meta-analysis. Studies from four continents were included – Africa, America, Europe and Asia. The selection included 27 papers, comprising 28 databases and 13,909 participants (49.6% men and 50.4% women, averaging 16.52 years of age); Zirak & Ahmadian’s (2015) sample was the youngest on average ($M = 9$) and MacCanna et al.’s (2011) the oldest ($M = 23.43$). In terms of geographical region, 21.11% of participants were African; 3.89% American; 56.80% European; and 18.21% Asian (Table 1). The predominance of European participants will be addressed in the statistical analysis section.

3.2. Effect size and statistical significance

A random effect model was taken as reference for the first meta-data analysis. The effect size in the relationship between EI and academic performance with 95% confidence level interval, significance factor $p < 0.001$, was found to be moderate-high and positive ($r = 0.417$) (Fig. 2).

3.3. Heterogeneity and variability analysis

The variability of the results was found to be significantly high ($Q = 1218,90$, $df = 26$, $I^2 = 97.86$). This led to several meta-analyses aimed to establish the sensitivity of the sample. Extreme data were excluded and the analyses focused on the European data, as noted in the previous section. Although these complementary analyses yielded lower variability values, in terms of effect size no significant differences were attested; since the excluded studies accounted for less than 50% of the statistical weight, it was decided to continue the analysis with the initial sample.

3.4. Publication bias analysis

A funnel plot analysis was undertaken to detect potential publication bias, a frequently overlooked problem according to Borestein et al. (2011), (Fig. 3). The plot illustrates that Z values are low, falling within an acceptable bracket (-1 to 1). This suggests that no bias exist, for this would yield values significantly different from 0. To confirm that no bias existed, Egger's test was undertaken, yielding non-significant values (p 1-tailed = 0.47 and p 2-tailed = 0.95) and near-0 (0.18) intersection points closed to the Y axis (Egger et al., 1997), which confirms that no bias exists.

In this regard, it must be pointed out that the data presented in the studies by Zahed-Babelana and Moenikia (2010), Joibaria and Mohammadtaheri (2011), Nesari et al. (2011), Zirak and Ahmadian (2015), Ranasinghe et al. (2017), AL-Qadri and Zhao (2020), Fernández-Lasarte (2019)a, Usán et al. (2020) and Fernández-Lasarte (2019)c, were regarded as extreme, despite their methodological rigour. It was decided to keep these studies in the selection because Egger's test established that no publication bias exists. In addition, Q and I^2 heterogeneity values suggest a high degree of heterogeneity, owing to the widely-different nature of the studies selected.

Finally, we must point out that the transformation of r values into Z Fisher values involves a risk, but this is regarded as methodologically acceptable (Higgins et al., 2003). This is because any value above 0.5 that is transformed into a Z value tends to greater distortion than values below, because this involves moving from a normal to a T-Student curve.

In consequence, it was decided to keep these samples within the selection.

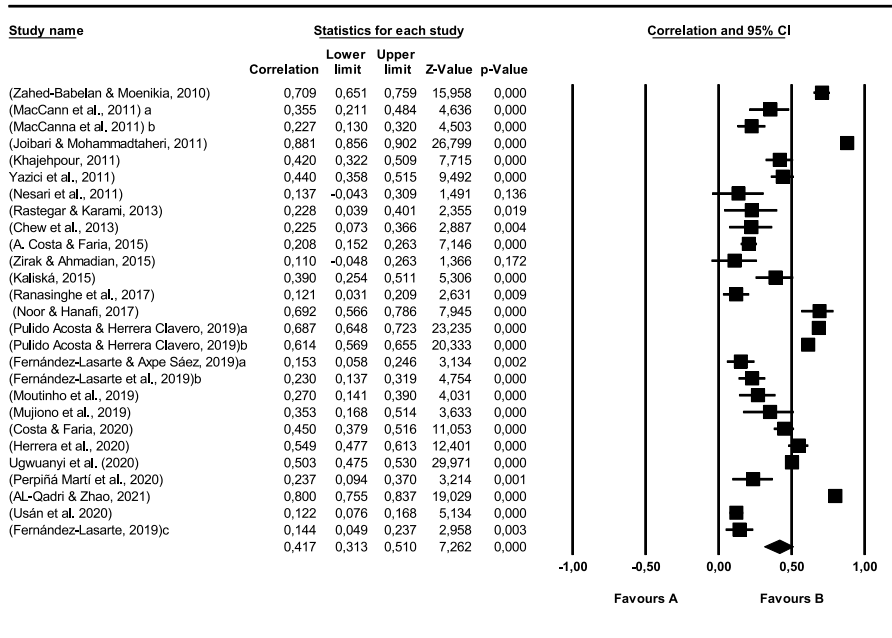
Table 1

Descriptive data of selected studies.

Study	Authors	Country	Continent	Sample	Men	Women	Average age	ES	SE
1	Costa & Faria (2015)	Portugal	Europe	1149	526	623	15,4	0.208	0.017
2	AL-Qadri & Zhao (2021)	China	Asia	303	116	187	14,36	0.8	0.029
3	Chew et al. (2013)	several	Asia	162	81	81	20	0.225	0.015
4	Costa & Faria (2020)	Portugal	Europe	523	246	277	15,5	0.45	0.015
5	Fernández-Lasarte et al. (2019)a	Spain	Europe	416	112	304	20,45	0.153	0.01
6	Fernández-Lasarte et al. (2019)b	Spain	Europe	415	199	216	15,57	0.23	0.015
7	Herrera et al. (2020)	Spain	Europe	407	192	215	11	0.549	0.017
8	Joibari & Mohammadtaheri (2011)	Iran	Asia	380	200	180	16,5	0.881	0.031
9	Kaliská (2015)	Slovakia	Europe	169	80	89	14	0.39	0.013
10	Khajehpour (2011)	Iran	Asia	300	150	150	16,5	0.42	0.014
11	MacCann et al. (2011) a	USA	America	159	77	82	23,43	0.355	0.069
12	MacCanna et al. (2011) b	USA	America	383	195	188	13,5	0.227	0.067
13	Moutinho et al. (2019)	Portugal	Europe	215	39	176	22,3	0.27	0.052
14	Mujiono et al. (2019)	Indonesia	Asia	100	25	75	21,7	0.353	0.068
15	Nesari et al. (2011)	Iran	Asia	120	60	60	19	0.137	0.004
16	Noor & Hanafi (2017)	Pakistan	Asia	90	51	39	22,3	0.692	0.024
17	Perpiñá Martí et al. (2020)	Spain	Europe	180	85	95	9,67	0.237	0.015
18	Pulido Acosta & Herrera Clavero (2019)a	Spain	Europe	764	403	354	9,41	0.687	0.023
19	Pulido Acosta & Herrera Clavero (2019)b	Spain	Europe	811	363	424	15,39	0.614	0.02
20	Ranasinghe et al. (2017)	Sri Lanka	Asia	471	220	251	21,5	0.121	0.008
21	Rastegar & Karami (2013)	Iran	Asia	106	26	80	22,5	0.228	0.08
22	Usán et al. (2020)	Spain	Europe	1756	914	842	14,55	0.122	0.008
23	Yazici et al. (2011)	Turkey	Europe	407	171	236	11,16	0.44	0.014
24	Zahed-Babelan & Moenikia (2010)	Iran	Asia	328	No data	No data	No data	0.709	0.025
25	Zirak & Ahmadian (2015)	Iran	Asia	156	80	76	9	0.11	0.006
26	Ugwuananyi et al. (2020)	Nigeria	Africa	2937	2035	1902	16,5	0.503	0.015
27	Fernández-Lasarte, et al. (2019)c	Spain	Europe	419	113	306	20,45	0.144	0.094
28	Chamizo-Nieto et al. (2021)	Spain	Europe	283	144	139	14,42	0.65	0.021

*Samples 27 and 18 are found in the same study, Fernández-Lasarte et al. (2019). Sample 17 is found in Fernández-Lasarte, Ramos & Axpe Sáez, (2019). They are different studies, published by the same main author in the same year.

Meta Analysis



Meta Analysis

Fig. 2. Forest plot, emotional intelligence vs academic achievement.

3.5. Moderating variables analysis

Finally, in order to establish which variables, if any, play a moderating role in the relationship between EI and academic performance, 8 models and meta-regressions were compared. Only two of these models yielded significant results. Sex (men, $p = 0.77$; women, $p = 0.92$); age ($p = 0.34$); evolutive stage ($p = 0.16$); geographical region ($p = 0.77$); and country ($p = 0.81$) were found to have no significance in the model created, so these factors playing a moderating role was ruled out. However, since some of these moderating variables have more than one category, a meta-regression analysis was undertaken for each of them to establish possible differences (see Table 3). Although no significant differences between continents were attested (Model 2) (Set, $Q = 1.12$; $df = 3$, $p = 0.77$), Model 5, dealing with countries (see Table 3), found that the Spanish (coefficient = -0.71 , $SE = 0.37$, $p = 0.05$) and Sri Lankan (coefficient = -0.97 , $SE = 0.50$, $p = 0.05$) samples present significant differences with the other samples. These results demanded a

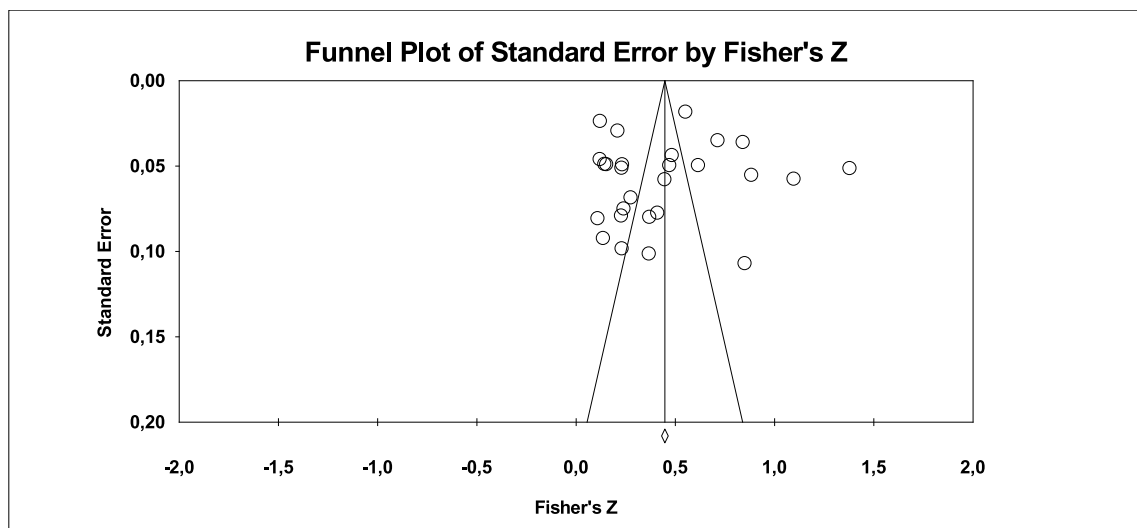


Fig. 3. Funnel plot, emotional intelligence.

more complex processing of the data using the PICOS method set out in [PRISMA \(2015\)](#).

Third, model 8, type of performance, no differences exist concerning Language- (Coefficient = -0.20; SE = 0.19; 95% Lower = -0.58; 95% Upper = 0.16; Z-value = -1.1; 2-sided P-value = 0.27) and Maths-measured performance (Coefficient = -0.10; SE = 0.34; 95% Lower = -0.57; 95% Upper = 0.16; Z-value = 0.29; 2-sided P-value = 0.77) and general academic performance, as the comparison yielded non-significant values (Set, $Q = 1.35$; $df = 2$, $p = 0.50$).

Finally, [PRISMA's \(2015\)](#) PICOS method was used to determine the relevance of the qualitative data and for those variables that could not be given statistical expression. [Table 2](#).

4. Discussion

Emotional skills are understood as a key variable for academic performance. Beginning in the late 1990s, authors such as Goleman (1998) argued for the introduction of EI teaching in schools as a means to improve academic performance and reduce school failure. This relationship must therefore be regarded as a research priority.

The statistical results of the meta-analysis suggest that the relationship between EI and academic performance is moderate, and that it is not affected by such variables as age, evolutive stage, sex, region, country and type of academic performance. However, these results must be contextualised by systematically examining both the meta-analytical sample ($k = 28$) and similar experimental, meta-analytical and review studies.

Some of the studies in the selection argue for a **close and significant relationship** (AL-Qadri & Zhao, 2020; Costa & Faría, 2020, Joibaria & Mohammadtaheri, 2011; Mujiono et al., 2019; Pulido-Acosta & Herrera-Clavero, 2019 a y b; Ugwuanyi et al., 2020; Zahed-Babelana & Moenikia, 2010), which agrees with similar studies (El-Adl & Alkharusi 2020; Khalaf, 2016; Monica & Ramanaiah 2019; Mudiono 2019; Njega et al., 2019; Preeti, 2013). Chew et al. (2013) even argue that EI skills are the best predictor of academic performance and even personality traits, in agreement with previous studies (Gil-Olarte et al., 2006; Lyons & Schneider, 2005; Romanelli et al., 2006; Song et al., 2010).

Other studies in the sample acknowledge that this relationship exists, but that it is **weak or moderate** – Chamizo-Nieto et al. (2021); Costa and Faría (2015); Fernández-Lasarte (2019) a and b; Herrera et al. (2020); Kaliská (2015); Khajehpour (2011); MacCanna et al. (2011) a and b; Moutinho et al. (2019); Nesari et al. (2011); Noor and Hanafi (2017); Ranasinghe et al. (2017); Ugwuanyi et al. (2020); Yazicia et al. (2011); and Zirak and Ahmadian (2015). Other studies, such as Perpiñà Martí et al. (2020) and Rastegar and Karami (2013) suggest, more specifically, that EI skills only explain a low percentage of academic performance in language-related topics. These results agree with previous studies (Brackett & Mayer, 2003; Festus, 2012; Rode et al., 2007). Similarly, it is to be emphasised that the effect size results yielded by our study agree with this perspective.

Finally, we must point out that **other studies in the sample obtained no significant results, either positive or negative**, including Usán et al. (2020), which is in agreement with previous studies (Hansenne & Legrand, 2012; Kashani et al., 2012; Pope et al., 2011). Kaliská (2015) found negative significant correlations between 'emotionality' and performance in Slavic language, between 'well being' and general intelligence (TIP) and performance in maths.

On the other hand, the meta-regression results ruled out differences between general and language- and math-specific performances. Similarly, they suggest that the geographical region variable plays no significant role, but that national differences may do, which could be due to the use of different educational criteria or strategies.

Concerning **studies carried out in Asia**, AL-Qadri & Zhao (2020) assess general performance, and find a close relationship with the Intrapersonal Skills and Interpersonal Skills variables. Mujiono & Fatimah (2019) measure Indonesian students' performance in "English subjects", and argue for a close relationship between EI and linguistic intelligence; EI is found to explain 44% of the variance in academic performance in this subject. However, Ranasinghe et al.'s (2017) results from Sri Lanka suggest a weak relationship between EI and average performance at the university level. In addition, in terms of meta-regression results, this study is different from the others. It is to be pointed out that this study assessed medical students, and concluded that EI improved the performance of final-year students, providing them with tools to cope with stress.

Regarding the **Middle East**, Noor & Hanafi's (2017) study in Pakistan, which measured average academic performance at the university level, argue for a weak correlation with EI. In Iran, Zahed-Babelana & Moenikia (2010) analyse economic performance globally, and argue for a strong correlation of EI with intrapersonal skills and a moderate correlation with interpersonal skills; Joibaria and Mohammadtaheri's (2011) results also suggest a strong correlation. However, Zirak & Ahmadian's (2015) and Khajehpour's (2011) results (the latter deals with language- and mathematics-related performance) suggest a weak correlation; Nesari et al. (2011),

Table 2
Model comparison.

Model name	Tau ²	R ²	Q	df	P-Value
Model 1	0.09	0.00	1155.05	25	.00
Model 2 region	0.09	0.2	1017.79	25	0.77
Model 3 male	0.11	0.00	1144.10	24	0.77
Model 4 female	0.11	0.21	1148.40	24	0.92
Model 5 country	0.09	0.32	783.02	14	0.81
Model 6 age	0.09	0.03	1081.76	24	0.34
Model 7 evolutive stage	0.08	0.05	993.25	25	0.16
Model 8 type of performance	0.11	0.21	1098.77	25	0.50

Table 3
Meta-regression according to model 5 country.

Covariate	Coefficient	Standard Error	95% Lower	95% Upper	Z-value	2-sided P-value	Set
Intercept	1.09	0.35	0.39	1.79	3.07	0.00	Q = 6.75. df=11. p = 0.8191
USA	-0.79	0.43	-1.65	0.06	-1.82	0.06	
Slovakia	-0.68	0.50	-1.68	0.30	-1.35	0.17	
Spain	-0.71	0.37	-1.45	0.02	-1.88	0.05	
Indonesia	-0.72	0.51	-1.73	0.27	-1.42	0.15	
Iran	-0.62	0.39	-1.39	0.13	-1.6	0.10	
Nigeria	-0.54	0.50	-1.53	0.43	-1.09	0.27	
Pakistan	-0.24	0.51	-1.25	0.75	-0.48	0.63	
Portugal	-0.77	0.41	-1.58	0.03	-1.88	0.06	
Sri Lanka	-0.97	0.50	-1.96	0.01	-1.94	0.05	
Turkey	-0.62	0.50	-1.61	0.36	-1.24	0.21	
Several	-0.86	0.50	-1.86	0.12	-1.71	0.08	

measuring performance in the 'nelson English test' obtained similar results. Finally, [Rastegar and Karami \(2013\)](#) analysed performance in 'language learning', and found a moderate correlation not only with EI but also with social skills. In conclusion, the results in the Middle East are inconclusive.

Africa is represented by Ugwuanyi et al.'s (2020) study in Nigeria. In this case, performance in mathematics was used, and it was concluded that 25.3% of the variance is explained by EI.

In **North America**, [MacCanna et al. \(2011\)](#) a and b address the issue in the United States. They analyse academic performance globally, and conclude that the correlation with EI is weak. However, in another section of their study they establish that the different factors that constitute EI correlate with academic performance differently. Although in aggregate terms the correlation is weak, emotional understanding is found to be moderately correlated with EI (although correlations concerning perception, facilitation and management remain weak). It is also observed that 'emotion-focused coping' correlates weakly and negatively with academic performance, while the reverse is found with regard to 'problem-focused coping'. Therefore, the various factors that constitute EI present subtle differences.

Most of the **European** sample comes from Spain, where meta-regression analyses yielded results that differed from those obtained in other countries. Most of these studies analysed academic performance globally, in the form of averages. [Pulido-Acosta & Herrera-Clavero \(2019\)](#) a and b argue for a strong correlation with EI, in contrast with [Chamizo-Nieto et al. \(2021\)](#), who argue for a weak correlation, in agreement with [Fernández-Lasarte \(2019\)](#) a, b and c, who also examine performance globally. [Perpiñà Martí et al.'s \(2020\)](#) study provides greater detail. Initially, they examine performance based on linguistic skills; they find a weak correlation between general EI and Linguistic Competence and Writing Skills. More specifically, they find correlations between linguistic competence and interpersonal skills and emotional adaptability and non-verbal intelligence. However, it is found that reading comprehension only correlates with E. adaptability; finally, writing skills correlate moderately with E. adaptability and E. Stress Management. Similarly, [Herrera et al. \(2020\)](#) average marks in the following subjects: Natural Sciences, Spanish Language and Literature, and Mathematics. Their results suggest that performance in natural sciences correlate with intrapersonal skills, performance in Spanish language and literature with Intrapersonal skills, and performance in mathematics with adaptability. In contrast with these studies, [Usán et al. \(2020\)](#), find a negative correlation, albeit very weak and non-significant, between general academic performance and EI.

Portugal also accounts for a large proportion of the sample. [Moutinho et al. \(2019\)](#) examine general performance, and conclude that its correlation with EI is very weak; [Costa and Faría \(2015\)](#) average marks in Portuguese language and maths in three different age groups, and find that in all cases the correlation is weak. It is, in addition, worth pointing out that the predictive value of EI over general and language- and maths-related performance is found to decrease with age. [Costa & Faría \(2020\)](#), also averaging marks, find a moderate and significant correlation between EI skills and Vocabulary of Emotions, but rule out a correlation with Emotional Expression; Perceive and Understand Emotion; and Manage and Regulate Emotion. In conclusion, Portuguese studies argue for a weak relationship between EI and academic performance.

Concerning Eastern Europe, [Yazicia et al. \(2011\)](#) (Turkey) average school subject marks, and find a significant correlation between academic performance and the EI variable Being aware of emotions; correlations with Managing emotions, Self-motivating, Empathy and Handling relationships are found to be non-significant. [Kaliská \(2015\)](#), in Slovakia, finds a negative significant correlation between emotionality and performance in Slavic language, and a significant negative correlation between general intelligence (TIP) and performance in maths.

[Chew et al. \(2013\)](#), on the other hand, analyse an **international sample**, in which performance is presented in the form of average marks. Interestingly, the results yielded by running marks and final exam marks are different. Final exam marks only correlate with the perceiving emotions and understanding emotion's scores, while running marks correlate, in addition, with the facilitating thinking score. At any rate, in all cases the correlations are moderate-weak. It is possible that the effect of EI on performance is different depending on the role played by teachers, the purpose of school activities and teaching methodology. These results raise new questions: can a change in teaching methods lead to a greater impact of EI on academic performance? It is surprising that no correlation is found between EI and the emotional management score.

In view of these results, it seems advisable to analyse the statistical results of meta-regressions associated with the age and sex

variables, because although the above results clearly suggest that these variables play no significant role, there is no scientific consensus on the matter. We must begin by pointing out that our results concerning age agree with the meta-analysis undertaken by Fahad Somaa et al. (2021), and those concerning age and sex with that by Quílez-Robres et al. (2021a).

Although it can be generally argued that age plays no moderating role in the relationship, significant differences exist between the studies analysed here. Chew et al. (2013), in agreement with Brackett and Salovey (2006), conclude that performance in first-year students does not correlate with EI, in contrast with intermediate-year students. They also find that the correlation is weak in final-year students, arguing that this is the result of a consolidated understanding of emotional skills, in agreement with Joseph & Newman's (2010) meta-analysis. In this regard, and in agreement with previous studies, such as Perera and DiGiacomo (2013), authors like Costa and Faría (2015) conclude that the correlation between EI and performance decreases with age; they also agree with Fernández-Lasarte (2019b) that the moderating role of EI on performance in language and mathematics decreases with age. Camacho-Morles et al.'s (2021) meta-analysis suggests that emotions play a greater moderating role in secondary school than in primary school and university, concluding that this could be related to the specific evolutive characteristics of adolescence. This evidence, however, must be compared with other studies. Pulido-Acosta & Herrera-Clavero's (2019) meta-analysis suggests that EI correlates with performance at pre-school and primary school levels, which is consistent with the evolutive stage of this age group (Billings et al., 2014; Cazalla-Luna & Molero, 2014).

As previously noted, there is no scientific consensus concerning the role played by sex. Classic studies such as Goleman's (1998) already argued that sex does not correlate with EI, and this agrees with some of the studies included in our selection (Chew et al., 2013; Costa & Faría, 2020; Joibaria & Mohammadtaheri, 2011; Nesari et al., 2011; Ugwuanyi et al., 2020). More recently, however, Somaa et al.'s (2021) meta-analysis suggests that sex plays a moderate mediating role in the relationship between EI and performance, for instance Al-Qadri and Zhao (2020), Costa and Faría (2015), Pulido-Acosta and Herrera-Clavero (2019) and Yazicia et al. (2011), which conclude that differences exist between sexes, although they are small. Some studies claim that women yield higher scores in interpersonal skills, such as stress control, adaptation to the environment, and mood, and also in intrapersonal skills (Brackett y Salovey, 2006; Kundi & Badar, 2021; Melguizo-Ibáñez et al. 2021), while men tend to be self-assured, optimistic and also adaptable (Ceron Perdomo et al., 2011; Santesso et al., 2006). These could be rooted in differences in self-assessment, as pointed out by Costa and Faría (2015), Deary et al. (2007) and Mestre et al. (2006), and also in social factors; girls in pre-school and primary school score higher than boys in EI (Pulido-Acosta & Herrera-Clavero, 2016; Pulido-Acosta & Herrera-Clavero, 2019 a; Soriano and González, 2013). As argued by AL-Qadri & Zhao (2020), these ideas are consistent with cultural factors and family education patterns affected by gender stereotypes (Kundi & Badar, 2021; Melguizo-Ibáñez et al. 2021).

On the other hand, categories of data that could not be normalised into statistical values, as they did not cover the whole of the sample, should also be taken into account, as they present complementary information that could lead to a better understanding of the factors that affect the relationship between EI and performance. This follows the PICOS method set out by PRISMA (2015).

First, EI can be used as a predictor of **wellbeing**, as pointed out by Martins et al.'s (2010) and Peña-Sarrionandia et al.'s (2015) meta-analyses. Similarly, the acquisition of emotional skills and a good emotional relationship with learning facilitates cognitive processes and memorisation, which improves academic performance (Dolev & Leshem, 2017; Mudiono, 2019; Suberviola, 2012). However, the relationship between these constructs can be direct or indirect, based on other factors, as argued by Ugwuanyi et al. (2020) and Petrides et al. (2004). It has been concluded that EI can improve academic performance through the mediation of such psychological constructs as **self-efficacy**, **locus of control**, **self-esteem** and **motivation**, which moderate the relationship and can provide tools to cope with anxiety and stress (Roesser & Eccles, 2000).

Self-efficacy is directly related to emotional intelligence and academic performance, as pointed out by El-Adl and Alkharusi (2020); Burnette et al., 2013, Costa and Faría (2020), and Monica and Ramanaiah (2019). Through social interaction, students acquire social and academic abilities that allow them to learn emotional and functional strategies with which to solve complex situations and improve their self-efficacy (Cabello & Fernández-Berrocal, 2015). However, it must be taken into consideration that the average age of the sample falls in middle adolescence. Scientific evidence clearly suggests that subjective evaluations do not necessarily reflect actual performance, as also pointed out by Costa & Faría (2020) with regard to understanding emotions. However, self-efficacy by itself does not explain academic performance, as these authors also argue. As such, the analysis must also take into account other factors such as adaptive strategies and coping styles/ locus of control.

The locus of control (coping style) plays a mediating role between EI and academic performance; this is a key argument for AL-Qadri and Zhao (2020), Kaliská (2015), MacCanna et al. (2011) a and b; Moutinho et al., 2019 and Zahed-Babelana & Moenikia (2010), which is in agreement with previous studies (e.g. Umaru & Umma, 2015). The ability to adapt to the environment positively correlates with intrapersonal and interpersonal intelligence and with academic performance (Zahed-Babelana & Moenikia, 2010). However, it is necessary to point out that an emotionally-focused coping style negatively correlates with performance, in contrast with problem-focused coping styles (MacCanna et al., 2011 a and b). In consequence, if students learn at school to focus on positive and constructive aspects, such as self-confidence, empathy and kindness, instead of on frustration, anxiety and stress, they will achieve better results (Sunil & Rooprai, 2009). AL-Qadri & Zhao's (2020) study, which is part of our selection, finds that general outlook and adaptability are closely related to academic performance. However, it is important to point out that this relationship is moderated by self-confidence, commitment, self-control, the ability to learn, organisation and planning (Duckworth & Seligman, 2005; Mavroveli et al., 2008; Moutinho et al., 2019; Yahaya et al., 2012). In this way, if students learn to emotionally cope with complex and unpleasant situations they will achieve greater resilience and will be able to address school tasks more efficiently (Kaliská, 2015). These results disagree with Zirak and Ahmadian (2015), who conclude that self-awareness and self-management, while correlating with EI, do not correlate with academic performance.

At any rate, there is no scientific consensus as to whether EI should be considered a dependant or independent variable. As such,

arguments can be found in the literature for EI to be either cause or consequence of self-efficacy and locus of control, that is, the relationship between these variables, which plays a mediating role on academic performance, is bidirectional (Njega, Njoka, & Ndung'u, 2019; Nwaukwa et al., 2019; Oyuga et al., 2019). Korkmaz et al. (2018), in contrast, finds no significant relationship between these variables.

Concerning self-esteem, again there is no consensus. While Moutinho et al.'s (2019) and Ugwuanyi et al.'s (2020) meta-analysis suggest that it is a very significant factor, others argue that its role is non-significant (Sepahi et al. 2015). Similarly, Ugwuanyi et al. (2020) conclude that self-esteem explains 27.5% of academic success, a predictive value similar to that of EI. Some authors go further and assign, in addition to this predictive value, a mediating role in the relationship between cognitive and motivational variables and academic performance (Quílez-Robres et al., 2021b).

Another essential factor is **extrinsic motivation**. Students who are able to regulate their emotions and understand those of others will be more motivated for learning (Perera, 2015; Rode et al., 2008). Teachers have the duty to establish a class methodology that poses real challenges to their students (Bembenutty, 2021; Wilson, & Stupnisky, 2021); this is especially interesting concerning students with learning handicaps (Lewin, 2021). However, according to Yazici et al. (2011) the self-motivation component of EI is unrelated to academic performance. In contrast, Quílez-Robres et al.'s (2021a) meta-analysis suggests that the effect size of motivational factors on academic performance is moderate-high.

On the other hand, education, from pre-school to university, implies acting in a purely social environment. In this regard, several studies in our selection – Costa & Faría (2015), Fernández-Lasarte (2019) a, Kaliská (2015), Perpiñà Martí et al. (2020), Rastegar & Karami (2013), and Zirak & Ahmadian (2015) – indicate that EI allows for a more efficient adaptation to the social environment; individuals recruit support from the community, returning better academic results. These results agree with previous studies that describe feedback between social and emotional factors (Quílez-Robres et al., 2021a). As such, students with higher EI scores create healthier and longer relationships with their peers, while they reduce interpersonal conflict and are better regarded by the school community (Argyle & Lu, 1990; Brackett et al., 2011; MacCann et al., 2011). Managing social skills efficiently (team work management, evolutive social demands) results in a better cognitive and intellectual development, which in turn leads to better academic results (Berndt, 1999; Costa & Faría, 2015; MacCann et al., 2011; Rastegar & Karami, 2013; Schutte, et al., 2001). This is because EI regulates the management of ideas and behaviour and the choice of a more adaptative lifestyle, again leading to better academic results (Brackett et al., 2011). In contrast with this, Kaliská (2015) finds a negative correlation between social awareness and performance in language subjects, and between social awareness and social skills and mathematics.

Concerning the school environment, it must be understood that the emotional reactions of students affect their performance. In other words, pleasant emotions are associated with stimulating activities and motivation, in contrast with unpleasant emotions, which lead to basic reactions of stress and fear. These variables play a prominent role in the studies by AL-Qadri & Zhao (2020), Chew et al. (2013); Costa & Faría (2015); Perpiñà Martí et al., 2020 and Pulido-Acosta & Herrera-Clavero (2019) a and b. In this way, the emotions that students feel in class can be used to partially predict academic results, as pointed out by both classic (Mayer & Salovey, 1997) and more recent studies (Bosman et al. 2018; Nasir & Masrur, 2010; Pullu, & Gömleksiz, 2021). In this regard, Chew et al. (2013), in agreement with Brackett & Salovey (2006) and Lievens, et al., (2022), argue that higher EI scores imply a more stable life and greater adaptability to shifting conditions, as well as the ability to better understand socio-emotional information, both of oneself and of others. The late incorporation of migrant students to the school environment hampers their emotional adaptability, as it involves learning social strategies that differ from those that prevail at the student's birthplace, as well as learning a new language (Pulido-Acosta & Herrera-Clavero, 2019 a and b). In this context, the involvement of teachers and families in the generation of favourable environmental conditions becomes especially important, both in terms of academic performance and of EI (Chamizo-Nieto et al., 2021; Fernández-Lasarte et al., 2019 a; Khajehpour, 2011; Pulido-Acosta & Herrera-Clavero, 2019 a).

4.1. Research limitations

Concerning the limitations of this study, we must emphasise the substantial gap in research between rich and developing countries. Most of the sample is based on Europe, although some data from South-East Asia (Indonesia and Sri Lanka), south Asia and the Middle East (Iran and Pakistan), and Africa (Nigeria) is also included. In addition, the number of participants in each study is very uneven, and Latin America and Oceania are not represented. It is essential to take cultural differences and the characteristics of the various educational systems into consideration before reaching conclusions concerning the impact of EI on the students. For this reason, we must support research in developing countries, lending tools and promoting synergies within the scientific community. In the future, longitudinal studies will play an essential role in determining the relationship between EI and academic performance. Similarly, teaching methodologies to improve EI from the pre-school to the university level must be systematically compared.

4.2. Practical applications and contributions

Based on the results obtained, we can establish certain theoretical and practical contributions. As for the theoretical ones, the main finding, which should be discussed in subsequent field studies on large samples and belonging to different educational systems, points to the difference in the relationship and explanatory power of EI on academic performance depending on whether this is taken as a general or specific performance. This leads us to ask the question of whether emotional intelligence influences the learning of new and general concepts or the establishment of specific learning related to mechanization? On the other hand, with regard to cultural differences, it should be asked whether these go hand in hand with the conception of educational systems and to know more concretely how emotional intelligence is constructed or understood from the cultural and educational points of view.

As for the practical repercussion of the study, the results would point out the need to design and implement not only improvement or intervention programs for the development of emotional intelligence due to its relationship with learning and academic performance, but also the possibility that in the educational framework, emotional intelligence should occupy a place of reference from an early age as an area of knowledge in itself.

5. Conclusions and limitations

The meta-analysis and the literature review suggest that the effect size of EI on academic performance is moderate-high (0.390). Some differences by region were attested. In Asian countries, the correlation is strong in countries with a well-developed education system, such as Indonesia and China, and weaker in countries in which the school system is still developing, such as Sri Lanka. The results for the Middle East are inconclusive, and suggest a stronger correlation when EI is measured against global marks and less so when the focus is on specific subjects, such as language and maths. In the USA, the correlation were found to be weak, and significant differences were attested in the relationship between academic performance and each of the elements that constitute EI. In Europe, a distinction must be made between western and eastern countries; in Spain and Portugal the correlation was generally found to be weak, but in Spain significant differences were established between subjects and EI factors. The correlation was also found to be weak in Turkey and Slovakia, and performance only correlates with some factors of EI. The study dealing with several countries reached similar conclusions. The results are clearly different if academic performance is measured globally or taking into consideration subject-specific marks, and differences also exist when measuring EI globally and broken down into its constituting elements. On the other hand, the correlation between EI and academic performance is stronger in eastern than in western countries, probably as a result of social differences (individual and collective) and cultural factors. In addition, sex and age were not found to play a mediating role, and the existing differences probably are a reflection of developmental stages, cultural influences, family patterns and educational factors, which in turn reflect stereotypical perspectives on gender.

EI must be understood as a predictor of socio-emotional wellbeing, which is directly and indirectly related to other psychological constructs that affect academic performance and adaptability to changing circumstances. These constructs are self-efficacy, locus of control, self-esteem and motivation. On the other hand, education takes place in a purely social environment, and EI allows for a more efficient adaptation to social environments, as social and emotional factors feedback on one another. For this reason, schools must promote favourable treats as self-confidence, empathy and kindness in order to improve the students' frame of mind and adaptability. Introducing measures to improve EI in the school environment will, therefore, have positive effects in terms of performance and emotional wellbeing.

Author statement

All authors have read and agreed to the published version of the manuscript.

CRediT authorship contribution statement

Alberto Quílez-Robres: Conceptualization, Methodology, Resources, Data curation, Writing – review & editing. **Pablo Usán:** Project administration. **Raquel Lozano-Blasco:** Conceptualization, Software, Formal analysis, Investigation, Writing – original draft. **Carlos Salavera:** Validation, Visualization, Supervision.

Data availability

No data was used for the research described in the article.

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