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Emotional intelligence predicting subject-specific academic success: EQ-i Youth in South Africa

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Background: Academic performance has been perceived as an element, which can change the lives of youth, while emotional intelligence (EI) often relates to adolescents' well-being and, in turn, can influence academic performance. Emotional intelligence development is related to multiple beneficial outcomes and deemed a valuable tool for educational and career planning. However, there is a need for more EI-related guidance in youth interventions.

Objectives: To inform such guidance, this is the first study that aimed to confirm the relationship between the academic results of South African adolescents and EI (measured using an updated assessment and newer EI model). It also aimed to determine whether specific EI scales were dominant predictors of subject-specific academic results.

Methods: A quantitative research study was conducted following a non-experimental, correlational research design and stratified random sampling method. The study was conducted in secondary schools across South Africa. Academic results and EI scores of 284 adolescents between 13 and 19 years were available for correlational and regression-based dominance analysis techniques.

Results: Results confirmed a significant positive relationship between total EI scores and academic year averages. Prominent findings included the decision making composite, which had the strongest relationship with and was the most dominant predictor of most compulsory subject averages.

Conclusion: The results point to the importance of considering learners' EI as a contributing aspect to their school performance, by incorporating learner-tailored EI testing and development at a school level.

Contribution: Findings contribute to the criterion validity of the EQ-i Youth assessment and can guide teaching and career guidance initiatives in incorporating tailored EI strategies for learner development.

Keywords: academic performance; adolescents; career planning; emotional intelligence; EQ-i Youth; EQ-i 2.0 model; South Africa.

Introduction

For a long time, academic performance has been used as an indicator of individual potential for future success (Dorta-Guerra et al., 2019). For example, an individual's grades in different subject areas often form the basis of academic performance or achievement including the measurement thereof (Matešić, 2015), which applies explicitly to adolescents in high school (Liang et al., 2020). These adolescents' grades are mainly being used to consider their future potential and make decisions regarding career planning and university placement (Brdesee & Alsaggaf, 2021; Xiao et al., 2018). Different life domains can favourably or unfavourably impact adolescents' academic achievements and well-being (and, evidently, individual potential). During this life phase, emotional intelligence (EI) skills play a crucial role in mitigating, influencing, and supporting a favourable impact (Bar-On & Maree, 2007; Calero et al., 2018). In light of the above associations, it is increasingly evident that EI can be used as a tool to unlock individual potential.

Following the publication of Daniel Goleman's book *Emotional Intelligence: Why EQ matters more than IQ*, it became apparent that certain EI aspects were predictive of academic achievement in youth

Note: Topical Collection: Advancing career intervention in developing countries.

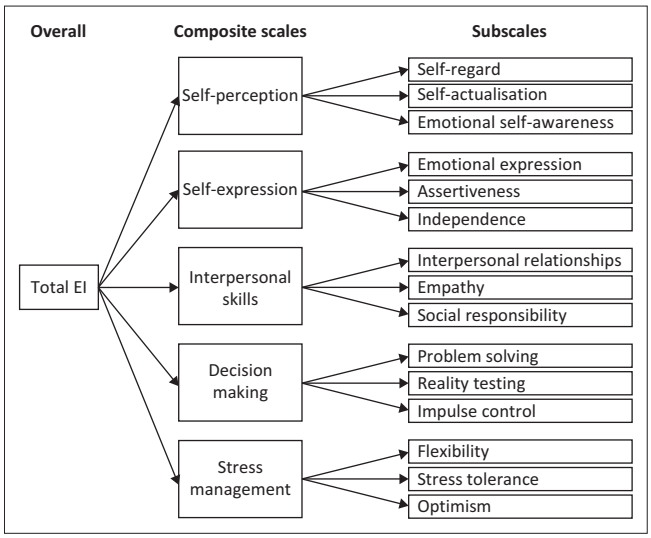
(Goleman, 1995). Further evidence hereof is stipulated in various studies that found significant relationships between EI and subject grade achievements of adolescents (MacCann et al., 2020:162; Suleman et al., 2019:10). A study including Western or European adolescents (n = 209) by Downey et al. (2008:14) reported a relationship between EI and mathematics, natural sciences, and arts. Furthermore, other researchers (Herrera et al., 2020:9; MacCann et al., 2020:168) confirmed a relationship between EI and various subjects' success (such as mathematics, home and additional language, and life orientation) in Africa. This study, therefore, builds on these in a South-African-specific context.

Specific EI dimensions that are proven predictors of academic achievements include awareness of the self and social norms, self-management, interpersonal skills, and the responsibility of making decisions (CASEL, 2003; Miller & Byrnes, 2001). In a social schooling environment, adolescents have to apply life and social skills to achieve good grades (Wentzel, 2022). Social relationships often form the foundation of learning, as a student's ability to adjust and perform in school is frequently impacted by the complex interactions that necessitate emotional and social skills (Bar-on & Maree, 2007). Further research (Bücker et al., 2018:90; Yang et al., 2019:333) revealed that adolescents need to balance their social lives and academic achievement in their school lives for them to have good and successful careers. Furthermore, EI dimensions predict the career success of adolescents during the transition to university or higher education institutions (De Clercq et al., 2017:51). Moreover, even career choices are often influenced by EI elements (Santos et al., 2018). Consequently, EI seems to play a role not only in successful academic performance but also in adolescent futures in the form of career success.

Emotional intelligence predictors of academic achievement

Previous research indicates that emotionally intelligent learners are often more effective in mitigating challenging life and school situations, such as dealing with anxiety surrounding failure, in-class participation, school performance, and critical feedback (Bar-On et al., 2007; Demetriou et al., 2020:8,29; Maree et al., 2013:207). Emotional intelligence research in relation to academic achievement has been conducted across different EI measurement models. The various measurement models often include 'ability-based' and 'trait-based EI' (the latter provides self-report and mixed EI model measures). However, for this study, the focus was only on the Emotional Quotient Inventory 2.0 (EQ-i 2.0) model, which is considered to be trait and/or mixed EI (Van Lill et al., 2023), making this the first EI study with adolescents based on the EQ-i 2.0 model. The structure of the EQ-i 2.0 model (Figure 1) includes five composite areas, which form the basis according to which the next section was unpacked.

Specific aspects of EI that predict school performance in the form of academic achievement include self-awareness and



Source: Wiechorek, D. (2011). *Emotional Quotient Inventory 2.0: User's handbook*. Multi-Health Systems, Inc.

FIGURE 1: EQ-i 2.0 model structure that also forms the base model of the EQ-i Youth assessment.

self-evaluation, which are essentially reflected by the self-perception (SP) composite of the Emotional Quotient Inventory 2.0 (EQ-i 2.0) model in terms of self-regard, self-actualisation, and emotional self-awareness (see Wiechorek, 2011). If these aspects were to improve, one would typically expect improved self-monitoring, self-management when learning, and alertness to feedback. Importantly, Demetriou et al. (2020:8) emphasise the predictability of these SP aspects in combination with cognitive reasoning, where the EI aspects allow one to utilise cognitive ability more effectively.

Social relationships and communication skills are also crucial for academic achievement. These skills are employed when students interact with their peers and teachers in class, as well as when managing their social lives. During classes, learners are expected to share learning equipment and work in groups. At the same time, in their social lives they need to recognise and react appropriately to peer pressure (MacCann et al., 2020). Improved communication, often seen in the comfort of expressing emotions and thoughts, asking and answering questions even when uncertain, or other core actions that could contribute to learning in class, are likely to also lead to higher grades (Kiuru et al., 2020; Pascoe et al., 2020:108). These skills clearly correspond with self-expression (SE) (expressing the inner self to the outside world in a self-reliant and constructive manner) and interpersonal skills (IS) composites (developing and maintaining trusting relationships, appreciating others' emotions, and contributing to one's own social groups) of the EQ-i 2.0 model (Wiechorek, 2011).

Decision making (DM), according to the EQ-i 2.0 model, has to do with making decisions when emotions are involved. The composite includes skills that also come into play during self-monitoring and self-management activities (Wiechorek, 2011) and is related to academic achievement. Primarily defined by the adaptability composite in the former BarOn Emotional Quotient Inventory (EQ-i) model, DM was

found to be significantly associated with academic performance, as students with higher Grade Point Average (GPA) scores also had significantly higher adaptability scale scores compared to lower-performing groups (Parker et al., 2004:1327).

Emotional management is also considered a predictor of academic achievement, where learners who are typically able to manage stress or anxiety, boredom, and disappointment when given negative feedback are likely to perform well in school (Esnaola et al., 2017; Guhn et al., 2020). Therefore, the two aspects in the EQ-i 2.0 model that are central to emotional management are stress tolerance (coping with emotions resulting from stress and unfamiliarity) and flexibility (adapting to change and unfamiliarity) as elements of the stress management (SM) composite (Wiechorek, 2011).

Consequently, overall, EI and its composites have been found to be predictors of academic achievement in general, with the most dominant predictive EI composites expected to be SM and DM. Previous research by Parker et al. (2004:1328) found the most consistent relationship between individuals with high GPA scores and EI scales equivalent to these two composites. These authors also recommended research that considers EI and achievement across different subjects, which this study adhered to. This literature leads the authors to believe that hypotheses H1 to H2A (provided in the hypothesis section of this article) would be valuable to test in the South African context.

When considering specific mandatory subjects, a study by Herrera et al. (2020:5–6, 9) used the BarOn Emotional Quotient Inventory: Youth Version-Short (EQ-i:YV-S; Bar-On & Parker, 2000) to determine which EI composites were predictors of academic performance for Spanish adolescents in the age group 10-years to 12-years. Findings suggested that the intrapersonal dimension of EI was a significant predictor of the Spanish language subject. The intrapersonal scale of the EQ-i:YV (based on the EQ-i model) is essentially equivalent to the combined SP and SE scales included in the updated EQ-i 2.0 model (Figure 1; Wiechorek, 2011). Because the SE dimension includes constructive communication and expression of one's emotions (Wiechorek, 2011), a positive predictive relationship with performance in language subjects, which is core to verbal communication, is anticipated (see hypothesis H2B).

In the case of mathematics, the adaptability dimension (including problem solving, reality testing, and flexibility) was predictive of performance on the subject (Herrera et al., 2020:9). These subscales form part of the DM (i.e. problem solving and reality testing scales) and SM composites (i.e. flexibility scale) in the EQ-i 2.0 model (Wiechorek, 2011). Tariq et al. (2013:1145) found that high levels of EI were a potential mitigator of anxiety's impact on mathematics performance. Furthermore, when considering that DM in the EQ-i 2.0 model specifically has to do with the skill to objectively solve problems in emotionally loaded (e.g. high-anxiety) situations while understanding its potential impact on decisions and objectivity (Wiechorek, 2011), it is understandable that DM specifically could be predictive of mathematics performance (leading to hypothesis H2C).

Another study carried out in Spain by Trigueros et al. (2019:8) found dimensions such as empathy, emotional regulation, and recognition to have an indirect positive influence on life skills subject scores. At the same time, effective communication and relationship building are suggested to impact such performance. Alternatively, a South African study indicated that if social-responsibility-related aspects underlie physical-related or life-skills-related education, it could contribute to academic performance in the life orientation subject (Jones & Roux, 2021:5). Consequently, as the mentioned dimensions constitute core traits of the EQ-i 2.0 IS composite, it is expected to predict performance in the life orientation or life skills subject (informing hypothesis H2D). Furthermore, the life orientation subject in South Africa has a critical objective of empowering learners to reach their potential on a personal, emotional, and social level (Department of Basic Education, as cited in Care et al., 2017:31); thus, it provides a potential point of departure where emotional and social skill development could be further promoted.

Emotional intelligence's potential to address adolescent challenges

Adolescence is a developmental phase where individuals are confronted with various challenges often related to change and transitioning, which is important for shaping individual futures (eds. Bonnie & Backes, 2019). In the school context, adolescent students are confronted with feelings of stress and can struggle to cope with stressful situations, which could lead to poor academic performance (Pascoe et al., 2020). However, adolescence can also be a developmental phase of opportunity as some impulsive and risk-taking behaviours can potentially facilitate creativity and motivation to seek new experiences. Therefore, creating an opportunity through interventions that address relevant emotional and social skills like SM, SP, DM, IS, and SE can help adolescents develop a mindset useful in navigating challenges, addressing their areas of vulnerability, and reaching their potential (eds. Bonnie & Backes, 2019; Wiechorek, 2011; Yeager, 2019). A review of previous research across different study contexts by Yang and Daun (2023) emphasised the importance of incorporating the development of these emotional and social skills in classes and curriculums. Thus, it emphasises the need for EI development to be integrated into an adolescent's whole 'ecosystem'.

Another challenge for adolescents relates to their progression through their school 'careers', that is, transitioning from primary to high school to career decisions, from subject selection to career planning (Kiuru et al., 2020; Wong et al., 2021). When adolescents transition, they are more likely to perform poorly because of their workload and adjustment difficulties (Virtanen et al., 2019). They are also expected to achieve lower grades until they have fully adjusted to the

new environment and to new teaching approaches (Anderson et al., 2000). However, specific skills grounded in EI (when linked to the EQ-i 2.0 aspects), such as flexibility, problem-solving, impulse control, emotional expression, self-regard, and maintaining interpersonal relationships, are essential during these transitions and can positively impact academics, well-being, and career planning and progression (Kiuru et al., 2020; St Clair-Thompson et al., 2017; Wong et al., 2021). As such, while academic achievement is often an integral component of career planning, it is believed that EI could play an indirect role in guiding its process. Therefore, providing youth with assistance during these stages of transitioning is crucial (Kiuru et al., 2020).

Career guidance and well-being care needs

Organisations globally consider support in career planning and coordination to be of specific importance during these transitioning phases to help guide individual potential and future outcomes. As a result, career development support systems are developed (and encouraged) to include career guidance and education, among other aspects (Kadletz et al., 2021). Career guidance, counselling, and education initiatives can be effective not only in guiding youth through transitioning periods but also in preparing them for the workplace and their future careers.

South African and global developments support career counselling initiatives to prepare adolescents for the workplace, for example, in remote, informal settlements and townships (Savickas & Savickas, 2019). The inclusion of social and emotional skills education in these initiatives is deemed necessary by educators from multiple African countries, mainly referring to empathy, self-management, and decision-making (Marsay et al., 2022:96); however, very few interventions focus on enabling the development of EI in South African schools (Harrison et al., 2021). Emotional intelligence (defined as self-management, self-awareness, and social awareness) was included in the SkillCraft application developed by the World Bank and colleagues (2022:3), which is a tool that uses digital tasks to assess overall 21st century skills often sought by employers, and assists youth in career guidance. The SkillCraft application is primarily aimed at supporting South African unemployed youths who are hard to reach because career guidance and well-being support often become a challenge in low- and middle-income countries because of a lack of resources (Maree & Molepo, 2007).

Therefore, as evidenced by the aforementioned, adolescents are faced with many challenges in their lives, which are often amplified for youth from developing countries (Masud et al., 2019). Because earlier literature (e.g. Kiuru et al., 2020) shows the value of EI skills in general for performance outcomes and the mitigation of life challenges, training and development of such skills should ideally be promoted. There is, however, a crucial need for more support and interventions that can assist youth in the development and use of EI skills for application in specific education and career contexts. Therefore, this study is now looking at the predictive value of specific elements of EI, as it is not clear which elements have the most dominant impact, particularly in the context of South African youth performance. Insights into the order in which EI skills development should take place to support specific academic and career progression can significantly help with the development of impactful social and emotional interventions. Findings could thus have implications for subject and career choices and significantly contribute to career planning and guidance initiatives.

Research aims and hypotheses

As a first study of its kind, this study, therefore, seeks to establish whether the EQ-i 2.0 model, adapted for youth samples (i.e. the Emotional Quotient Inventory Youth [EQ-i Youth]), is predictive of academic performance as the original EQ-i model was in a youth context (Parker et al., 2004), and as the EQ-i 2.0 is of adult work performance (Van Lill et al., 2023). Furthermore, this study aims not only to confirm the relationship between EI aspects (as defined by the EQ-i 2.0 model) and the academic results of adolescents but also to determine whether EI is a significant predictor of academic success (represented by academic year marks) in a South African context.

The authors also aim to indicate which EI scales are more dominant in their prediction of overall and subject-specific academic results, which is often lacking in other EI studies (e.g., MacCann et al., 2020; Suleman et al., 2019). After considering previous research, the authors formulated the following hypotheses to address the aims:

H1: Total EI has a significant positive relationship with academic performance.

H2: There are several significant relationships between EQ-i Youth scales and academic results.

H2A: The SM and DM composites have the strongest positive effects on overall academic achievement.

H2B: The SE composite has the strongest positive effect on home language and additional language performance.

H2C: The SM and DM composites have the strongest positive effects on mathematics performance.

H2D: The IS composite has the strongest positive effect on life orientation performance.

Research methods and design

Study design

As part of this article, the aim was to investigate and measure the nature of the relationship between EI and academic performance for secondary school adolescents in a South African context. The EQ-i Youth assessment provided a measure of EI, while academic year marks represented an indication of individual academic performance. The authors conducted a quantitative research study following a non-experimental, correlational research design (Mertler, 2019).

Setting

Learners were approached via schools or psychology professionals working at schools with representation in private and public schools across two of the five school quintile levels (4 and 5) throughout the nine provinces in South Africa. The school quintile levels indicate the level of financial resources allocated to specific public schools by the government, that is, more resources are allocated to quintile one schools. In contrast, quintile five schools receive the least resources.

Study sample and sampling strategy

Stratified random sampling was applied to first collect responses on the EQ-i Youth from South African adolescents. The only inclusion criteria were that individuals had to be at a secondary school, within the age group 13-years to 19-years, and have a functional understanding of written English while being able to read English questions. Exclusion criteria were participants who suffered from emotional or psychological distress, (which was self-reported by parents). Based on the consent provided, academic results were requested from schools at the end of the academic year as additional data that could be used in the validation of an EI measure. To the best of the authors' knowledge, the schools included were not exposed to previous EI interventions. The sample consisted of the learners whose academic results were made available ($n = 284$). The average age was 15.12 years (standard deviation [SD] = 1.33), while 29.6% of the sample self-identified as male and 70.4% as female. Participants were also from different ethnic groups (39.5% African, 44.7% white, and 15.8% from other ethnic groups such as Indian, mixed race or Asian). Using the statistical tool GPower, the authors determined that our sample size has a statistical power and a 99.5% probability of finding moderate effects from regression analyses, which is satisfactory (Mayr et al., 2007).

Data collection

Data were collected between February and December 2019 in a proctored group setting where students completed the EQ-i Youth in English after a thorough written informed consent process was followed. The proctored setting allowed for the validity assurance of responses as trained psychology administrators were available to ensure independent responses and to answer any questions that could arise. The assessment's readability level is at a Flesch-Kincaid reading grade indicator of grade level 4–5 (Kincaid et al., 1975). A small number of younger English second-language learners indicated difficulty in understanding one or two items. These items were neutrally explained to the learners by administrators so as not to influence participants' responses.

Academic performance

Academic year marks were captured by the research team from each student's year school report. The reports were provided directly by the schools, with permission from the students and their parents. It is important to notice that the sample sizes for some school subjects varied as not all students took the same subjects in later grades. The South African Department of Basic Education (2021) requires learners to complete at least seven subjects (four compulsory subjects and three optional subjects of their choice) to achieve their National Senior Certificate in Grade 12. Consequently, this article focussed on the overall year averages (across both compulsory and optional subjects) and compulsory subject averages (only), which unsurprisingly had the most consistent sample sizes.

Emotional Quotient Inventory Youth

The EQ-i Youth Adolescent form was used, which was validated and normed for a South African sample of adolescents between the ages of 13-years and 19-years and based on the EQ-i 2.0 model structure. The single Total EI score indicates an individual's 'overall level of emotional and social functioning' at a specific point in time (Stols & Taylor, 2020:37). The Total EI is comprised of five composite scales that each include three subscales. The five composite scales include SP, SE, IS, DM, and SM (Figure 1).

The psychometric properties of the EQ-i Youth Adolescent form indicated that it is a reliable and valid measure of EI for adolescents (Stols & Taylor, 2020). The McDonald's omega (Ω^T) and Cronbach's alpha (α) values were acceptable with values larger than 0.70. From a construct validity perspective, the confirmatory factor analyses provided acceptable fit indices when tested against the EQ-i 2.0 factor structure. At the same time, the inter-factor correlations demonstrated evidence of uni-dimensionality. Rasch and differential item functioning (DIF) analyses were also conducted and indicated that the EQ-i Youth items fit the EQ-i 2.0 model well, contributed to measurement, and had notable similarities across different contextual groups (including age groups, gender and ethnic groups). Any group differences or DIF that occurred were either not substantial or did not transfer to total scale scores, which provided confidence in the fairness of the assessment across these groups. More specific information about how the EQ-i Youth was further validated is beyond the scope of this article and detailed information can be found in the assessment manual (i.e. Stols & Taylor, 2020).

Data analysis

Data capturing professionals captured the data after receiving training and a process manual of the required steps. The captured data were double-checked by a central person who cleaned the data by ensuring a universal capturing style, removing duplicates, and checking missing data. Careless responses were identified and removed from the original sample using the *careless* package (Yentes & Wilhelm, 2018) in the R software environment (R Core Team, 2021).

To produce the findings for this manuscript, the researchers first conducted a correlational analysis to confirm the relationship between total EI and total academic performance. To determine the contribution weights of EI aspects to total academic performance, calculated across all subjects,

dominance analysis (DA) was conducted, which is a regression-based technique that is useful when potential suppressor variables are present. Dominance analysis is also more sensitive in its indication of predictor variables' relative importance through direct comparisons (Darr & Catano, 2016:195). This method was used because there are often intercorrelations between EI scales (i.e. predictor variables) that may limit our interpretation of the variance explained in some outcome variables and specifically the weights determined by multiple linear regression (MLR) analyses (Nimon & Oswald, 2013).

Therefore, to allow for more advanced conclusions from a regression analysis with increased insights, further indices were included in the interpretation and the specific *yhat* R package for analysis that Nimon and Oswald (2013:9) proposed was used. These indices include structured coefficients and dominance weights. Structured coefficients assist in identifying the variance of the outcome variable explained by each predictor variable in isolation, if no intercorrelations among predictor variables existed. General dominance weights, acquired through DA, indicate a predictor variable's average contribution to an outcome variable when all predictor variables in the model are considered and when examining the variable on its own (Nimon & Oswald, 2013). Even though there was a strong focus on interpreting the general dominance weights, the rescaled dominance percentages of each scale were also calculated, (i.e. the rescaled %), which emphasises the relative importance of a construct.

Ethical considerations

An application for full ethical approval was made to the the University of Johannesburg, Faculty of Education, Research Ethics Committee and ethics consent was received on 21 January 2019. This committee is registered with the National Health Research Ethics Council (REC-110613-036). The ethics approval number for this study is Sem-2-2018-001. This research study was also conducted following the Ethics in Health Research guidelines by the South African Department of Health (DoH, 2015). After obtaining written permission from parents, consent forms were provided to learners, who were given ample time to consider participation in discussion with their parents. On the date of participation, the research was explained to the learners again; whereafter they were provided with the opportunity to ask questions and provide informed assent. Throughout the entire project, all written data was securely stored in closed containers with restricted access available only to the research team in order to preserve data confidentiality. Electronic data is stored on access-controlled and secure servers.

Results

The results are structured to indicate which of the EQ-i 2.0 composite scales are the most dominant and statistically significant predictors of the sample's academic performance. The academic performance indicators constitute student marks based on their year average and year marks related to compulsory subject areas such as languages, life orientation, and mathematics. Variable descriptive statistics show consistent relationships between academic scores and most EI scales, while mean scores and standard deviations provide a good indication of the data variability (Table 1). Certain contextual variables, such as age groups and gender were considered, but no fundamental differences were found. Therefore, only the results of the overall sample were reported. The performance findings (Table 2) report, in relation to each academic subject, each composite scale's structure coefficient (r^s), Beta weight (β), general dominance weight (Dom), and the rescaled dominance weight (ResDom) at a 95% significance rate. The scale statistics are reported in the order of dominance for each subject.

Overall academic performance

Our findings confirm a significant positive relationship between the sample's total EI score and the sample's academic year average (Pearson's $r = 0.27, p < 0.001$), thereby confirming Hypothesis 1, which is comparable to previous research (Parker et al., 2004:1327) and satisfactory to predict both short- and long-term outcomes (Funder & Ozer, 2019:159). Various EI composites, which often form the focus of individual development, are also significant predictors of the year average (Table 2).

Overall, the DM composite scale had the greatest positive correlation with the year academic average, followed by the SE composite and the SM composite (r_s = 0.60–0.76; M = 0.66). Decision making (Dom = 0.05*; 36%) also seems to dominate all other predictors of academic year marks, followed by the SE and the IS composite scale.

Compulsory subjects

Compulsory subjects include home language, a first additional language, mathematics (or maths literacy), and life orientation. These subject areas and their relationships with EI display a similar trend than the relationship between the year average marks and EI (Table 2). The DM composite has the strongest relationship with home language, first additional language, and life orientation (r_s = 0.66–0.82; M = 0.72) and was also the most dominant predictor of these subject averages.

However, the IS composite is still considered necessary when inspecting the findings because it was the second most dominant predictor of both the language subjects and third for life orientation while also indicating significant positive relationships with these subjects (r_s = 0.56–0.66; M = 0.63). The SE composite also had significant relationships with various subjects and was the second most dominant predictor of life orientation. Interestingly, SE indicated a significant positive direct relationship with mathematics and was the most dominant predictor of mathematics scores (Dom = 0.03*; 25%), followed by SM and DM. Hypothesis 2A to 2D could, therefore, not entirely be confirmed.

TABLE 1: The descriptive statistics of the emotional intelligence scale and academic mark variables including correlation coefficients, mean scores, and standard deviations.

Academic performance variables	SP	SE	IS	DM	SM	Total EI	Mean	SD
Academic year average (N = 284)								
r	-	0.216***	0.212***	0.271***	0.212***	0.268***	68.42	13.46
ρ	-	0.250***	0.211***	0.262***	0.212***	0.267***	-	-
Home language (N = 284)								
r	-	0.176**	0.199***	0.199***	-	0.191**	67.50	10.95
ρ	-	0.214***	0.217***	0.216***	-	0.205***	-	-
First additional language (N = 284)								
r	-		0.136*	0.200***	-	0.150*	68.92	14.48
ρ	-	0.125*	0.143*	0.183**	-	0.139*	-	-
Life orientation (N = 284)								
r	-	0.196***	0.189**	0.196***	0.149*	0.213***	73.81	11.95
ρ	-	0.233***	0.203***	0.193**	0.131*	0.211***	-	-
Mathematics (N = 254)								
r	0.180**	0.270***	0.242***	0.270***	0.267***	0.323***	60.81	19.37
ρ	0.197**	0.289***	0.231***	0.265***	0.283***	0.323***	-	-
Mean	36.490	32.330	42.850	39.470	31.770	182.900	-	-
SD	6.780	6.130	6.270	6.820	6.110	24.170	-	-
Max	48.000	48.000	56.000	56.000	48.000	256.000	-	-

EI, emotional intelligence; SP, self-perception; SE, self-expression; IS, interpersonal; DM, decision making; SM, stress management; r, Pearson's correlation coefficient; ρ, Spearman's rank correlation coefficient; SD, standard deviation; Max, maximum possible scale score.

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

TABLE 2: Results from the dominance analysis indicate the relative importance of the emotional intelligence composite scales for academic performance in the form of year average and compulsory subjects.

Order	Academic year average (N = 284)	Home language (N = 284)	First additional language (N = 284)	Life orientation (N = 284)	Mathematics (N = 254)
1	**DM**	**DM**	**DM**	**DM**	**SE**
	r_s = 0.76*	r_s = 0.66*	r_s = 0.82*	r_s = 0.69*	r_s = 0.74*
	β = 0.26*	β = 0.25*	β = 0.27*	β = 0.18*	β = 0.16*
	Dom = 0.05*	Dom = 0.03*	Dom = 0.04*	Dom = 0.02*	Dom = 0.03*
	ResDom = 36%	**ResDom = 34%**	**ResDom = 62%**	**ResDom = 28%**	**ResDom = 25%**
2	**SE**	**IS**	**IS**	**SE**	**SM**
	r_s = 0.61*	r_s = 0.66*	r_s = 0.56*	r_s = 0.68*	r_s = 0.73*
	β = 0.15*	β = 0.15*	β = 0.10	β = 0.16*	β = 0.16*
	Dom = 0.02*	Dom = 0.03*	Dom = 0.01*	Dom = 0.02*	Dom = 0.03*
	ResDom = 18%	**ResDom = 28%**	ResDom = 19%	**ResDom = 27%**	**ResDom = 23%**
3	**IS**	**SE**	**SP**	**IS**	**DM**
	r_s = 0.59*	r_s = 0.59*	r_s = 0.22	r_s = 0.66*	r_s = 0.74*
	β = 0.13	β = 0.15*	β = -0.16	β = 0.12*	β = 0.15
	Dom = 0.02*	Dom = 0.02*	Dom = 0.01*	Dom = 0.02*	Dom = 0.03*
	ResDom = 18%	ResDom = 21%	ResDom = 10%	ResDom = 24%	**ResDom = 23%**
4	**SM**	**SP**	**SM**	**SP**	**IS**
	r_s = 0.60*	r_s = 0.17	r_s = 0.36	r_s = 0.27	r_s = 0.67*
	β = 0.10	β = -0.23*	β = -0.02	β = -0.20*	β = 0.14*
	Dom = 0.02*	Dom = 0.01*	Dom = 0.003*	Dom = 0.01*	Dom = 0.03*
	ResDom = 15%	ResDom = 13%	ResDom = 5%	ResDom = 11%	ResDom = 21%
5	**SP**	**SM**	**SE**	**SM**	**SP**
	r_s = 0.29	r_s = 0.32	r_s = 0.34	r_s = 0.52*	r_s = 0.50*
	β = -0.25*	β = -0.02	β = 0.02	β = 0.06	β = -0.14
	Dom = 0.02*	Dom = 0.003*	Dom = 0.002*	Dom = 0.01*	Dom = 0.01*
	ResDom = 12%	ResDom = 3%	ResDom = 3%	ResDom = 10%	ResDom = 8%

Note: *, statistically significant because the relevant confidence interval did not contain 0 (Nimon & Oswald, 2013).

SP, self-perception; SE, self-expression; IS, interpersonal; DM, decision making; SM, stress management.

Discussion

Although no intervention was conducted as part of this study, the overall findings confirm the importance of considering EI, and its possible development, as strategies to improve academic performance of adolescent students in the South African educational context. Costa and Faria (2015:40) found that the focus on EI skills in development is important in education and suggested to use it as a strategy to enhance educational success. However, the findings of this study go beyond the overall indication of EI's strategic importance for academic performance and help to indicate the order of importance of specific EI domains for specific subject areas.

The order of importance of EI skills differed across most subjects, but the substantial importance of DM that emerged

consistently as the most dominant predictor for overall academic performance and most compulsory subjects, is notable. This finding only supports Hypothesis 2A of DM as a positive predictor of overall academic performance, while all remaining hypotheses were proven incorrect. These results imply that DM is a critical component in adolescents' academic achievement. In the introduction, the authors provided some explanation by defining DM as being able to objectively solve problems in emotionally loaded (i.e. highly anxious and frustrating) situations and understanding the potential impact of one's emotions on decisions and objectivity. It also includes skills in controlling one's impulses (Wiechorek, 2011). Even though postulated in a mathematics study (Tariq et al., 2013:1154), this dominant importance of DM could potentially emerge as the objective way in which (i.e. *how*) academic stressors and challenges are mitigated, which allows for better performance. To better understand DM as the most dominant predictor of language subjects, a more recent study by Wang and Liu (2023:14) is considered, which suggests that learning languages correspond with experiences of anxiety and frustration, and those who often see increased performance are more able to control and regulate their emotions while discovering learning solutions. Thus, the authors believe that this is likely also the case in this study. The importance of these DM skills should further be considered when adolescents are making career decisions, such as choosing a career and training direction, which can be challenging and emotional for some. Core to the prescriptive career decision-making model is being objective about personal abilities and other information available for use in making optimal career decisions (Gati & Kulcsar, 2021:4).

Decision making was also the most important predictor of life orientation, with the original hypothesis, the IS domain, emerging as the third predictor. When referring to the South African curriculum policy (as cited by Care et al., 2017:30), a central goal is to deliver students skilled in problem identification and solving, and decision-making with critical thinking; while another key objective is promoting effective group work and communication skills. These skills are incorporated as a critical outcome of the life orientation subject. Educators, parents, and curriculum personnel from South Africa identified interpersonal skills as very important for learners to reach success and are therefore often prioritised (Care et al., 2017:12). Nevertheless, in this research study, DM skills seem to be a more pronounced predictor of performance in life orientation and other prominent subjects.

The importance of interpersonal skills should, however, not be underestimated since the IS composite also emerged as a relatively significant predictor of academic performance overall, in language subjects and life orientation. Despite being in second and third place, this implies that adolescents may need to navigate relationships and collaborate respectfully in class to perform. In language subjects, these interpersonal skills are important when working together to practise grammar rules and using new words (Wang & Liu, 2023:14).

Effective interpersonal skills and having a greater social network in a classroom might stimulate an adequate social environment for better cooperative work, better group learning, greater support from classmates, and better relationships with teachers (Sánchez-Álvarez et al., 2020:3), which is often associated with better academic results (Suleman et al., 2019:17).

Furthermore, it could be argued that the hypothesis regarding the most dominant predictors of mathematics performance was only partially confirmed because the DM and SM composites emerged as the second and third predictors of mathematics performance. The statistical values in the findings were also similar to those of the SE composite, which was indicated as the most dominant predictor of mathematics performance. Consequently, the findings suggest that learners who are skilful in expressing themselves in a self-reliant and constructive manner manage their stress effectively, and their ability to make decisions in the presence of turbulent emotions will likely also improve their maths performance (Wiechorek, 2011). The prominence of the SE dimension can be better understood when considering Boaler (cited by Darling-Hammond et al., 2020:112), who indicated that classes where students were encouraged to discuss and explain their reasoning achieved positive performance outcomes in mathematics. Essentially, when students express their reasoning and assert questions regarding information not yet grasped, get feedback, and understand other approaches, they actually learn more deeply (Darling-Hammond et al., 2020:112). Therefore, similar self-expressive behaviour should be encouraged during classes and group work so that learners can progress in their maths performance. As discussed during the introduction, effectively dealing with the stressors and anxiety around mathematics work and tests, that is, skills represented by the SM composite, is important for learning mathematics and is expected to impact performance (Pascoe et al., 2019:107; Tariq et al., 2013:1157).

Therefore, by encouraging the effective management of stress-related challenges such as anxiety, stress, working independently, and peer communication (that can impact on maths performance), one can also support adolescents to be passionate about careers such as engineering and medicine or other careers where mathematics is an important requirement.

Lastly, an interesting finding was the non-prominent dominance position of the SP composite. This composite has to do with feelings of self-confidence and internal strength, self-awareness about personal emotions and impact, and pursuing individual goals (Wiechoreck, 2011). It is interesting because SP as an aspect of EI is often a core focus of many youth and career development programmes or initiatives. For example, a group of South African curriculum development stakeholders indicated confidence as key to learner success (Care et al., 2017:26). At the same time, the SkillsCraft application assesses EI as self-management, self-awareness, and social awareness to guide personalised job-seeking interventions (World Bank Group, 2020:2).

At face value, these EI components essentially correspond with aspects represented by the SP composite.

Therefore, even though SP is important, and all the elements of EI are well presented, our findings do not justify that it should be the most prominent point of EI development for learners, especially when considering academic performance (Calero et al., 2018). Implications of this finding could be that EI development initiatives and stakeholders are focussing on developing skills that do not necessarily have the most impactful outcome.

The results of this study hold implications for teachers and career counselling professionals to potentially adapt their approach to how development training and career support are delivered. Career guidance interventions could help to expand EI development into the entire ecosystem of a learner by establishing a more comprehensive communication and an integrated focus across parents, teachers, schools and career counselling professionals, which has been a key suggestion in other learning development initiatives (e.g. Klarare et al., 2022). However, relevant stakeholders involved in the implementation of the curriculum in South Africa emphasised their difficulties with targeting important EI skills because of a shortage of knowledge on how to teach these specific skills (Care et al., 2017:31). Therefore, the implications could also evolve to a policy level, where these findings could motivate and support a requirement that teachers be upskilled in how to teach EI skills and incorporate it in daily lessons and curriculum. A further policy requirement could be to ensure the measurement of learners' EI profiles during school screenings, especially at crucial transitioning times during school careers. Standard feedback to parents on activities that could help with such development could help address the importance of EI in another area of a child's daily ecosystem. Because limited counselling in South African schools with a focus on enabling adolescent EI development exists (Harrison et al., 2021:81), a further policy implication could relate to ensuring the availability of such services. Another implication could relate to mandatory continuity of EI development services, especially when considering the proven benefit of EI development later in life in terms of individual work performance (Van Lill et al., 2023).

Therefore, the authors recommend that continued student development and support initiatives be focussed on EI skills that would effectively optimise their specific subject performance (e.g. first focus on SE to promote mathematics performance or focus on DM-related skills to promote performance in languages or life skills). For overall performance, decision-making skills should form a focal point of training for adolescents. Interpersonal skills remain an important focus for EI training and should be kept in mind. The importance of interpersonal skills is aligned with the perception of some educators in South Africa (Marsay et al., 2022:33). This knowledge could be valuable to individuals who provide career guidance to better support and guide learners towards careers they are interested in, and of which subjects such as mathematics are gateways to, for example, engineering or medicine. The findings imply that the design of EI interventions could potentially be tailored according to specific career interests. However, individual EI as well as individual aptitude profiles remain important to consider. Research is recommended regarding the construction and evaluation of EI development initiatives' effectiveness and incorporation of EI skills development in curriculum designs (*cf* Care et al., 2017:31). Further research about how EI skills development supports specific academic and career progression is also recommended. MacCann et al. (2020:172) suggested that specific EI skills relating to interpersonal and stress management skills may become more and more important as online teaching increases. Therefore, future research could also inspect whether the most dominant predictors differ for those who receive education online versus in-person.

Strengths and limitations

The DA method used in this study contributes to its strengths because it is a more robust regression analysis technique that indicates relative importance (Darr & Catano, 2016:195). A limitation of the study is the subgroup sample sizes (N = 284), as only data from learners whose academic results were made available by schools could be used, despite receiving proper permissions. Although some representation across quintiles 4 and 5 was acquired, larger samples representing all quintiles would allow comparing predictive models across quintile groups. The authors acknowledge that even though certain contextual information was considered, the impact of further variables such as school settings, hostel versus at-home learners, should also be explored. A larger sample of each age group and grade level could also provide more detailed insights. It should be considered in an empirical study focussing on socio-demographic factors and EI. A further limitation is that data were collected pre-COVID-19 (coronavirus disease 2019), and even though the authors do not expect to see differences in the findings, during COVID-19, learning occurred mainly online, which could have implications (MacCann et al., 2020:172).

Conclusion

This study is the first to investigate the individual domains of EI as dominant predictors of subject-specific academic performance in the South African context using the EQ-i Youth assessment. It contributes to the validity of this newly developed assessment (Stols & Taylor, 2020). The findings not only confirm the significant positive relationship between EI and academic performance but also indicate decision-making skills as the most dominant predictor of academic performance. While still a dominant predictor of mathematics, self-expression was deemed a more important predictor thereof. Applying these findings to teaching and career guidance initiatives, that is, tailoring EI development according to individual profiles and career interests and expanding such development to the entire ecosystem of a student, can help them unlock their academic potential and guide their future careers.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

A.S. was the project manager and responsible for the design of the EQ-i Youth validation project. A.S assisted with data collection and data management, while also analysing the data for this article. P.E. also assisted with data collection in some regions. The initial conceptualisation and writing of some sections of the article was performed by A.S., P.E., and W.F.T. The article was further written by A.S., while P.E. and W.F.T. critically reviewed the final draft.

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Data availability

Participants did not give written consent for data to be shared outside of the JVR research team, thus because of the sensitive nature of the sample, data are not available. However, specific statistical analyses can be made available by the corresponding author, A.S., upon reasonable request.

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