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Socioeconomic status and wellbeing as predictors of students' academic achievement: evidence from a developing country

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Abstract

The COVID-19 pandemic has deepened the effects of socioeconomic status (SES) and wellbeing (WB) on students' academic achievement, particularly in developing countries; thus, it becomes necessary to understand the nature of these concurrent relationships. This study aimed to explore the relationships between SES, WB and academic achievement, based on the data from the Programme for International Student Assessment (PISA) in 2018 within the Turkish context. In this cross-sectional study, we used hierarchical multiple linear regression analysis to explore how the independent variables predicted academic achievement in blocks based on data from 6890 students attending 186 schools. The study revealed that the model, including the independent variables, predicted students' achievement in reading, mathematics and science; however, the prediction level of demographic factors and domains of WB were very low, while SES had the highest prediction level. The results offer insights into the predictors of academic achievement and educational inequalities in the context of a developing country.

Keywords: Wellbeing; academic achievement; socioeconomic status; educational inequalities; predictors of academic performance

Students' academic achievement and its related factors have long been a central issue of educational research. Among various factors, socioeconomic status (SES) and wellbeing (WB) are significant predictors of student achievement. There is a growing body of educational research supporting this argument (e.g., Bae & Wickrama 2015; Bücker et al., 2018; Caro, 2009; Sirin, 2005; Soykan et al., 2019). For instance, SES has the highest effect size in a meta-analysis study examining the effects of 18 different variables on students' academic achievement (Karadağ, 2017). Children with low SES exhibit greater achievement gaps (Reardon et al., 2013), higher risks of school dropout (Winding & Andersen, 2015), and a lower probability of attaining a bachelor's degree or additional higher education (National Center for Education Statistics [NCES], 2015).

In addition to SES, students' wellbeing plays an important role in their academic achievement. WB is not only related to current achievement, but also to outcomes in later stages of life (Gutman & Vorhaus, 2012). Despite being a critical component of human life and student success, WB has not been emphasised in the scholarly literature in the field of education until recently. Accordingly, international assessment programs such as the Programme for International Students Assessment (PISA) have started to collect data regarding the WB of students.

The physical closure of schools during the COVID-19 pandemic has led to decreased learning outcomes and has affected students negatively, particularly those coming from less advantaged

backgrounds. This is due to the inaccessibility of digital resources, insufficient home learning environments and lower levels of parental support; and these factors, combined with decreasing emotional WB and motivation for students as the pandemic has stretched on, have led to aggravated educational inequalities (Di Pietro et al., 2020). Recent data suggest that the pandemic has decreased individuals' life satisfaction and WB, and that this phenomenon varies depending on SES (Wanberg et al., 2020). Indeed, the pandemic has not only exposed the significance of SES and WB, but also deepened their effects on students. Therefore, policy makers should design interventions to compensate for these decreased learning outcomes and negative psychological effects during the age of COVID-19, particularly for disadvantaged groups. Yet, there is a need for further studies to truly understand the nature of the relationships between SES, WB and academic achievement in different contexts, since different global locations experience these constructs uniquely, which in turn can provide a more complete and nuanced overall understanding of the phenomenon. This study, using data that predates the pandemic, seeks to understand this phenomenon.

Despite the persistent and substantial nature of the association between SES and academic achievement outlined in the literature, researchers have yet to come to a consensus on the size of this effect (Thomson, 2018). Meta-analysis studies have reported moderate to strong correlations between SES and academic achievement, concluding that this relationship varies according to countries' levels of development; however, these studies largely depend on data from developed countries (Kim et al., 2019). Similarly, WB and its effects on individuals and communities also differ according to the level of national development (Boarini et al., 2014). These facts underlie the need for data from developing countries to generalise the findings of this important area of research. Moreover, student performance varies even across countries with similar SES (Organisation for Economic Co-operation and Development [OECD], 2019a). Research evidence suggests that the effect of SES on student achievement and transition to further levels of education is even further magnified in developing countries such as Turkey (Karağaç Cingöz & Gür, 2020). Turkey's SES scores in the PISA 2018 data were well below average. Since the correlation between WB and academic achievement may be influenced by other variables such as SES (Bücker et al., 2018), the joint correlation of SES and WB with academic achievement should be explored. This is the critical gap which the current study seeks to fill. A high correlation between SES, WB and academic achievement may indicate low social mobility and high educational inequality, which makes country-specific analysis, based on international and standardised data collection instruments, pivotal. To this end, the current study aims to examine the relationships between Turkish students' SES, wellbeing levels and academic achievements, based on the PISA 2018 data.

Conceptual Framework

SES and Academic Achievement

The association between SES and academic achievement has been the focus of momentous research attention for several decades. Work in this area dates back to the Coleman Report (Coleman et al., 1966), a ground-breaking study by the United States Office of Education that demonstrated the considerable effect of SES on student achievement. Since then, a great deal of empirical and theoretical research, including meta-analysis studies and reports by international organisations, has revealed varying relationships between these two constructs. While some studies report a strong correlation between SES and academic achievement (Karadağ, 2017; Okoye & Okecha, 2008; Smeding et al., 2013), other studies have indicated a weak or null relationship (Ripple & Luthar, 2000).

Defined as an individual's 'combined economic and social status' (Baker, 2014), SES not only represents one's social and economic background, but also their 'relative position in a particular social structure' (Villalba, 2014). In this way, SES represents resources beyond students' financial status and wealth. Although there are different definitions and conceptual meanings of SES, its three main indicators are parental income, parental education and parental occupation (Sirin, 2005). Bourdieu

(1986) refers to economic, social and cultural capital as necessary elements for social reproduction. Similarly, PISA measures SES according to an estimated index of economic, social and cultural status (ESCS), which represent a combination of the various resources available to students (OECD, 2019a). SES is also related to academic achievement and is mediated through the effects of grade level, minority status and school location (Sirin, 2005). Therefore, SES is a complex and dynamic construct that affects academic achievement both directly and indirectly.

Many studies over the decades have asserted that the most reliable predictor of one's academic performance at school, and even afterward in professional life, is one's family. These claims are supported by evidence that students with low SES face barriers to learning and difficulty accessing resources, while students with high SES receive both financial and emotional support from their parents (OECD, 2019a). Schools may help to compensate for the inequalities experienced by students from low socio-economic backgrounds; however, they face an uphill battle in doing so. One study that followed two million students in Turkey over a 10-year period revealed that students with high SES attending private schools had higher academic achievement in mathematics, science and language, and that this difference persisted even when they were transferred to different types of high schools (Suna et al., 2020). This suggests that schools not only fail in making up for such inequalities — they also exacerbate them. This problem has been magnified during the COVID-19 pandemic, when schools have been closed and students with low SES have experienced greater learning loss due to a lack of financial support, technological resources and digital skills (Di Pietro et al., 2020).

Wellbeing and Academic Achievement

Achieving happiness and a high quality of life have always been key goals of both individuals and their governments, yet with the rise of positive psychology in recent years, the notion of WB has gained increased significance and popularity. WB is an elusive concept because people have different understandings and priorities regarding happiness or wellness, and the concept is studied in a range of disciplines (Pollard & Lee, 2003). WB is also a multidimensional concept, including various domains, which leads to blurred and broad definitions (Forgeard et al., 2011). Although mostly used interchangeably with 'happiness' or 'quality of life', Dodge et al.'s (2012) review of the literature on WB offers the following definition: 'the balance point between an individual's resource pool and challenges faced' (p. 230), which includes psychological, social and physical aspects.

The literature on WB is complex due to the concept's overarching nature. Cooke et al. (2016) group the approaches towards WB into four categories: the eudaimonic approach, which is related to the natural world and achieving potential; the hedonic approach, which focuses on happiness and pleasure; the quality-of-life approach, which encompasses the physical, social and psychological nature of WB; and the wellness approach, which aims to widen one's potential. Accordingly, the main domains of wellbeing studied in the literature include subjective WB, psychological WB and social WB; the categories covered in the PISA data, which also comprise the focus of the current study. Subjective WB is part of the hedonistic approach to WB, focusing on one's perception of their life regarding affection and cognition (Diener, 2000), and is directly related to life satisfaction (Linley & Joseph, 2004). In addition to feelings of happiness, psychological WB involves responding effectively to both challenges and opportunities that life presents (Deci & Ryan, 2008). Psychological WB includes autonomy, personal growth, environmental mastery, purpose in life, positive relations with others and self-acceptance (Ryff & Keyes, 1995). This type of WB shields individuals from psychopathology and mental illnesses, as well as some physical illnesses (Weiss et al., 2016). Consisting of the dimensions of social integration, acceptance, contribution, actualisation and coherence, social WB has to do with evaluating one's conditions and functioning in society (Keyes, 1998). This construct involves the continual assessment of one's relationships with other members of society.

Research has illuminated the relationships between these different domains of WB and academic achievement (Crede et al., 2015; Suldo et al., 2011). WB affects achievement in later stages of education, in addition to current academic performance and school engagement (Gutman & Vorhaus, 2012).

Kirkcaldy et al.'s (2004) analysis of 30 countries to explore the relationship between subjective WB and academic achievement has revealed that the countries with the highest scores in the PISA survey also have the highest levels of subjective WB, indicating a strong relationship between the two. In their meta-analysis of the relationship between subjective WB and academic achievement, Bückner et al. (2018) report a small to moderate correlation between the two variables. Since there are also ambiguous results in the literature regarding the correlation between WB and academic achievement (Amholt et al., 2020), more empirical studies are needed with data from diverse contexts. This relationship may also be mediated by other factors, such as SES (Bückner et al., 2018). This posits that SES and WB are closely related; in actuality, the two factors feed each other. Parents with higher levels of education are more likely to provide emotional support to their children than parents with lower education levels (Di Pietro et al., 2020).

The Present Study

As the conceptual framework suggests, there is a complex relationship between SES and achievement, as well as between WB and achievement. Moreover, the variables of SES and WB are also interrelated. Additional studies analysing samples from non-Western contexts are needed to further illuminate the relationships between these constructs, which should also be based on international and standardised data collection instruments. PISA provides one venue for such an aim. PISA is perhaps the most prominent international large-scale assessment measuring students' knowledge in subject areas such as reading or mathematics, as well as collecting data from students, including about their SES and WB; thus, it provides a practical and rich pool of data for examining factors affecting student achievement. In the current study, we used the data from Turkey reported to PISA in 2018 to examine the correlations between students' demographic characteristics (age and gender), SES, WB and academic achievement. Through hierarchical multiple linear regression analysis, we explored how these variables predict student achievement. Accordingly, the study sought answers to the following research questions:

1. Are there statistically significant relationships between Turkish students' demographic characteristics, SES and WB and their academic achievement (in reading, mathematics, and science)?
2. Do Turkish students' demographic characteristics, SES and WB levels predict their academic achievement?

Method

The current study employed a cross-sectional survey design. Data regarding students' current SES, WB and academic achievement were collected at a single point in time, and relationships among these variables were examined (Creswell, 2012). In correlational studies, the values of variables can be predicted by other variables. In the current study, the relationships between students' demographic characteristics, SES, WB and academic achievement were examined to determine the presence of such relationships and gauge their size. Consequently, this work tested whether Turkish students' SES and WB predicted their academic achievement.

Participants

The data for this study were obtained from the Turkish portion of the PISA 2018 dataset. The sample was determined through the hierarchic sampling technique by referencing the country's regions according to school types and socioeconomic levels. The Turkish sample of the PISA 2018 dataset consisted of 186 schools and 6890 students; 49.6% of the sample was female while 50.6% was male (3396 female students and 3494 male students respectively), suggesting a balanced distribution in terms of gender. The mean age of students in the sample was 15.82 years ($SE = 0.01$), because PISA surveys students at age 15. Students at the age of 15 in Turkey are typically enrolled at the 10th grade level.

Consequently, 78.8% of Turkish PISA sample consisted of students at the 10th grade level, while 21.2% of the sample included students in other grades from 7–12.

Data Collection and Analysis

Additional statistics from the PISA 2018 dataset were used as secondary data for this study. PISA 2018 measured students' academic achievement in the areas of mathematics, science and reading skills. It also obtained additional data beyond student achievement, including variables such as students' socio-economic and cultural levels, WB, financial literacy, and use of information and communication technologies. Weighted likelihood estimate values at the student level were used as data for the purposes of the present study.

The data used in the current study were collected from Turkish students in 2018. Of the 79 countries that participated in PISA 2018, 69 collected data in a computer environment while 10 collected data in paper-pen format. Turkey collected data in the computer environment. Test administrators accompanied students while they took the tests, and helped them to prevent potential data loss. The data of the variables used in the current study were all provided by the students. The students answered questions — for example, on the highest level of education of parents, index of family wealth, index of home educational resources, and index of possessions. They could get help from the test administrators.

To analyse and draw correlations between the study variables, the PISA 2018 data from Turkey were transferred into SPSS. These data were arranged before moving on to the statistical tests. To begin analysis, basic assumptions of regression models were tested. Then, tests of normality regarding the distribution of the variables were performed. Skewness and kurtosis values were calculated for the variables. For a normal distribution, these values should vary between +2 and -2 (George & Mallery, 2010). The skewness and kurtosis values of the variables in this study were observed to vary between -2.00 and 1.30 (see Table 1). These values suggest that the dataset has a normal distribution at an acceptable level.

The multicollinearity among the variables was tested through the variance inflation factor (VIF) values. The VIF values in the study varied between 1.03 and 1.44. If the VIF value is smaller than 10, it means there is not a problem of multicollinearity among the variables (Field, 2013). Accordingly, there was not a problem of multicollinearity among the independent variables in the dataset for this study.

After these tests were performed, the relationships between students' academic achievement (in the areas of reading, mathematics and science) and their demographic characteristics, SES levels and WB levels were explored through the Pearson product-moment correlation coefficient. In addition, the hierarchical multiple linear regression analysis technique was used to test whether students' demographic characteristics, SES and WB predicted their academic achievement. The hierarchical regression technique was used here to interpret the effect of independent variables on dependent variables in blocks. In the hierarchical regression analysis, we first added demographic variables (age and gender) and then SES to the regression model, and subsequently added WB domains. The reason for this order was to reveal the association between students' WB and their academic achievement after controlling for the variables regarding students' demographic characteristics and SES. The constructs explored in these tests are outlined below.

Dependent variables

For the purposes of this study, academic achievement was defined as students' level of accomplishing the predetermined goals of the school, class and lessons. The dependent variables of this study were achievement scores in reading, mathematics and science. The academic achievement areas in the PISA 2018 assessment were limited to these areas. In PISA tests, 10 plausible values are calculated regarding each of these academic achievement areas. Özdemir (2016) recommended using PV1 plausible values among these values as opposed to means of possible values, since using means would lead to mistakes

Table 1. The correlation coefficients between the variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age															
2. Gender	-.005														
3. ESCS	-.016	.021													
4. Eudmo	.007	-.004	.036**												
5. Affect	-.009	-.068**	.052**	.302**											
6. Resilience	.000	-.083**	.076**	.416**	.222**										
7. Goal	-.024*	-.079**	-.039**	.344**	.240**	.372**									
8. Fear	-.020	-.090**	.027*	.026*	-.032**	.036**	.111**								
9. Bullied	-.025	.207**	-.046**	-.081**	-.157**	-.122**	-.064**	.077**							
10. Com	-.019	.009	.042**	.293**	.110**	.344**	.233**	.215**	-.017						
11. Support	-.015	-.135**	.136**	.272**	.267**	.314**	.263**	.039**	-.200**	.190**					
12. Belong	-.011	-.107**	.040**	.237**	.271**	.267**	.185**	-.051**	-.286**	.155**	.268**				
13. Read	.020	-.156**	.338**	.009	.027*	.111**	-.069**	.048**	-.145**	.103**	.197**	.105**			
14. Nat	.043**	.025*	.334**	-.004	.033**	.067**	-.075**	.023	-.081**	.086**	.146**	.063**	.807**		
15. Scie	.036**	-.059**	.324**	-.012	.008	.075**	-.075**	.031*	-.115**	.072**	.147**	.063**	.868**	.834**	
Mean	15.825	.507	-1.171	.150	-.260	.352	-0.055	.119	-.044	.322	.015	-.143	464.230	452.70	467.49
SD	0.285	.500	1.178	1.009	1.124	1.144	1.129	1.008	1.053	1.215	1.067	1.024	87.780	87.39	83.11
Skewness	-.020	-.028	.254	-.082	-.282	.066	.242	.010	1.296	-.268	-.549	.873	.045	.15	.08
Kurtosis	-1.190	-2.000	-.641	-.556	-.631	-.012	-.736	-.533	1.108	-.545	-.971	1.733	-.300	-.04	-.32

Note: **Correlation is significant at the .01 level (2-tailed). *Correlation is significant at the.05 level (2-tailed).

ESCS, Economic, social and cultural status; Eudmo, eudaemonia, meaning in life (subjective wellbeing); Affect, positive affect (subjective wellbeing); Resilience, resilience (psychological wellbeing); Goal, mastery goal orientation (psychological wellbeing); Fear, fear of failure (psychological wellbeing); Bullied, experience of being bullied (social wellbeing); Com, competitiveness (social wellbeing); Support, parents' emotional support (social wellbeing); Belong, sense of belonging to school (social wellbeing); Read, reading score; Mat, mathematics score; Sscie, science score.

in calculating standard errors. In this study, plausible values of PV1READ, PV1MAT and PV1SCIE were used for achievement in reading, mathematics and science respectively.

Independent variables

The independent variables in the current study were demographic characteristics, socioeconomic and cultural status, and WB levels. Demographic variables included students' age and gender. Dummy coding is used for categorical predictor variables in regression studies. Therefore, we used dummy coding for gender variable (female = 0, male = 1).

Socioeconomic and cultural status

Socioeconomic and cultural status are indicators of the material and cultural assets of the family to which the students belong (Avvisati, 2020). To gauge socioeconomic and cultural indices, PISA included various factors. These consisted of the International Socioeconomic Index of Occupational Status (ISEI), the highest level of education of the student's parents, the index of family wealth, the index of home educational resources, and the index of possessions (OECD, 2017).

Wellbeing

Student WB encompasses students' life quality and standard of life. This construct involves psychological, subjective and social WB. In the PISA 2018 assessment, subjective WB was identified with the factors of eudemonia: namely, meaning in life and positive affection. Psychological WB was defined by the factors of resilience, mastery goal orientation and fear of failure. Social WB was comprised of the factors of belonging, competitiveness, parents' emotional support and being bullied (OECD, 2019b).

Results

Results Regarding Correlations Among Variables

The correlation coefficients between the variables in this study are presented in Table 1. The correlation coefficients among the independent variables varied between $r = -.286$ and $r = .416$. There was a positive and moderate relationship between the ESCS and achievement in reading, mathematics and science ($r = .338$; $r = .334$; $r = .324$; $p < .01$, respectively). Analysis also yielded a small but positive relationship between parents' emotional support and students' achievement in reading, mathematics and science ($r = .197$, $r = .146$, $r = .147$; $p < .01$, respectively). On the other hand, there was a negative and small relationship between being bullied and achievement in reading, mathematics and science ($r = .145$, $r = -.081$, $r = -.115$; $p < .01$, respectively). In addition, a negative and small relationship was observed between reading achievement and gender ($r = -.156$; $p < .01$).

Hierarchical Regression Analysis Results Regarding Reading Skills

The results of the hierarchical multiple linear regression analysis to test whether students' demographic characteristics, SES and WB predicted reading achievement are given in Table 2.

The results in Table 2 revealed that Model 1 was statistically significant ($\Delta F = 55,235$; $p < .01$). Model 1 explained 1.8% of the variation in students' reading skills scores ($R^2 = .018$). The participating students' demographic characteristics predicted their reading skills at a statistically significant level. While gender contributed significantly to the model ($\beta = -0.132$; $p < .01$), age did not contribute significantly.

Model 2 was also revealed to be statistically significant ($\Delta F = 865,177$; $p < .01$). Model 2 explained 14% of the variation in students' reading skills scores ($R^2 = .140$). The participating students' ESCS levels predicted their reading skills significantly. The variable of ESCS contributed significantly to

Table 2. Hierarchical regression analysis regarding reading skill

Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Model 1	.133	.018	.018	55.235	55.235			
Constant						410.748**	60.333	
Age						4.473	3.811	.015
Gender						-22.793	2.183	-.132**
Model 2	.374	.140	.122	330.426	865.177			
Constant						414.719**	56.470	
Age						6.117	3.567	.020
Gender						-24.545	2.044	-.143**
ESCS						25.469	0.866	.349**
Model 3	.374	.140	.001	198.425	0.504			
Constant						414.783**	56.475	
Age						6.125	3.568	.020
Gender						-24.546	2.048	-.143**
ESCS						25.494	.867	.350**
Eudmo						-1.029	1.068	-.012
Affective						.022	.965	.000
Model 4	.393	.154	.014	138.925	34.340			
Constant						417.722**	56.070	
Age						5.633	3.542	.019
Gender						-23.977	2.048	-.139**
ESCS						24.475	.866	.336
Eudmo						-1.438	1.164	-.017
Affective						.716	.973	.009
Resilience						7.509	1.035	.098**
Goal						-8.480	1.015	-.111**
Fear						3.249	1.021	.038**
Model 5	.428	.183	.029	113.701	53.660			
Constant						411.398**	55.154	
Age						5.721	3.484	.019
Gender						-19.583	2.068	-.114**
ESCS						23.174	.858	.318**
Eudmo						-3.926	1.165	-.046**
Affective						-2.018	.985	-.026**
Resilience						3.716	1.062	.049**
Goal						-10.160	1.007	-.133**
Fear						2.589	1.034	.030**

(Continued)

Table 2. (Continued)

Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Bullied						-6.315	1.040	-.076**
Com						5.460	.916	.077**
Support						10.276	1.057	.126**
Belong						2.414	1.080	.029

**Significant at the .01 level (2-tailed).

ESCS, Economic, social and cultural status; Eudmo, eudaemonia, meaning in life (subjective wellbeing); Affective, positive affect (subjective wellbeing); Resilience, resilience (psychological wellbeing); Goal, mastery goal orientation (psychological wellbeing); Fear, fear of failure (psychological wellbeing); Bullied, experience of being bullied (social wellbeing); Com, competitiveness (social wellbeing); Support, parents' emotional support (social wellbeing); Belong, sense of belonging to school (social wellbeing).

the model ($\beta = 0.349$; $p < .01$). The contribution of the ESCS variable to the model was 12.2% ($R^2 = .122$).

Model 3 was not statistically significant. The participating students' subjective WB (eudaemonia and affectivity) did not predict their reading skills in a statistically significant manner.

Model 4 was statistically significant ($\Delta F = 34,340$; $p < .01$). Model 4 explained 15.4% of the variation in students' reading achievement ($R^2 = .154$). The participating students' psychological WB contributed to their reading achievement by 1.4% ($\Delta R^2 = .014$). Students' resilience, goal and fear variables all contributed significantly to the model ($\beta = 0.980$, $\beta = -0.111$, $\beta = 0.38$; $p < .01$, respectively).

Finally, Model 5 was statistically significant ($\Delta F = 53.66$; $p < .01$). Model 5 explained 18.3% of the variation in students' reading achievement scores ($R^2 = .183$). The participating students' social WB contributed significantly to their reading achievement. Students' social WB contributed to the model by 2.9% ($\Delta R^2 = .029$). Students' variables of being bullied, competitiveness and parents' emotional support all contributed significantly to reading skill ($\beta = -0.076$, $\beta = 0.077$, $\beta = 0.126$; $p < .01$, respectively), while their belonging levels did not contribute significantly to reading achievement ($\beta = 0.029$; $p > .01$).

Hierarchical Regression Analysis Results Regarding Mathematics Achievement

Table 3 presents the results of hierarchical multiple linear regression analysis conducted to test whether students' demographic characteristics, SES and WB predicted mathematics achievement.

The analysis revealed Model 1 to be statistically significant ($\Delta F = 12.80$; $p < .01$). Model 1 explained 0.4% of the variation in students' mathematics scores ($R^2 = .004$). The participating students' demographic characteristics predicted their mathematics scores significantly. Both age and gender contributed significantly to the model ($\beta = 0.041$; $\beta = 0.050$; $p < .01$, respectively).

Model 2 was also statistically significant ($\Delta F = 812.71$; $p < .01$). Model 2 explained 12.1% of the variation in students' mathematics achievement scores ($R^2 = .121$). The participating students' ESCS levels predicted their mathematics achievement scores significantly. Students' ESCS contributed significantly to the model ($\beta = 0.342$; $p < .01$). The contribution of the ESCS variable to students' mathematics achievement was 11.7% ($\Delta R^2 = .117$).

Model 3 was not statistically significant. The participating students' subjective WB (eudaimonia and affectivity) did not significantly predict their mathematics achievement.

Model 4 was statistically significant ($\Delta F = 17.992$; $p < .01$). Model 4 accounted for 13% of the variation in students' mathematics achievement scores ($R^2 = .130$). The participating students' psychological WB contributed to their mathematics achievement score by 0.8% ($\Delta R^2 = .008$). Students' resilience and goals contributed significantly to mathematics achievement ($\beta = 0.064$, $\beta = -0.087$; $p < .01$, respectively), while the variable of fear did not.

Model 5 was also statistically significant ($\Delta F = 31,141$; $p < .01$). Model 5 accounted for 14.8% of the variation in students' mathematics achievement scores ($R^2 = .148$). The participating students' social

Table 3. Hierarchical regression analysis regarding mathematics achievement

	Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Model 1		.065	.004	.004	12.800**	12.800**			
	Constant						260.109**	60.790	
	Age						12.219	3.840	.041**
	Gender						8.662	2.199	.050**
Model 2		.348	.121	.117	280.569**	812.705**			
	Constant						264.001**	57.113	
	Age						13.830	3.608	.046**
	Gender						6.945	2.067	.040**
	ESCS						24.966	0.876	.342**
Model 3		.350	.122	.001	170.256**	4.327			
	Constant						263.852**	57.082	
	Age						13.889	3.606	.046**
	Gender						7.188	2.070	.042**
	ESCS						24.954	.877	.342**
	Eudmo						-2.958	1.080	-.035
	Affective						1.810	.976	.023
Model 4		.361	.130	.008	114.045**	17.992**			
	Constant						267.023**	56.899	
	Age						13.480	3.594	.045**
	Gender						7.453	2.078	.043**
	ESCS						24.221	.879	.332**
	Eudmo						-2.837	1.181	-.033
	Affective						2.452	.987	.032
	Resilience						4.865	1.050	.064**
	Goal						-6.659	1.030	-.087**
	Fear						2.435	1.037	.028
Model 5		.384	.148	.017	87.913**	31.141**			
	Constant						260.648**	56.373	
	Age						13.638	3.561	.045**
	Gender						10.554	2.114	.061**
	ESCS						23.170	.877	.318**
	Eudmo						-4.798	1.191	-.056**
	Affective						.471	1.007	1.007
	Resilience						1.931	1.086	.025
	Goal						-8.010	1.029	-.105**
	Fear						1.720	1.057	.020

(Continued)

Table 3. (Continued)

Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Bullied						-4.312	1.063	-.052**
Com						4.553	.936	.064**
Support						8.626	1.081	.106**
Belong						.868	1.103	.010

**Significant at the .01 level (2-tailed).

ESCS, Economic, social and cultural status; Eudmo, eudaemonia, meaning in life (subjective wellbeing); Affective, positive affect (subjective wellbeing); Resilience, resilience (psychological wellbeing); Goal, mastery goal orientation (psychological wellbeing); Fear, fear of failure (psychological wellbeing); Bullied, experience of being bullied (social wellbeing); Com, competitiveness (social wellbeing); Support, parents' emotional support (social wellbeing); Belong, sense of belonging to school (social wellbeing).

WB had a statistically significant contribution to their mathematics achievement. The contribution of students' social WB to the model was 1.7% ($\Delta R^2 = .017$). While the variables of being bullied, competitiveness and parents' emotional support contributed significantly to mathematics achievement ($\beta = -0.052$, $\beta = 0.064$, $\beta = 0.106$; $p < .01$, respectively), their level of belonging did not significantly contribute to mathematics achievement ($\beta = 0.010$; $p > .01$).

Hierarchical Regression Analysis Results Regarding Science Achievement

Table 4 presents the results of hierarchical multiple linear regression analysis to test whether students' demographic characteristics, SES and WB predicted science achievement.

Model 1 was found to be statistically significant ($\Delta F = 7.109$; $p < .01$). Model 1 explained 0.2% of the variation in students' science achievement scores ($R^2 = .002$). Thus, it was reasonable to assert that the students' science achievement was predicted significantly by their demographic characteristics. Both the age and gender variables significantly contributed to this model ($\beta = 0.035$, $\beta = -0.033$; $p < .01$, respectively).

Model 2 was also statistically significant ($\Delta F = 749,030$; $p < .01$); 11.1% of the variation in students' science achievement scores were explained by this model ($R^2 = .111$). This suggested that students' ESCS levels predicted their science scores significantly. ESCS contributed significantly to the model ($\beta = 0.330$; $p < .01$). Its contribution to mathematics achievement was 10.9% ($\Delta R^2 = .109$).

As in other academic areas, Model 3 was not statistically significant for science achievement. Students' subjective WB (eudaimonia and affectivity) did not predict their science achievement significantly.

Model 4 was statistically significant ($\Delta F = 21.80$; $p < .01$). Model 4 explained 12.2% of the variation in students' science scores ($R^2 = .122$). Students' psychological WB contributed 0.9% to their science achievement ($\Delta R^2 = .009$). Students' resilience and goals contributed significantly to their science achievement ($\beta = 0.064$, $\beta = -0.087$; $p < .01$, respectively), while the fear variable did not.

Finally, Model 5 was statistically significant ($\Delta F = 33.14$; $p < .01$). Model 5 explained 14% of the variation in students' science achievement scores ($R^2 = .148$). Students' social WB contributed significantly to their science scores, with social WB contributing 1.9% to the model ($\Delta R^2 = .017$). Regarding the subfactors of social WB, being bullied, competitiveness, and parents' emotional support, all contributed significantly to science achievement ($\beta = -0.079$, $\beta = 0.052$, $\beta = 0.101$; $p < .01$, respectively), while students' levels of belonging did not have a significant effect on scores in this area ($\beta = 0.004$; $p > .01$).

Discussion

The literature lends its support to the argument that SES and WB are significant predictors of student achievement (Bücker et al., 2018; Caro, 2009; Sirin, 2005). Yet, additional factors mediate this

Table 4. Hierarchical regression analysis regarding science achievement

	Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Model 1		.048	.002	.002	7.109**	7.109**			
	Constant						317.519**	57.866	
	Age						9.951	3.655	.035**
	Gender						-5.453	2.093	-.033**
Model 2		.334	.111	.109	254.997**	749.030**			
	Constant						321.093**	54.617	
	Age						11.431	3.450	.040**
	Gender						-7.029	1.977	-.043**
	ESCS						22.920	0.837	.330**
Model 3		.335	.112	.001	154.728**	3.955			
	Constant						321.386**	54.591	
	Age						11.435	3.449	.040**
	Gender						-7.139	1.980	-.044**
	ESCS						23.018	.838	.332**
	Eudmo						-2.424	1.033	-.030
	Affective						-.710	.933	-.010
Model 4		.349	.122	.009	105.607**	21.180**			
	Constant						324.668**	54.374	
	Age						11.005	3.435	.038**
	Gender						-6.834	1.986	-.042**
	ESCS						22.250	.840	.321**
	Eudmo						-2.479	1.129	-.030
	Affective						-.030	.943	-.001
	Resilience						5.371	1.004	.074**
	Goal						-6.765	.984	-.093**
	Fear						2.308	.991	.028
Model 5		.375	.140	.019	82.935**	33.140**			
	Constant						322.019**	53.837	
	Age						10.907	3.401	.038**
	Gender						-3.045	2.018	-.019
	ESCS						21.234	.838	.306**
	Eudmo						-4.118	1.137	-.051**
	Affective						-2.074	.962	-.028
	Resilience						2.776	1.037	.038**
	Goal						-7.940	.983	-.109**
	Fear						1.996	1.010	.024

(Continued)

Table 4. (Continued)

Predictors	<i>R</i>	<i>R</i> ²	ΔR^2	<i>F</i>	ΔF	<i>B</i>	<i>SE</i>	β
Bullied						−6.254	1.015	−.079**
Com						3.519	.894	.052**
Support						7.814	1.032	.101**
Belong						.294	1.054	.004

**Significant at the .01 level (2-tailed).

ESCS, Economic, social and cultural status; Eudmo, eudaemonia, meaning in life (subjective wellbeing); Affective, positive affect (subjective wellbeing); Resilience, resilience (psychological wellbeing); Goal, mastery goal orientation (psychological wellbeing); Fear, fear of failure (psychological wellbeing); Bullied, experience of being bullied (social wellbeing); Com, competitiveness (social wellbeing); Support, parents' emotional support (social wellbeing); Belong, sense of belonging to school (social wellbeing).

relationship, making the association between SES and WB a complex one. Studies have yielded ambiguous results regarding the correlation between WB and academic achievement (Amholt et al., 2020). This relationship may also be mediated by other factors such as SES (Bücker et al., 2018). In addition, the COVID-19 pandemic has deepened the effects of SES and WB on students. Policy makers are in a need of strategies to compensate for the learning loss and negative psychological effects posed by the pandemic, particularly for disadvantaged groups. This situation necessitates a deeper understanding of the interplay between SES, WB and academic achievement. Meta-analysis studies offer a holistic perspective of the nature of these phenomena; however, most meta-analyses on this topic have collected their data from developed countries (Kim et al., 2019). PISA tests offer data collected with standardised instruments from a diverse array of countries. Therefore, the current cross-sectional survey study used the PISA 2018 data sample from Turkey to reveal the relationships between the aforementioned variables and their prediction powers through the application of a hierarchical multiple linear regression analysis technique.

The analysis revealed substantial relationships between these constructs, varying in level from small to moderate. A positive and moderate relationship was revealed between SES and academic achievement in the areas of reading, mathematics and science skills. This result is in line with the findings in the previous literature (e.g., Karadağ, 2017; Smeding et al., 2013). In his comprehensive meta-analysis study on a sample from the United States, Sirin (2005) reported moderate to strong relationships between SES and academic achievement. In a meta-analysis study with a Turkish sample, a moderate-level relationship was also reported (Sarier, 2016). In a Chinese sample, Liu et al. (2019) also reported a moderate relationship between these variables. The present study also indicated a small but positive relationship between parents' emotional support and students' academic achievement. Parents' support was previously shown to foster students' performance in the classroom (Erdem & Kaya, 2020). This study also indicated a small, negative relationship between experiencing bullying and academic achievement. Bullying, along with exposure to violence and/or sexual abuse, was correlated with lower achievement (Strøm et al., 2013).

Model 1 of the present study included age and gender as students' demographic variables. This model was proven significant for all achievement areas under investigation: reading, mathematics and science. Although significant, the model's prediction level was very low: 0.4% for mathematics, 0.2% for science and 1.8% for reading. Gender contributed to the models in all areas, and age contributed significantly to the model for mathematics and science. In the current study sample, male students were more successful in reading and science than their female peers, while female students were more successful in mathematics. Although gender cannot be the sole predictor of academic achievement, previous research revealed a small but significant female advantage (Diaconu-Gherasim et al., 2019; Voyer & Voyer, 2014). The result in the current study may stem from the fact that the sample was a non-Western one, and sociocultural factors in the Turkish culture may have supported males' achievement more than females' achievement.

Model 2 added SES to regression analysis, determining that it was a meaningful predictor for all academic areas in the study. SES predicted students' academic achievement in the areas of reading, mathematics and science by 12.2%, 11.7% and 10.9% respectively. This revealed that SES had the closest relationship with achievement in reading skill, which was related to language ability. This finding overlapped with the meta-analysis study by Liu et al. (2019), who reported that the relationship between SES and academic achievement was stronger for language achievement than that with math or science achievement. This prediction level of SES for academic achievement was also consistent with the OECD average. For instance, in the PISA 2018 data, students' reading performance was predicted through students' SES by 12% on average across the OECD countries (OECD, 2019a).

Models 3, 4 and 5 explored the contribution of WB domains to the prediction of students' academic achievement. Model 3, which added subjective WB to the regression analysis, was insignificant for all areas of reading, mathematics and science. This meant that the participating students' subjective WB did not significantly predict their academic achievement. This finding actually contradicted some of the literature. Some studies reported a positive relationship between subjective WB and academic achievement, though the effect size of this relationship was typically small (Bücker et al., 2018; Fan et al., 2020; Witter et al., 1984). However, Kirkcaldy et al. (2004) identified that countries that reported higher academic performance in the PISA survey also demonstrated the highest average levels of subjective WB. Thus, it is reasonable to hypothesise that the results in this area in the present study could be attributed to the characteristics of developing countries or nations with lower academic achievement in PISA surveys.

The other WB domains demonstrated significant relationships with academic achievement; however, their level of prediction for this achievement was quite low. Model 4 added psychological WB to the analysis, and this construct was found to be significant for all areas. Psychological WB predicted students' academic achievement in the areas of reading, mathematics and science by 1.4%, 0.8% and 0.9% respectively. Students' resilience and goals contributed to the model significantly for all areas, while the variable of fear contributed only to reading. The last model added social WB; and its prediction levels for students' academic achievement in reading, mathematics and science were 2.9%, 1.7% and 1.9% respectively. While the variables of being bullied, competitiveness and parents' emotional support contributed significantly to academic achievement, students' level of belonging did not.

Adding all of the variables together, students' demographic characteristics, SES and WB predicted their achievement in reading, mathematics and science by 18.3%, 14.8% and 14% respectively. Thus, these variables should be taken into consideration when designing policies for improving students' academic achievement. Among these variables, SES had the highest level of prediction. It is well documented in the literature that SES is a notable predictor of academic achievement, and the results of the current study lend support to these claims. Bae and Wickrama (2015) revealed that families' SES was both directly and indirectly linked to students' academic achievement. Similarly, Li et al. (2020) reported that family SES had a direct effect on students' achievement in the areas of mathematics and Chinese language. Unfavourable economic conditions faced by families, such as low income or material hardship, affect parents negatively and lead to detrimental parenting practices, adversely influencing students' academic achievement (Bae & Wickrama, 2015). Negative parenting behaviours caused by economic hardship also hinder children's development (Conger & Conger, 2002). However, the economic and cultural backgrounds of parents with a high socioeconomic level may give them the opportunity to support their children both psychologically and materially, leading to increased educational outcomes.

The results of the current study are also consequential for policy makers. A closer relationship between SES and academic achievement has critical implications for educational inequalities. The association between these two factors may indicate a greater academic success gap between students from different SES levels (Reardon, 2011). The results of the current study posit that this is valid for Turkish students. Turkey is a disadvantaged country with respect to students' SES. More than 20% of Turkish students were in the bottom decile of SES distribution in the PISA 2018 data (OECD, 2019a). Students with low SES experience greater barriers in accessing resources. In a study with a Turkish sample,

students' SES negatively impacted their academic achievement — and these consequences persisted in later stages of life (Suna et al., 2020). In another study, Karaağaç Cingöz and Gür (2020) identified that Turkish students' SES affected their performance in national exams required to transfer from lower secondary school to upper secondary school at a greater degree than indicated in PISA surveys. Aslanargun et al. (2016) investigated a number of factors associated with Turkish students' academic achievement, revealing that SES was the most important factor determining scholarly performance. These results confirm that SES is a truly critical factor for Turkish students' academic achievement. This close association may stem from severe nationwide economic problems.

Students' WB was a significant predictor of their academic achievement in the current study. This is supported by several research studies in the literature (Gregory et al., 2021; Gutman & Feinstein, 2008; Phan et al., 2016). Nevertheless, the prediction level was quite low in this study. Amholt et al. (2020) argued that the literature on the relationship between academic achievement and WB was inconsistent in that there were some studies reporting positive association at varying degrees, while other studies reported no association at all (Rüppel et al., 2015; Whitley et al., 2012). In their systematic review of the literature, these authors explained that while studies focusing on students aged 10–14 reported a positive association between academic achievement and WB, studies focusing on older students reported lesser or null association (Amholt et al., 2020). The low level of prediction in the current study may be related to students' ages; it could also be explained by other factors, such as social forces and demographics. Bücken et al. (2018) argued that the relationship between WB and academic achievement might be influenced by other factors such as SES, since meta-analysis studies reported a small to medium positive association between life satisfaction and SES. In the current study, SES was found to be a greater predictor of academic achievement. In addition, the small magnitude of the relationship between WB and academic achievement may be related to the fact that schools focus on cognitive development and academic performance. The competitive environment in schools may lead the students to devote their attention to academic achievement, ignoring their WB (Kaya & Erdem, 2021). Due to the nationwide examinations, there is a competitive environment in schools in Turkey, and competitiveness was found to be associated with academic achievement in this study. Besides, WB is a multidimensional concept, measured in various domains. The current study tested only subjective, psychological and social WB. The differences may stem from measures of WB (Pollard & Lee, 2003).

Implications for Psychologists and Counsellors in Schools

The current study offers some implications for the practice of psychologists and counsellors in schools. First, this study revealed that SES was an important factor for academic achievement in developing countries such as Turkey. The psychologists and counsellors in schools in these contexts should be aware of this fact, and they may pay special attention to students coming from low SES families or disadvantaged backgrounds. Students from low SES cannot exercise upward social mobility if they cannot succeed in school due to educational inequalities. To prevent low social mobility and high educational inequality as a result of poor academic performance, special efforts for these students need to be implemented. For example, psychologists and counsellors in schools may identify students with low socioeconomic backgrounds, work with them one to one, and get in touch with their families to better familiarise with the student. This familiarisation allows them to identify the reasons for students' academic failure with regard to SES. They may not be able to change families' income, but they can raise the parents' awareness regarding their effect on students' academic achievement if the problem is about parents' education level or awareness. If the problem is lack of resources, they can guide the parents to access new resources or use the extant resources more efficiently. They can also request the school administration help those students find new resources. In addition, psychologists and counsellors can contribute to the formation of a school climate in which these students are supported both psychologically and in material aspects. A supportive school climate promoting students' WB may contribute to compensation for economic disadvantages. One-to-one interactions with these students,

using tests or interviews, enables areas of failure to be spotted, and psychologists and counsellors can inform teachers about these weaknesses. Teachers may help students through extra study sessions.

Second, we revealed that psychological WB and social WB were important predictors of academic achievement, with the latter having more magnitude of prediction. Psychologists and counsellors in schools should design activities to improve students' WB. These guidance activities may be designed in line with positive psychology approaches. More specifically, regarding social WB, we found that parents' emotional support was positively related with academic achievement. Thus, psychologists and counsellors may seek ways to enhance parental involvement. They may train parents with regard to providing emotional support to their children. Even sharing weekly informative short essays or cues on providing emotional support to children with parents using information and communication technologies such as WhatsApp can be fruitful. A negative relationship was identified between being bullied and academic achievement. Therefore, psychologists and counsellors should design and enact plans to prevent bullying and violence in schools, and they should teach students how to cope with bullying as well as how to help peers who are being bullied.

Competitiveness was also related to academic achievement. Psychologists and counsellors in schools can also help students and teachers in creating a competitive environment; however, they should also check the limits of competition. Learning environments should also be cooperative. Psychologists and counsellors can help teachers in monitoring these limits. Regarding psychological WB, we revealed that resilience, mastery goal orientation and fear of failure contributed to students' academic achievement. School psychologists and counsellors need to be mindful of these variables; for instance, they can design and enact activities to raise students' awareness of mastery goal orientation. In one-to-one conversations, they can help individual students set goals and together they can monitor their progress. Resilience is particularly crucial for students from a low SES background. Students' social ecology explains their ability to cope with adversities and their resilience (Ungar & Liebenberg, 2011). Social ecology constitutes the protective factors of academic resilience. Therefore, relationship between students, teachers and other stakeholders should be developed in a positive way. Psychologists and counsellors can design interventions aimed at teaching students to establish positive relationship with other people. Providing students with access to various learning environments and developmental support through guidance programs may enhance academic resilience (Bryan et al., 2020).

Limitations

The current study had critical limitations worth noting when interpreting its findings. First, the study was limited to the Turkish sample provided in the PISA 2018 survey. Turkey is a developing nation, so the findings from this study regarding SES and WB may contradict those relying on data from Western and developed countries. This study also limited its treatment of WB to the subjective, psychological and social domains, as it was based on PISA data. WB extends beyond these domains into the realms of the cognitive, physical and material as well (Borgonovi & Pál, 2016). In terms of SES, this study examined the construct generally, without exploring its various subdimensions.

Conclusion and Recommendations

The current study revealed noteworthy results regarding the factors that predict students' academic achievement. The demographic factors of age and gender, students' SES, and the psychological and social domains of WB predicted Turkish students' academic achievement in the areas of reading, mathematics and science. Among these factors, SES was a very significant factor predicting students' academic achievement and therefore leading to educational inequalities. Although some research has suggested that the strength of the relationship between academic achievement and SES has decreased in the past several decades, the current study unearthed that it was still a serious indicator of academic performance in Turkey. In the COVID-19 period, these inequalities have become even more evident (Di Petro et al., 2020). Therefore, the ways in which the current pandemic has affected the relationship

between SES and academic achievement should be explored in future studies. Moreover, policy makers should make every effort to lessen the educational inequalities caused by students' SES. Based on the finding that Turkish students' SES greatly affected their transition to higher levels of education, Suna et al. (2020) suggested reducing or at least delaying students' tracking into different high schools. On the other hand, WB was found to have little predictive power for academic achievement. WB is associated with SES; however, mediation studies may help researchers understand it more comprehensively. Other factors, such as academic resilience, may also account for the weaker association of WB with academic achievement. In addition, Turkey is a developing country, and such countries are not well represented in the literature on WB, SES and academic achievement. Similar studies with samples from other underdeveloped or developing countries may build a more complete and nuanced understanding of the nature of these phenomena and provide a chance to compare results. Future research may also examine SES in more detail, including the effects of SES indicators.

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