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Regular Article

Emotional intelligence as a predictor for academic achievement of children: Evidence from primary schools of southern Ethiopia

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ABSTRACT

In education, understanding the determinants of learners' achievement is crucial. This study aimed to explore the correlation between emotional intelligence (EI) and academic achievement in primary schools. Using Goleman's Emotional Intelligence Assessment Scale adapted for local use, 444 primary school students were assessed via random sampling. Inferential statistical methods, especially multinomial logistic regression, were employed for data analysis. The research revealed that self-regulation, self-awareness, empathy, and motivation significantly influenced academic outcomes compared to high-achieving peerAdditionally, demographic factors played a pertinent role in students' performance. The study's implications highlight the necessity of interventions to nurture EI in students. Recommendations include revising educational policies to cultivate resilient learners, raising awareness among educators, parents, and implementing strategies to enhance children's EI, emphasizing self-regulation, self-awareness, empathy, and motivation. These findings underscore the importance of EI in academic achievement and provide valuable insights for educational practitioners and parents, emphasizing the need for targeted interventions to support children's holistic development.

1. Introduction

Understanding the factors that contribute to individual achievement is paramount in the context of contemporary society (Krogh, 2023). One such crucial factor is emotional intelligence (EI), a widely recognized attribute that encompasses deliberate agency, rational cognitive processes, and adept situational adaptation (Wechsler, 2007). The intricate link between emotions and these fundamental aspects of EI plays a pivotal role in shaping various facets of human behavior, including decision-making, cognitive evaluations, and adaptive responses (Šimić et al., 2021). Emotional intelligence, as elucidated by Cherniss (2010) and Chokshi and Farley (2012), involves the adept management of emotions through thoughtful reasoning, with the aim of preventing emotions from dictating one's behavior. The significance of EI extends across diverse domains such as work, education, and personal life, exerting considerable influence on job proficiency, motivation, decision-making, as well as management and leadership skills (Maiya & Michael, 2009).

Numerous empirical studies consistently reveal positive links between emotional intelligence (EI) and various competencies such as empathy, verbal intelligence, extraversion, receptivity to emotional experiences, self-esteem, and life satisfaction (Ferrando et al., 2011; Lievrouw & Livingstone, 2010; Cabello et al., 2016; Schutte et al., 2001). Ferrando et al. (2011) identified significant correlations between EI and extraversion, as well as receptivity to emotional experiences in Spanish adults. Similarly, Cabello et al. (2016) found positive associations between EI and cognitive and affective empathy in university students from Spain and Chile. Schutte et al. (2001) reported a positive correlation between EI and greater life satisfaction in South African and U.S. adult samples. In the context of education, stress management emerges as a crucial dimension of students' emotional intelligence, involving the effective adaptation and regulation of emotional responses (Lievrouw & Livingstone, 2010). Addressing stress within the educational setting is imperative for nurturing students' emotional intelligence, as it directly influences their ability to navigate academic challenges and social interactions. Consequently, recognizing emotional intelligence as a pivotal factor in individual achievement highlights its significance in contemporary society.

While Western education systems have long dominated the global landscape, Asian nations have increasingly challenged this dominance in

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education provision and management (Cabanda, Tan, & Chou, 2020). Countries like China and Pakistan have made significant strides in their educational sectors to become strategically competitive and seize learning opportunities (Latif, Latif, Farooq Sahibzada, & Ullah, 2017). In the scholarly work by Shafait, Yuming, and Sahibzada (2021), EI is elucidated as the cognitive ability encompassing the faculties to apprehend, articulate, comprehend, and manage not only one's own emotional states but also those of others. Individuals within the staff cohort exhibiting elevated levels of EI demonstrate an elevated state of psychological well-being and an augmented proficiency in interpersonal and public relational aptitude. The importance of these competencies cannot be overstated when it comes to improving students' educational achievements (Zhoc, Chung, & King, 2018).

In Africa, emotional intelligence (EI) is widely recognized as a crucial factor for success in various domains, eve including leadership. Specifically, leaders and organizations in South Africa face post-apartheid challenges such as global competitiveness, equity legislation, and the need for gender and cultural balance in the workforce (Du Plessis & Barkhuizen, 2012; Mayer & Barnard, 2015). A unique leadership approach can be observed among female leaders in South Africa, characterized by the cultivation of resonance. This leadership style is distinguished by their adeptness in adaptive communication, mentoring prowess, penchant for collaboration, and cooperative attributes, all of which are intimately associated with EI (Van Wyk, 2012). This observation highlights the significant influence of women in leadership roles within the African context, as emphasized by Mayer and Barnard (2015), and underscores the profound impact of EI on various aspects of existence.

In the Ethiopian context, where ethnic conflicts disrupt communities and create instability (Mekonnen, 2015; Herut & Dube, 2022; Herut, Dube, & Dewey, 2022), it becomes challenging for households, school leaders, and teachers with competing priorities to shape students' emotional setup and academic achievement due to emotional disturbances. Particularly in chronically conflict-affected areas, it is crucial to reevaluate intervention mechanisms and implement targeted strategies through adaptive policies to sustain the educational system and foster emotionally intelligent citizens (Herut & Dube, 2022; Mekonnen, 2015). With this context in mind, exploring the factors influencing students' EI and its contribution to academic achievement is of paramount importance. This understanding can inform policymakers in creating suitable learning environments for students across the country. With this objective in mind, the present study aims to investigate the extent to which EI contributes to academic achievement.

2. Objectives

This research endeavors to explore the connection between the emotional intelligence (EI) of students and their academic achievements. The goal is to uncover the influence of different aspects of emotional intelligence on students' academic success. The study aims to provide valuable insights into the specific relationship between EI and academic performance within the unique context of Southern Ethiopia.

3. Literature review

3.1. Understanding emotional intelligence

EI as expounded by Mayer & Salovey, 1997 and subsequently cited by Kalat in 2008, denotes a cognitive aptitude characterized by the capacity to discern, grasp, and effectively regulate emotions, while also incorporating emotional data into the fabric of decision-making procedures. EI encompasses various aspects, including the recognition of others' emotions and the ability to respond appropriately in emotional situations. EI encompasses facets of self-awareness, self-regulation, and the nuanced expression or suppression of emotions, contingent on situational demands (Kalat, 2008). Empirical findings underscore the pivotal role of EI in fostering optimal learning outcomes, eclipsing conventional determinants like intelligence and technical proficiency (Mirhashemi, Pasha Sharifi, & Sabeti, 2008). While Intelligence Quotient (IQ) signifies a foundational threshold, Emotional Quotient (EQ) emerges as a potent predictor of pinnacle achievements (Serrat, 2017). According to a study by Singh (2023), individuals endowed with heightened EI exhibit enhanced adeptness in interpersonal and professional realms, concurrently enjoying elevated levels of personal contentment, self-assurance, and overall well-being. Moreover, a strong understanding of one's emotional strengths and weaknesses is crucial for achieving superior performance in academic or professional settings. High EI has been associated with lower aggression, higher empathy, happiness, reduced depression, decreased stress levels, higher self-esteem, and/or decreased feelings of loneliness (Poulou, 2014). Consequently, it is believed that the competencies related to EI can be learned and developed over time, and it is essential for students to acquire knowledge of what they are learning, a sense of responsibility, and the ability to manage their emotions effectively. Schools are encouraged to go beyond providing basic instruction in traditional academic subjects and focus on fostering EI and innovation at the organizational level (Jenaabadi, Shahidi, Elhamifar, & Khademi, 2015).

3.2. Constructs in emotional intelligence

A multitude of empirical investigations have elucidated the profound influence of EI on diverse facets, notably encompassing academic attainment and various domains. Conspicuously, EI has emerged as a robust harbinger of occupational proficiency, scholastic accomplishments, leadership acumen, adaptive coping mechanisms, and personal maturation (Chernis & Adler, 2023; Chokshi & Farley, 2012; Parker, Summerfeldt, Hogan, & Majeski, 2004; Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000; Salovey, 1999). According to Tay & Diener (2011), individuals characterized by a deficiency in emotional competencies manifest an elevated susceptibility to the vicissitudes of stress and emotional vicissitudes within the educational milieu, thereby underscoring the imperative of cultivating adaptive emotional proficiencies as an efficacious means of contending with these exigencies. Furthermore, EI serves as an intermediary construct mediating the nexus between cognitive capacities and scholastic performance (Curelaru, 2017; Poulou, 2014). Among the various models of EI, this study adopts Daniel Goleman's framework, which emphasizes that emotional competencies can be learned and are particularly relevant to the learning processes and academic achievements of students. Goleman's model incorporates specific emotional competencies within each construct of EI (Goleman, 2009).

3.2.1. Self-awareness

Self-awareness, as elucidated in Goleman's 1995 model, is heralded as the fundamental linchpin of personal development and triumph. It encompasses the aptitude to identify and judiciously evaluate one's own emotional states. This construct encapsulates self-awareness, precise self-assessment, and self-assurance. Empirical investigations have illuminated a robust nexus between self-awareness and scholastic attainment. To illustrate, a study conducted by Purwanti et al. (2022) unveiled a noteworthy correlation between self-regulation, academic self-awareness, and academic burnout among the student body at Universitas Negeri Yogyakarta. Moreover, self-aware individuals better regulate distressing emotions during exams (Pekrun, Goetz, Titz, & Perry, 2002; Zeidner, 2007), with self-awareness even predicting grades over IQ (Kidwell, Van Dyke, & Tabares, 2011), and display greater motivation to seek assistance versus avoiding challenges (Noureen, Afghane, & Bhatti, 2013). Self-awareness also cultivates self-discipline, time management, and an internalized motivation less reliant on external factors, thereby bolstering academic achievement (Diseth, 2007), in addition to associations with self-efficacy, autonomy, and disengagement from performance-avoidance goals (Fan, Williams, &

Corker, 2012; Zeidner, 2007). Collectively, substantial evidence indicates academic self-awareness enables students to optimize learning strategies around strengths and weaknesses (Fan et al., 2012; Klassen & Kuzucu, 2009). Furthermore, Ajmal and Rafique, in their 2018 study, substantiated a conspicuous correlation between academic self-concept and academic achievement among distance education participants. The study recommended the provision of workshops to enhance students' self-concept and help them discover their latent potential and utilize their strengths to achieve better academic outcomes.

3.2.2. Empathy

Empathy denotes the capacity to comprehend and vicariously experience the emotional states of individuals, while concurrently demonstrating adeptness in discerning and construing social cues proficiently, as expounded by Goleman (1995) and elucidated by Chokshi and Farley (2012). Empathy is believed to contribute to academic achievement, although studies have yielded mixed findings. For instance, Yalcin-Tilfarlioglu and Arikan (2012) found no significant relationship between empathy levels and achievement in foreign language learning. However, teachers often emphasize the importance of empathy in academic achievement, suggesting that empathic teachers can positively influence their students' achievements. Aldrup, Carstensen, and Klusmann (2022) underscored the paramount importance of teacher empathy in cultivating superior teacher-student interactions and promoting favorable student outcomes.

3.2.3. Self-regulation

Self-regulation involves managing and controlling one's behaviors and reactions prompted by emotions (Goleman, 1995). It encompasses self-control, adaptability, and conscientiousness. Several empirical investigations have substantiated the favorable influence of self-regulatory processes on scholastic attainment. Notably, Duckworth and Seligman (2005) ascertained that self-regulation exhibited superior prognostic capability regarding academic achievement when juxtaposed with conventional measures such as IQ scores. Students exhibiting elevated self-regulation tend to be more disposed towards goal establishment, proficient time management, and resolute persistence when confronted with academic adversities. They also exhibit better self-control and are less likely to engage in impulsive or disruptive behaviors that can hinder their academic progress (Chernis & Adler, 2023; Mayer, Roberts, & Barsade, 2008; Pérez & Castejón, 2007).

3.2.4. Motivation

Motivation refers to the drive and enthusiasm to pursue goals, as well as the ability to defer gratification and persevere in the face of obstacles (Goleman, 1995). Motivation constitutes a pivotal determinant in the realm of academic achievement, exerting substantial influence over students' proclivity to participate in scholastic pursuits, manifest a favorable disposition towards educational institutions, and persevere in their endeavors for achievement. Empirical investigations have consistently elucidated a constructive correlation between motivation and scholastic attainment, as demonstrated in prior scholarly works by Elliot and Dweck (2005), Liem, Lau, and Nie (2008), and Salovey (1999). For instance, a study by Ainley and Hidi (2012) found that students' intrinsic motivation positively predicted their academic achievement. Thus, fostering intrinsic motivation in students can contribute to improved academic outcomes.

3.2.5. Social skills

Social competence encompasses a spectrum of interpersonal proficiencies crucial for scholastic triumph. This proficiency incorporates the aptitude to forge and perpetuate favorable associations, convey with effectiveness, and partake in cooperative endeavors (Goleman, 1995). These competencies constitute indispensable prerequisites for excelling academically, as they expedite concord, teamwork, and efficacious communication within educational milieus. Scholars endowed with robust social skills tend to partake more actively in classroom discourse, solicit assistance when requisite, and foster constructive relationships with peers and educators. Empirical evidence corroborates a favorable correlation between social competence and scholastic accomplishment (Chernis & Adler, 2023; Durlak et al., 2011; Mumford et al., 2000). Notably, a study by Battistich, Solomon, Kim, Watson, and Schaps (1995) discerned that students who participated in a social-emotional learning curriculum that emphasized social competencies evinced superior academic attainment in comparison to their counterparts in the control cohort.

To sum up, EI has emerged as a pivotal determinant of academic achievement. EI encompasses a multifaceted array of constructs, including self-awareness, empathy, self-regulation, motivation, and social competence. These constructs evince interdependence and collectively contribute to scholars' holistic emotional and social adeptness, thereby exerting an influential impact on their academic achievements. A discerning grasp of these emotional proficiencies and their cultivation can engender salutary consequences, augmenting scholars' well-being, motivation, and capacity to adroitly surmount challenges. Consequently, educational establishments and policymakers should deliberate on the integration of EI development programs into the educational curriculum, fostering comprehensive student development and optimizing scholastic outcomes.

4. Methods and materials

4.1. The study context

The investigation was carried out in primary schools situated within the catchment areas of five colleges of teacher education in South Ethiopia. These schools are under the administrative jurisdictions of five zones in the Southern Nations, Nationalities, and Peoples' Region (SNNPR): Gedeo, Sidama, Gamo, Kafa, and Hadiya. Notably, certain areas, specifically Gamo, Gedeo, and Sidama, share borders with the neighboring Oromia region. The region has grappled with persistent conflicts spanning from the 1960s to 2018 (Beyene 2017). This historical backdrop has presented significant challenges for primary schools in Southern Ethiopia, affecting the well-being of their student populations over an extended period (Beyene, 2017; Herut & Dube, 2022; Herut, Dube, & Dewey, 2022). The region is marked by both internal and external ethnic and political instability, leading to disruptions within communities and families (Mekonnen, 2015). The protracted duration of conflict has exposed numerous children to difficult situations, heightening their susceptibility to a range of issues, including insecurity, homelessness, and hunger. This has significantly affected their overall well-being (Herut, Dube, & Dewey, 2022). Factors such as poverty, food insecurity, violence-induced displacement, and family separation significantly contribute to this vulnerability (Herut & Dube, 2022). The turbulent environment within these schools can have adverse effects on students' social-emotional development and their ability to express emotional intelligence (Herut et al., 2022; Mekonnen, 2015). In the absence of adequate support systems, these vulnerable children may encounter difficulties in regulating their emotions, empathizing with others, and realizing their academic potential.

While the government has made efforts to enhance educational access, more needs to be done to foster resilience among at-risk youth (Herut & Dube, 2022). In light of these challenges, our study aims to investigate the correlation between emotional intelligence and academic performance in primary students from Southern Ethiopia. We intend to gain insights into this relationship within the context of persistent risks stemming from ethnic and political divisions that have characterized the region.

4.2. The study design, population and sampling

The research methodology employed in this study is a purely quan-

titative approach that utilizes an EI test for primary school students (Mavroveli, Petrides, Rieffe, & Bakker, 2007). The study's target demographic encompassed elementary school pupils within the Southern Nations, Nationalities, and Peoples' Region (SNNPRS) of Ethiopia. The schools in the region were categorized into five catchments associated with teacher education colleges: (a) Hawassa, (b) Dilla, (c) Hosana, (d) Arba Minch, and € Bonga. One urban and one rural primary school were selected for the study. The intention was to distribute the EI questionnaire to 528 students using simple random sampling. However, a total of 444 students expressed their willingness to participate and provided appropriate responses. Due to the conceptual nature of the study variables, it was anticipated that students in grades 5 and 6 might have difficulty understanding the survey questions. To address this, the EI test was administered orally under the supervision of individual invigilators. Following an initial phase, a random sampling methodology was implemented in-situ to designate the grades from which participants would be drawn for inclusion in the study. The quantity of selected students was commensurate with the pre-established sample size. The requisite sample size was ascertained through an algorithm that stratified the participants into two cohorts: those exhibiting EI and those devoid of it. Assuming an equal distribution of students across grades, with a 5% margin of error and a 95% confidence interval, the maximal estimated sample size for a singular category was computed to be 528 students, assuming uniformity in student attributes. Consequently, the comprehensive sample size for this investigation was established at 1056 individuals across the five distinct clusters, factoring in the design effect calculated subsequently.

$$n = \frac{Z^2 P.Q+}{e^2} + 10\%$$

n represents the sample size, while Z corresponds to the standard normal value at the desired confidence level of 2. P is an estimate of the population proportion assumed to be present, and Q is its complement (1 - P). E stands for the maximum acceptable error margin or the confidence interval, expressed as a decimal (0.05).

$$n = \frac{2^2(0.49)(0.515)}{(0.05)^2} + 10\%$$

$$n = 444$$

Thus, the total sample size per one category is 444.

4.3. Data collection and analysis

The data were collected from the students utilizing Goleman's EI assessment, a pre-structured tool comprising 50 items rated on a 5-point Likert scale. This assessment was adjusted for primary school children, considering age-appropriate criteria. In the process of customization, an academic achievement component was integrated into the assessment. To ascertain the assessment's validity, pilot testing was conducted, and prior to data collection, internal consistency tests were administered to evaluate the instruments' reliability. In this study, we classified academic achievers into three categories (bottom 25%, medium 50%, and top 25%) using an ordinal scale. We collected academic performance data, sorted it in ascending order, and established cutoff points at the 25th and 75th percentiles. Individuals were then assigned to categories based on their performance: below 25th percentile as bottom 25%, between 25th and 75th percentiles as medium 50%, and above 75th percentile as top 25%. Cutoff points were determined by the actual distribution of academic performance in our study population.

Utilizing SPSS version 28 and a sample of 102 students encompassing grades 5, 6, and 7 at Dawit and Wonago primary schools, a reliability coefficient of 0.83 was computed. The Cronbach's alpha values for the EI indicators, namely self-awareness, empathy, self-regulation, social skills, and motivation, were determined to be 0.78; 0.86; 0.96; 0.80; and 0.95, correspondingly, signifying commendable reliability. Subsequent to data collection, multinomial regression analysis was employed to investigate the predictive capacity of students' EI scores on their academic achievement. The primary findings of this study have yielded implications and recommendations.

5. Results and discussions

5.1. Results

5.1.1. Demographic characteristics of the respondents

The table below displays information about the demographic attributes of the survey participants, including gender, age, grade level, family education, and family size. This data represents a total of 444 respondents.

According to the data provided in Table 1, it is evident that around 59.23% of the participants were male students, while the percentage of female students who participated in the research was almost evenly split at 40.77%. The majority of the participants, accounting for 67.32%, fell within the age range of ten to twelve years, whereas those between the ages of thirteen and fifteen constituted 32.67%. In terms of grade level, 57.28% of the surveyed individuals were in grade 5, while 42.72% were in grade 6. More than half of the students (50.99%) came from families with four to six members, with the remaining 40.99% coming from families of different sizes. Participants were also asked about their parents' educational background and family size. It was found that 32.88% of the respondents were able to read and write, followed by 18.92% who had completed grades 1 to 8, 5.63% who had completed grades 9 to 10, and the remaining portion (16.44%) who were unable to read and write. Efforts were made to ensure that the sample size adequately represented the diverse identities of the study participants.

5.1.2. The correlates of EI with academic achievement

This portion examines the data to determine if EI can forecast academic achievement. Table 2 presents the model fitting details for the multinomial regression approach.

Table 2 presents a comprehensive overview of academic achievement for a total of 444 students. The result variable in this regression is academic achievement, which provides a numeric code indicating the subject's status. These students have been divided into three categories based on their performance: the top 25, the medium 50, and the bottom 25 achievers. Among these categories, the top 25 group consists of 158 students, which accounts for 35.6% of the entire sample. The medium 50% group is the largest, comprising 196 students, or 44.1% of the participants. The bottom 25 achieving group includes 90 students, making up 20.3% of the total sample. It is important to note that all 444 students have valid data available, with no missing cases reported. The

Table 1
Characteristics of the respondents (n = 444).

Characteristics		*n*	%
Gender	Male	263	59.23
	Female	181	40.77
Age range	10–12	272	67.32
	13–15	132	32.68
Grade Level	Grade 5	299	57.28
	Grade 6	145	42.72
Parents' Education	Cannot read and write	73	16.44
	Can read and write	146	32.88
	Grade 1-8	84	18.92
	Grade 9-10	25	5.63
	10 + 1 & 10 + 2 Certificate	38	8.56
	Preparatory (11–12)	45	10.14
	College Diploma & above	33	7.43
Family size	<3	37	8.33
	4–6	225	50.68
	7–10	182	40.99

Table 2
Case processing summary.

Case Processing Summary			
		n	Marginal Percentage
Academic achievement	Top 25s	158	35.6%
	Medium 50s	196	44.1%
	Bottom 25s	90	20.3%
Valid		444	100.0%
Missing		0	
Total		444	
Subpopulation		299[a]	

table provides an overview of the distribution of academic achievement levels for more than 400 students. The majority of students fall within the mid-range group, while a smaller number are classified in the highest and lowest quartiles.

The chi-square statistic was used to evaluate the model's adequacy, as shown in Table 3. The resulting p-value fell below the critical threshold of 0.05. Notably, the chi-square value was substantial at 130.518, accompanied by a −2 Log likelihood of 935.538 with a p-value of 0.000. These findings undeniably demonstrate a statistically significant relationship between the dependent variable and the independent variables in the final model.

Table 4 presents the goodness-of-fit metrics utilized to assess the suitability of the model for subsequent analysis. The Pearson coefficient (583.276) and variance value (511.927) depicted in Table 4 affirm the appropriateness of the model. Notably, the non-significant nature of the test (with a p-value exceeding 0.05) further supports the model's adequacy for the intended analysis.

The pseudo-R-square statistics of the model, namely Cox and Snell's (0.446), Nagelkerke's (0.496), and McFadden's (0.293), are outlined in Table 5. Together, these metrics indicate that the model accounts for a substantial portion of the variance in the data, ranging from 29.3% to 49.6%, highlighting its significant explanatory capability.

With the exception of self-awareness ($p = 0.58$, $p > 0.05$), the independent predictor variables delineated in Table 6 exhibit noteworthy associations with the outcome variable. Specifically, empathy ($p = 0.001$, $p < 0.05$), social skills ($p = 0.034$, $p < 0.05$), self-regulation ($p = 0.022$, $p < 0.05$), and motivation ($p = 0.032$, $p < 0.05$) all evince statistically significant contributions to the final model. Moreover, beyond these dimensions of EI, demographic attributes of the survey respondents, namely age ($p = 0.014$, $p < 0.05$) and gender ($p = 0.002$, $p < 0.05$), manifest robust associations with students' academic achievement.

Table 7 depicts the relationships between academic achievement measures and EI dimensions such as empathy, social skills, self-awareness, self-regulation, and student motivation. Using the Top 25 achievers as a baseline, parameter estimates for the remaining groups, Medium achievers and Bottom 25 achievers were calculated. The table also illustrates statistically significant associations between academic attainment and various dimensions of EI. Specifically, it reveals positive relationships between academic achievement and empathy ($\beta = 0.060$; $p = 0.025$, $p < 0.05$), self-regulation ($\beta = 0.019$; $p = 0.008$, $p < 0.05$), and motivation ($\beta = 0.017$; $p = 0.011$, $p < 0.05$). This observation underscores the fact that students who exhibit empathy, effective self-regulation, and a strong motivational drive tend to excel academically.

Table 3
Model fitting information.

Model Fitting Information				
Model	Model Fitting Criteria	Likelihood Ratio Tests		
	−2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	743.686			
Final	935.538	130.518	22	0.000

Table 4
Goodness-of-Fit.

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	583.276	730	0.136
Deviance	511.927	730	0.989

Table 5
Pseudo R-square.

Pseudo R-Square	
Cox and Snell	0.446
Nagelkerke	0.496
McFadden	0.293

However, when considering students categorized as medium achievers, the dimensions of EI, namely social skills and self-awareness, exhibit inverse connections with academic achievement ($\beta = -0.002$; $p = 0.023$, $p < 0.05$ and $\beta = -0.018$; $p = 0.042$, $p < 0.05$, respectively). In addition, for the same subset of students, demographic factors such as age and gender display statistically insignificant correlations with academic achievement ($\beta = 0.015$; $p = 0.064$, $p > 0.05$; and $\beta = 0.024$; $p = 0.056$, $p > 0.05$, respectively). Furthermore, our findings indicate that male students outperform their female counterparts ($\beta = 1.026$; $p = 0.007$, $p < 0.05$). Conversely, among students classified as bottom achievers, there are significant positive correlations between empathy ($\beta = 1.045$; $p = 0.027$, $p < 0.05$), self-awareness ($\beta = 0.008$; $p = 0.029$, $p < 0.05$), self-regulation ($\beta = 0.032$; $p = 0.000$, $p < 0.05$), motivation ($\beta = 1.026$; $p = 0.017$, $p < 0.05$), and their academic achievement. Notably, the age variation within the lowest achievers group does not demonstrate a significant association with their academic achievements, as indicated by $\beta = 0.016$; $p = 0.068$; $p > 0.05$.

Table 8 showcases the classification data employed to determine the group of students whose academic achievement the model accurately predicted. In terms of academic performance, the model achieved a commendable accuracy rate of 16.7% for students belonging to the bottom 25 achiever categories. The formula used to calculate this accuracy rate is as follows:

$$\text{Accuracy rate} = \frac{19}{19 + 56 + 15} = 0.211$$

In this case, the numerator, which is 19, represents the number of students correctly predicted by the model within the bottom 25 achiever categories. The denominator, which is the sum of 19 + 56 + 15, represents the total number of students in all three achiever categories (bottom 25, middle 50, and top 25). By dividing the numerator by the denominator, we obtain the accuracy rate of 0.211, which can be expressed as 21.1% when multiplied by 100. This means that the model accurately predicted the academic achievement of 21.1% of the students in the bottom 25 achiever categories. Moreover, the model exhibited success rates of 74.5% and 38.6% in correctly identifying students in the top 25 and middle 50 achievers, respectively.

5.2. Discussion

The principal aim of this research endeavor was to evaluate the EI levels among primary school students residing in specific target regions, while concurrently investigating its correlation with their academic achievements. The study divulged that a majority of the students exhibited an EI level categorized as 'average.' Gender-based analysis revealed no statistically significant disparities in the association between gender and EI. However, when examining male and female students separately, it was discerned that more than half of the male students demonstrated a moderate level of EI. This discovery concurs

Table 6
Likelihood ratio test.

Effect	Model Fitting Criteria		Likelihood Ratio Tests			
	AIC of Reduced Model	BIC of Reduced Model	−2 Log Likelihood of Reduced Model	Chi- Square	df	Sig.
Intercept	894.850	945.780	870.850	.		0.000
Empathy	932.719	983.649	908.719a	1.181	2	0.001
Social Skills	931.541	982.471	907.541a	0.003	2	0.034
Self-awareness	935.538	994.957	907.538b	2.460	2	0.058
Self-regulation	935.538	994.957	907.538b	6.361	2	0.022
Motivation	932.018	982.948	908.018a	0.480	2	0.032
Age	932.299	983.229	908.299a	0.760	2	0.014
Sex	932.301	983.231	908.301a	0.763	2	0.002

Table 7
Parameter estimates.

Parameter Estimates									
Semester Average		β	Std. Error	Wald	df	Sig.	Exp(β)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Medium achievers	Intercept	.060	.670	.008	1	.000			
	Empathy	.015	.162	.009	1	.025	1.015	.739	1.394
	Social Skills	−.002	.177	.000	1	.023	1.002	.709	1.416
	Self-awareness	−.018	.166	.012	1	.042	.982	.708	1.361
	Self-regulation	.019	.142	.008	1	.043	1.005	.706	1.417
	Motivation	.017	.163	.011	1	.015	1.018	.739	1.401
	Age	.015	.136	.012	1	.064	.985	.754	1.287
	Sex	.024	.154	.024	1	.056	.976	.721	1.321
Bottom 25s	Intercept	.966	.852	1.285	1	.037	1.008	.767	1.726
	Empathy	1.045	.205	.048	1	.027	1.046	.699	1.564
	Social Skills	1.002	.224	.000	1	.059	1.002	.645	1.555
	Self-awareness	.008	.211	.002	1	.029	1.008	.667	1.525
	Self-regulation	.032	.264	.004	1	.000	1.046	.699	1.564
	Motivation	−.009	.208	.002	1	.004	.991	.659	1.489
	Age	.016	.173	.008	1	.068	1.016	.724	1.426
	Sex	1.026	.196	.017	1	.007	.975	.663	1.432

Table 8
Classification.

Observed	Predicted			
	Top = 25	Medium = achiever	Bottom = 25	Percent = Correct
Bottom = 25 achievers	19	56	15	16.7%
Medium 50 achievers	42	146	8	74.5%
Top = 25 achievers	61	93	4	38.6%
Overall	27.5%	66.4%	6.1%	50.0%

with the findings of an investigation conducted by Meshkat and Nejati (2017), which underscored distinctions in the socialization processes undergone by males and females, influenced by a composite interplay of societal and biological factors. Correspondingly, Saba, Sana, and Hina (2017) posited that there exists a perceptual notion of women possessing lesser EI compared to men, despite the empirical evidence suggesting a parity in EI. Consequently, this study postulates that both male and female students exhibit comparable EI levels.

The second focal point of this study entailed an exploration of the interrelationship between diverse facets of EI and the academic achievement of primary school students in the designated regions. The analysis revealed a statistically significant positive correlation between academic achievements and all facets of students' EI, encompassing social skills, self-awareness, motivation, empathy, and self-regulation, particularly among students classified as 'medium' academic achievers. This outcome aligns with antecedent research. An earlier correlational study conducted by Jane, Jacinta, and Alice (2020) unveiled noteworthy associations between EI domains and academic achievement among students within a similar age cohort located in Kilili County, Kenya. The study advocated for collaborative efforts among educators, teachers, and education stakeholders to nurture the development of EI in students, consequently augmenting academic achievements (Gao, Liu, Xu, Mesman, & Van Geel, 2022; Moè, Consiglio, & Katz, 2022). The present study's findings corroborate those reported by Nwadinigwe and Azuka, who documented a favorable correlation between EI competencies and students of similar age groups in Lagos. Furthermore, investigations conducted in Babylon City (Ali & Mohammed, 2020), as well as other scholarly research endeavors (Ajmal & Rafique, 2018; Aldrup et al., 2022; Hakiki & Qolby, 2019; Rani et al., 2023; Sivrikaya, 2019; Yalcin-Tilfarlioglu & Arikan, 2012), consistently underscore the role of EI factors in contributing to students' academic achievements. Scholars have posited that the enhancement of students' EI skills may lead to an amelioration in academic achievement (Chokshi & Farley, 2012; Nwadinigwe & Azuka-Obieke, 2012).

Furthermore, this study deliberated upon the circumstances of low-achieving students and determined that gender disparities constituted one of the explanatory variables influencing their academic achievement. Among the myriad components of EI, namely self-awareness, self-regulation, motivation, and empathy, were discerned as the most influential determinants elucidating students' academic achievements. These findings are consonant with earlier research in the domains of empathy (Yalcin-Tilfarlioglu & Arikan, 2012), self-regulation (Hakiki & Qolby, 2019), motivation (Alheri, Burgasa, Isah, & Gambo, 2022), and self-awareness (Ajmal & Rafique, 2018). Almost every facet of EI emerged as an explicative indicator for students' academic achievements, mirroring the trends observed among students characterized as 'medium' academic achievers. However, the dimension of social skills, an integral component of EI, did not manifest a significant association

with students' academic achievement.

6. Educational implications

The study's findings have significant implications for the field of education, emphasizing the importance of nurturing emotional intelligence in children. A key recommendation arising from this research proposes a reassessment of educational policies, urging the adoption of targeted strategies to actively support the development of resilient learners, particularly in the unique context of southern Ethiopia. Equally crucial is the need to raise awareness of emotional intelligence among educators and parents. This should be accompanied by the implementation of measures aimed at enhancing children's skills in areas such as self-regulation, self-awareness, empathy, and motivation, as indicated by Denham et al. (2003; 2016) and Baker and Perry (2022). To foster emotional intelligence in children, educators and parents are encouraged to employ specific strategies, including promoting self-determination and addressing individual needs, as suggested by Gao et al. (2022) and Moè et al. (2022). The study underscores the pivotal role of emotional intelligence in academic achievement, providing valuable insights for educators and parents alike. Emphasis is placed on the necessity of tailored interventions that prioritize the overall growth and development of children.

7. Conclusions

The primary objective of this research was to assess the contribution of Goldman's fundamental components of EI to the academic achievement of elementary school students. Given the growing global recognition of EI's significance in the context of academic achievement, a crucial imperative emerged to scrutinize the interrelation between these two variables. The study's empirical analysis reveals that a considerable proportion of male students demonstrate comparable levels of EI as their female counterparts. Furthermore, specific facets of EI, notably self-regulation, empathy, motivation, and self-awareness, emerge as robust predictors of students' scholastic accomplishments. Consequently, this investigation posits that educational institutions should actively administer EI interventions to optimize educational outcomes. Professionals involved in education, encompassing a spectrum from early childhood education to higher education, should individualize their instructional support to accommodate learners' unique cognitive and emotional needs. Moreover, it is advisable to reevaluate parenting practices within households to assist children in regulating their emotions and augmenting their EI. Additionally, educational leaders and policymakers should cultivate nurturing learning environments, while systemic authorities should contemplate policy revisions and targeted strategies geared towards enhancing the scholastic milieu for children. The broader implications of this study encompass the cultivation of resilient learners and heightened consciousness within the educational system.

8. Limitations and further studies

In light of our research scope, it is crucial to extend our investigation to include additional aspects, particularly resilience in connection with academic success. Although our primary focus was on exploring the correlation between emotional intelligence and academic performance in primary school students in southern Ethiopia through a singular methodology, forthcoming research initiatives should delve into the intricate interactions among emotional intelligence, resilience, and other relevant characteristics, utilizing diverse study techniques. A comprehensive grasp of these elements holds the promise of a deeper understanding of the factors impacting academic achievement. Therefore, we strongly endorse future research initiatives that explore the collective influence of emotional intelligence, resilience, and other pertinent characteristics. Embracing such a holistic approach is essential for advancing our comprehension of children's overall development and academic attainment. This nuanced perspective will contribute significantly to refining instructional approaches, ultimately bolstering students' overall well-being and academic success.

Data availability statement

The dataset is under the custodianship of the principal investigator.

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CRediT authorship contribution statement

Adane Hailu Herut: Conceptualization, Data curation, Formal analysis, Methodology, Validation, Writing – original draft, Writing – review & editing. **Habtamu Disassa Muleta:** Project administration, Supervision. **Mulugeta Fufa Lebeta:** Data curation, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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