Multilevel Analyses of Student, Parent, and School Indicators of Achievement in High School Transition in Turkey

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Abstract

In Turkey, students are placed in a high school according to the scores they receive from a large-scale transition exam. Although the assessment procedures have shown changes over time, scores of this exam still play a vital role in students being accepted into a prestigious high school, which may also be an initial step for their prospective achievement at the higher education level. Therefore, this study aimed to analyze the student-, parent-, and school-related variables affecting eighth grade students' academic achievement on high school transition exams (TEOG) in state secondary schools in Eskişehir, Turkey, along with the relationships of these variables, by using hierarchical linear modeling (HLM). Study participants included 667 students and their parents as well as 211 school leaders and teachers. The results showed that schools located in high socioeconomic status neighborhoods received higher effectiveness scores. The first HLM analysis indicated that 37% of the variation in the TEOG scores resulted from schools. School effectiveness was responsible for 85% of variation in scores. In the second HLM analysis, it was found that school socioeconomic level created a 76% of variation in scores. Although cross interactions in both analyses were significant, the percentage of their explained variance was rather low. The findings of this study could be used to take reasonable steps to improve educational decisions and might give insights to students, parents, and educational leaders to increase students' academic achievement in the process of transition to high school.

Key Words: achievement, HLM, school effectiveness, socioeconomic status, high school transition exam, TEOG, Turkey, students, parents, neighborhoods

Introduction

Academic achievement is the ultimate goal of education systems and is mostly associated with the grades students receive in an education year. In this respect, students meet the terms "success and failure" in the early years of their educational life, and vital decisions are made in order to include or exclude students. In Turkey, students are placed in a high school according to the scores they receive from a large-scale transition exam, and these schools are ranked by the Ministry of Education based on several factors such as school effectiveness. In this condition, students generally prefer to get extra help from private tutors or institutions in hopes of being accepted to a prestigious high school which may also be considered as an indicator of their prospective achievement at the higher education level (Yıldırım, 2006). This means success and failure in their early years has an impact on students' entire lives.

Achievement is defined as the desired outcome reached by studying in a planned manner with the guidance of predetermined goals and objectives (El-macıoğlu, 1998). Academic achievement plays a vital role in making use of opportunities students will meet in the future by eliminating some options and giving more importance to others (Laidra, Pullmann, & Allik, 2007). In the concluding report of five projects conducted by the National Postsecondary Education Cooperative, Hearn (2006) indicated that all the stakeholders that contribute to a student's academic life should cooperate and be aware of each other's efforts, which may especially be of vital importance during transition stages of education.

In educational terms, transition is the life stage students go through involving the change of schools, teachers, or curriculum with a move from one educational setting to another (Margetts, 1999). Transitions from preschool to primary school, from primary to high school, or from high school to college are stages of concern for students, parents, and educators. Transition to high school is especially a cause of anxiety as this period coincides with the passage from childhood to adolescence. A vast body of literature demonstrates the negative impacts of this period on students' academic achievement. More specifically, students' grades consistently decline (Benner, 2011; Benner & Graham, 2009; Roderick, 2003), and school engagement levels show a decrease while a sharp upsurge is observed in absenteeism rates and discipline problems (Barber & Olsen, 2004; Roderick, 2003; Roeser et al., 1999). Similar negative effects are also observed on Turkish students who have to take high

school transition exams (Atila & Özeken, 2015; Yıldırım, 2000). Thus, the impact of the transition stage and the factors influencing students' academic achievement should be examined more closely.

Several factors are thought to have an impact on students' academic achievement. These factors, which are also called "learning variables," may stem from physiological, psychological, and social conditions (Güleç & Alkış, 2003) and shape students' learning and achievement levels either positively or negatively. Therefore, the aim of this research is to analyze the learning variables that may have an impact on students' achievement on the high school transition exam which is a critical turning point in students' educational lives in Turkey.

Literature Review

A great deal of research has focused on the relationship of achievement and various variables. Although these factors vary by differences of conditions, they are mostly classified under four major categories: student-, parent-, school-, and teacher-related factors.

Innate capacities of students, as well as their interaction with the environment and culture they were born in, create individual differences among students (Tarım, 2005). These individual differences play a direct or indirect role in their own success and failure. Cognitive capacities of students are considered as the major predictor of achievement (Farsides & Woodfield, 2003; Laidra et al., 2007; Neisser et al., 1996; Yıldırım, 2000). Studies conducted with Intelligence Quotient (IQ) tests reveal .05 correlation between school grades and IQ and show that the higher the IQ scores, the lower the dropout rates (Neisser et al., 1996; Spinks et al., 2007). Also, Emotional Quotient (EQ) is seen as the complement of IQ by increasing students' motivation and communicative abilities (Goleman, 1995; Mohzan, Hassan, & Halil, 2013).

In addition to cognitive capacity, psychological factors are seen as predictors of achievement. Research revealed that personality types—especially extroversion, responsibility, and openness to new experiences—have a positive impact on grades (Bidjerano & Dai, 2007; Farsides & Woodfield, 2003; Laidra et al., 2007; Lounsbury et al., 2004; Poropat, 2009; Vermetten, Lodewijks, & Vermunt, 2001). On the other hand, exam anxiety is accepted as a hindering factor on achievement, and a high level of exam anxiety is thought to be one reason for low grades (Baltaş, 2003; Bonaccio, Reeve, & Winford, 2012; Ergene, 2011; Eum & Rice, 2011). School engagement, which is also a widely studied branch of educational psychology that incudes having a sense of belonging and participation in school-related activities, creates a positive influence on academic achievement (Appleton, Christenson, Kim, & Reschly, 2006; Carini, Kuh, & Klein, 2006; Gunuc, 2014; Park, 2005). Motivation,

especially intrinsic motivation, is expressed as having a direct relationship with achievement, and students who are intrinsically motivated were found to be more successful in both school and on large-scale exams (Ayub, 2010; Broussard, 2002; Gottfried, 1990; Kusurkar et al., 2013; Li & Pan, 2009).

Furthermore, physiological factors, absenteeism, and excessive use of technology were also found as student-related reasons for underachievement in the literature. Physiological conditions of students were proved to be responsible for their success and failure. Inappropriate nourishment, lack of physical fitness, and disorders in the sensory organs create negative effects on students' academic achievement (Brown, Beardslee, & Prothrow-Stith, 2008; Engin et al., 2009; Stein et al., 2008; Trudeau & Shephard, 2008). Chen and Lin (2008) and Landin and Perez (2015) asserted that a high rate of absenteeism during a school year inevitably results in lower grades. Excessive use of technology is another student-driven factor which has a negative correlation with academic achievement. Research revealed that students' GPAs showed a decline when they used computers, mobile phones, or the internet (social media) for more than three hours a day for nonacademic purposes, and this situation might also be regarded as technology addiction (Austin & Totaro, 2011; Chen & Peng, 2008; Kirschner & Karpinski, 2010; Kubey, Lavin, & Barrows, 2001).

Parental factors which affect the academic achievement of students mostly focus on the socioeconomic status (SES) of the family, educational background of parents, attitudes towards students and school, and parental aspirations. A great body of research confirms the strong relationship between SES and academic achievement by indicating that families which belong to a higher socioeconomic class provide students with more educational opportunities and resources which results in higher levels of achievement (Boyacı, Öz, & Akay, 2018; Dearing, 2008; Gottfried et al., 2003; Lee & Burkam, 2002; Matsen et al., 1999; Papanastasiou, 2000). Educational background of parents is not only a determinant factor of SES, but also a source for students' academic achievement. Many studies report either mother or father or both as the student's motivator for academic achievement by mentioning that educated parents create better visions for their children, give better care, and provide better educational opportunities (Avşar & Yalçın, 2015; Diaz, 2003; Hijazi & Naqvi, 2006; İpek, 2011; Özer & Anıl, 2011; Tor, 2008). In addition, it is stated in the literature that democratic parents—compared to other types of family functioning—bring up self-confident, respectful, creative, autonomous, active, and sociable children, which increases the level of achievement (Spera, 2005; Tor, 2008; Weiser & Riggio, 2010). Also, children of parents who have positive attitudes towards school, who join parent–teacher organization meetings frequently, and who have high expectations of children were found to be more

successful in different types of evaluations (Çelenk, 2003; Yelgün & Karaman, 2015; Zhan, 2006).

Although the school-related factors were seen as having little impact on students' academic achievement in the 1970s, especially after the Coleman Report (Coleman et al., 1966), subsequent studies focusing on school effectiveness proved that schools make a difference (Mortimore et al., 1988; Reynolds & Creemers, 1990). School effectiveness is defined as the rate of goal attainment of a school (Scheerens, 2013). Schools are considered effective when they fulfill their expected functions and the stakeholders are satisfied with this (Bollen, 1996). Although it is usually thought that schools which have high performing students in exams are effective, several qualities are given as the school effectiveness criteria in the literature. Educational leadership, clearly defined goals, positive school climate, effective teaching and learning processes, high expectations of students, tracking student performance, teacher qualities, school–parent collaboration, and support for professional development are mentioned as the qualities of effective schools (Lezotte, 2010; Sammons et al., 1995; Scheerens, 2000; Teddlie et al., 2000). Many studies have investigated the relationships of these qualities with student achievement. To illustrate, Bosker (1997) analyzed the PISA results from 27 countries, including 100 schools from each, and concluded that private schools in city centers made better contribution to reading scores. Moscoso (2000) asserted that the ethnic composition of the school and teacher time spent on emphasizing rules and expectations created negative influences on academic achievement. On the other hand, Luyten et al. (2005) showed evidence on the positive effect of school-related factors—such as school resources, school climate, and politics—on achievement. A more recent study by Odeh et al. (2015) found school climate, discipline practices, and physical resources of schools predicted achievement significantly. In the current study, school effectiveness was measured in a holistic approach with the School Effectiveness Scale designed by the researchers, including items related to the criteria mentioned above.

Last but not least, teacher-related factors were reportedly 30% of the impact on the variance of academic achievement (Hattie, 2003). Sanders and Rivers (1996) emphasized that students of less effective teachers, compared to the more effective ones, reached lower achievement levels. Several factors related to teachers' general academic skills and intelligence, field knowledge, pedagogical knowledge, experience, diploma level, and attitudes and behaviors toward students are thought to have positive or negative influences on students' academic achievement either directly or indirectly (Darling-Hammond, 2000; Ferguson, 1991; Hattie, 2003; Kola & Sunday, 2015; Spilt et al., 2012; Srinivasan, 2015; Wilson, Floden, & Ferrini-Mundy, 2001; Zuzovsky, 2009).

As can be seen in the above mentioned literature review, there are a plethora of studies focusing on the relationships of different variables and academic achievement. This study is expected to bring a holistic approach to the issue of achievement on transition exams as the variables in different categories were analyzed in a multilevel manner.

Turkish Context and Scope of the Study

The Turkish education system is supervised by the Ministry of National Education. Education is compulsory for 13 years and is free in state schools. Stages of education start with a one-year compulsory preschool. Primary education comprises two sections: four years in primary school, and four years in middle school. Then students are obliged to take the high school transition exam to continue their compulsory secondary education for another four-year period and to be placed in a high school according to the scores they receive.

In the scope of this study, students' placement scores on the TEOG Exam (Exam for Transition From Primary Education to Secondary Education) were used as the indicators of academic achievement and as the dependent variable. In the TEOG system, eighth grade students took six exams each term from the six subjects they study (i.e., Turkish, Mathematics, Science and Technology, Religion, Revolution History, and Foreign Language). It is apparent that this system has a washback effect on teaching practices and student learning. In other words, it is possible that teachers design their lessons in accordance with the exam content or students pay attention only to the topics asked about on the exam and not to the others covered in the curriculum. This may explain the tendency of students to get extra help from private tutors or institutions to perform better. In addition, schools in Turkey which have more successful students in such exams are considered more prestigious and effective and therefore are preferred by parents and students since these schools use the achievement rate of their students as a marketing maneuver. Since the period of high school transition is stressful not only for students but also for parents, the variables which affect students' performance should be examined in different aspects to provide implications for students, parents, and educational leaders in the process of making decisions.

Method

The investigation of student outcomes is traditionally conducted based on two approaches. In the first approach, the effects of students' individual and social qualities (such as motivation, peer influence, parental education level, or SES) are considered as indicators (Coleman et al., 1966). In the second

approach, with the emerging effective schools movement in the late 1970s, school-related factors such as school resources, atmosphere, safety, and so on began to be included in studies (Edmonds & Frederiksen, 1979). For the current study, instead of focusing only on one approach, both of these approaches were combined.

This research, which aims to analyze the variables affecting eighth grade students' academic achievement in transition exams in Eskişehir, Turkey state secondary schools and the relationships of these variables by using hierarchical linear modeling, is a cross-sectional study. The analyses of the data were carried out by means of two-level hierarchical linear models (HLM). In the macro level (Level 2), data were collected from different schools, and in the micro level (Level 1), from students and their parents. As can be seen in Figure 1, the effects on exam scores of student- and parent-related factors in Level 1 and school SES and school effectiveness factors in Level 2 were analyzed. Different HLM analyses for each of the Level 2 variables were conducted, and the relationship between these two variables was investigated as well.
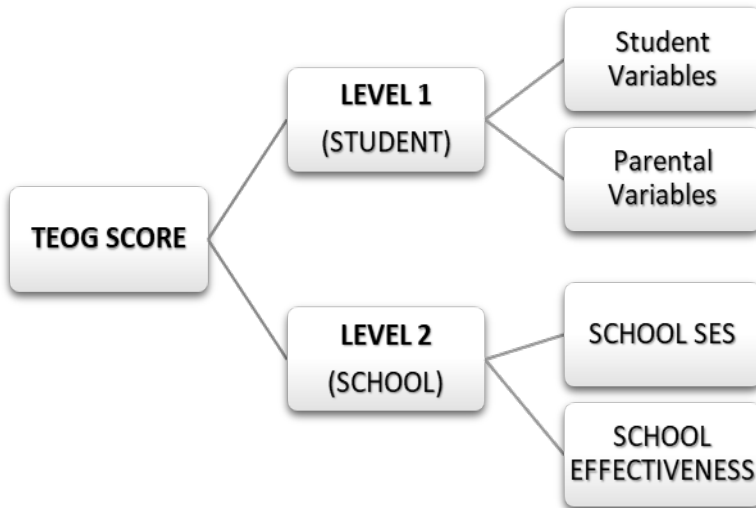

Figure 1. Conceptual framework of the study.

The study aimed to answer the following research questions:
• Is there a significant difference among schools in terms of students' TEOG scores?
• Do the student and parental indicators predict TEOG scores?
• Does school effectiveness predict TEOG scores?
• Do the interactions of student and parental indicators and school effectiveness predict TEOG scores?

- Does the school socioeconomic status predict TEOG scores?
- Do the interactions of student and parental indicators and school socioeconomic status predict TEOG scores?
- Does the school effectiveness vary according to the socioeconomic status of the neighborhoods in which schools are located?

Sampling

When the private schools and schools functioning in the universities were eliminated, 49 state secondary schools in the two districts (Odunpazarı and Tepebaşı) of Eskişehir city were identified. These schools were stratified based on the SES of the neighborhoods they are located in as low (low SES), average (average SES), and high (high SES). In order to determine these strata, current values listed in the document prepared by Odunpazarı Municipality and named as "Current Values of the Minimum Land Properties and Building Plots to be used in 2010" was taken into consideration (Eskişehir Odunpazarı Belediyesi, 2010). Based on the values in the document, mean values of the neighborhoods were calculated by computing the current values of each street in Odunpazarı and Tepebaşı Districts. Instead of using an arithmetic mean in this calculation, median was used because there were extreme values among the current values of streets in the neighborhoods. Also, these values were estimated in 2010 and did not represent the current situation. In order to update these values to 2016 (the time of the study), calculations were conducted by using the basic indexes given by the Turkish Statistical Institute and the Wholesale Price Index and Consumer Price Index coefficients. After these calculations, graphics were created, and it was seen that the neighborhoods having 300₺ (Turkish lira) or over current values are high SES, neighborhoods having 150–299₺ current values are average SES, and neighborhoods having 150₺ or below current values are low SES neighborhoods.

Having received permissions from the Turkish Ministry of Education, students, parents, teachers, and administrators of randomly selected secondary schools—three high SES and three low SES—were surveyed. Average SES schools were not included in this study in order to see the differences more sharply. Participants included 296 students, 296 parents, and 87 teachers and administrators from low SES schools and 371 students, 371 parents, and 124 teachers and administrators from high SES schools (see Table 1). The rationale of including more participants from high SES schools depends on the percentages of students having education in each stratum. Out of 6,872 secondary school students in central Eskişehir, 18.17% were placed in low SES schools, and 30.55% were in high SES schools.

Table 1. Number of Participants

School	Students	Parents	Teachers and Administrators
Low SES School 1	72	72	11
Low SES School 2	59	59	26
Low SES School 3	165	165	50
High SES School 4	161	161	43
High SES School 5	75	75	77
High SES School 6	135	135	4
Totals	**667**	**667**	**211**

Data Collection Instruments

In this study, data were collected by means of three instruments, all of which were developed by the researchers. First, the School Effectiveness Scale (see Appendix C) was designed to determine the factors reflecting school effectiveness through the eyes of teachers and administrators (see Table 2). The scale did not include items related to the quality or delivery of instruction since the centralized administration of the Turkish education system makes decisions and supervises schools and teachers on this issue. Therefore, there is not much variation among schools according to the quality or delivery instruction. A pilot study of the scale was conducted with the participation of 152 teachers and administrators prior to the actual study. The data collected for the pilot study were analyzed to define the psychometric qualities of the scale and to create the final version. The results of these analyses are given below.

Table 2. Psychometric Qualities of School Effectiveness Scale

School Effectiveness Scale	Variables	# of Items	Cronbach's Alpha
Personal Information	Gender	1	
	Age	1	
	Education level	1	
	Major	1	
	Status	1	
	Total Experience	1	
	Experience in Current School	1	
	Teaching Hours	1	
School Effectiveness Scale	Administrator Effectiveness	7	0.918
	Teacher Effectiveness	9	0.897
	Student Effectiveness	9	0.955
	Parent Effectiveness	6	0.925
	School Atmosphere Effectiveness	3	0.759

Cronbach's Alpha coefficient of the scale was 0.962 and the anti-image value of each item was more than 0.05, which means all the items contributed to the factor structure of the scale. Also, exploratory factor analysis was conducted on the data set. A scree plot graphic (Figure 2) revealed five factors in the scale, which were later called "Administrator, Teacher, Student, Parent, and School Atmosphere Effectiveness" by the researchers. Explained variance score for these factors was found to be 69.608%. Further information on Cronbach's Alpha Test and exploratory factor analysis is available from the authors upon request. Confirmatory factor analysis conducted with Lisrel 9.1 software affirmed the goodness of fit; values and further details may also be obtained from the authors upon request.
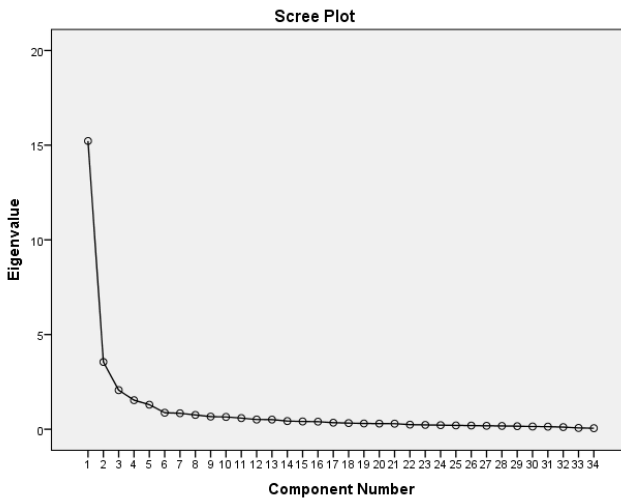

Figure 2. Scree plot graphic for the factors of the School Effectiveness Scale.

Secondly, the Student Questionnaire completed by eighth grade students in selected schools consisted of items that mention personal variables which might have an influence on the difference of TEOG scores (see Table 3). The questionnaire was designed by the researchers, and a pilot study was conducted with the participation of 130 eighth grade students.

This questionnaire was not developed to measure a single phenomenon as was the School Effectiveness Scale, but to collect comments and information on different areas. However, Question 22, which consisted of 12 items, was a Likert-type scale designed to determine the students' attitudes towards school. Therefore, this question went through a factor analysis process. Cronbach's Alpha value of 0.883 revealed that this scale is a reliable and collectible instrument. The exploratory factor analysis claimed two factors in the scale with the explained variance score of 63.58%. These factors were "General attitude towards

school" and "Attitudes towards school's TEOG practices." Values and further details of the estimations may be obtained from the authors upon request.

Table 3. Psychometric Qualities of Student Questionnaire

Student Questionnaire	Items	# of Items	Cronbach's Alpha
Personal Information	Gender	1	
	Time in Eskişehir	1	
	Absenteeism	1	
	Breakfast	1	
	Extracurricular activities	15	
Home Information	Home possessions	19	
	Facilities	6	
	Number of books	1	
	Internet use for school	8	
	Internet use for fun	3	
Study Information	GPA last term	1	
	Class repetition	1	
	Certificate received last term	1	
	Private lessons	6	
	Private lessons per TEOG lesson	6	
	Self-study time per TEOG lesson	6	
	Educational goals	1	
	Importance given to TEOG exam	1	
Attitudes Towards School Scale	General attitude towards school	7	0.862
	Attitudes towards school's TEOG practices	5	0.879

The third instrument to collect data for the study, the Parent Questionnaire, was used to determine the parental factors that might have an effect on TEOG scores (see Table 4). The questionnaire was designed by the researchers, and a pilot study was conducted with the participation of 130 parents whose children filled in the Student Questionnaire in the pilot study.

Similar to the Student Questionnaire, this instrument included a question which consisted of nine Likert-type items in order to determine parents' attitudes towards school. Cronbach's Alpha value was 0.886, and exploratory factor analysis indicated a single factor in the scale with an explained variance score of 53.39%.

Table 4. Psychometric Qualities of Parent Questionnaire

Items	# of Items	Cronbach's Alpha
Mother age	1	
Father age	1	
Marital status	1	
Mother occupation	1	
Father occupation	1	
Mother education level	1	
Father education level	1	
Monthly family income	1	
Mother homeland	1	
Father homeland	1	
Education expenditure	1	
Education goal for student	1	
Importance given to TEOG exam	1	
Attitudes towards school scale	9	0.886

Data Collection and Analysis

In the initial step of the data collection procedure, official permissions were obtained from the Ministry of Education. During the data collection, the three instruments were compiled in envelopes considering the number of participants and delivered to the determined schools. Considering the ratios of high and low SES schools in the population and the possibility of data loss, 730 Parent and Student Questionnaires were sent to high SES schools, and 371 were delivered to the low SES schools. Assistant managers of these schools organized how to distribute and collect forms in each eighth grade class and among staff. Parent Questionnaires were submitted to the students and received back in a week filled out by the parents. However, the number of the Parent Questionnaires returned was lower than the Student Questionnaires. Therefore, the students whose parents did not fill the form were also excluded from the study. In addition, out of 350 School Effectiveness Scales delivered to the schools, 211 were returned and included in the analyses. During April 2016, a pilot study of the instruments was carried out, and the actual research was conducted in May 2016.

Data collected by means of the three aforementioned instruments were computed with IBM SPSS 22 (Statistical Package for the Social Sciences) software. These files were transferred to Hierarchical Linear Modeling 6 software to carry out statistical analyses. HLM was preferred for analysis since the data were collected from different strata and as the data set reflected a nested and hierarchical structure. When the education field is considered hierarchically, individual students are clustered in classes, and these classes are clustered in

schools (Bryk & Raudenbush, 1992; Goldstein, 1995; Hox, 2010). Therefore, an estimation on an individual student is influenced both from the variables of the class which the student is in and from the qualities of the school in which he or she receives education. Groups and individuals in these groups (i.e., a class and students in this class) not only affect the group, but they are also affected by their group memberships. Ignoring such hierarchical relationships results in missing the group influence on individual estimations and leads to the use of traditional statistical analyses such as regression or ANOVA, which may cause invalid predictions (Goldstein, 1999). In this study, two-level HLM was used, as the variables related to both students and schools were taken into consideration. In Level 1 (micro level), student-related variables were considered, while school-related variables were contemplated in Level 2 (macro level). Classes were not taken as a level of analysis in this study as the main concern was to see the variation among schools, not among classes. As the dependent variable consisted of a single score, no plausible values were included in the study. Specifically, the student Level 1 baseline model is:

$$(Y)_{ij} = \beta_{0j} + r_{ij}$$

where $(Y)_{ij}$ is the achievement score for student i in school j, β_{0j} is the average score of student achievement in school j, and r_{ij} is the student-level random effect.

The corresponding Level 2 model is:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

where γ_{00} is the grand mean (or intercept) for student achievement across schools and u_{0j} is the school-level random effect. These formulas were expanded with the independent variables used in the study. Items in the student and parent questionnaires were added to the Level 1 model as separate independent variables. School effectiveness and school SES were included in the Level 2 model separately and analyzed in two different models since these nominal variables with the same number of categories may overlap and create biased results.

Findings

Multilevel Analysis of the Student- and Parent-Related Factors and School Effectiveness

In the first step of the research, the data were analyzed to see the effect of student- and parent-related factors (Level 1) and the school effectiveness variable (Level 2) on TEOG scores by means of two-level HLM. Based on the average scores given on the School Effectiveness Scale, schools were categorized

as having a "low level of effectiveness" or "high level of effectiveness." Interestingly, one of the schools located in a low SES neighborhood was found to have a high level of effectiveness (see Table 5). The summary of the four models conducted with HLM is given in Appendix A.

Table 5. School Effectiveness Mean Scores and Categories

School	Effectiveness Mean Score	Effectiveness Category
Low SES School 1	112.45	Low
Low SES School 2	131.15	High
Low SES School 3	105.18	Low
High SES School 4	136.00	High
High SES School 5	139.32	High
High SES School 6	132.25	High

Variation of Scores Among Schools

In the first stage of HLM analyses, to test Research Question 1, an unconstrained model (Model 1) was applied on the data set to see whether the variability in the TEOG scores were associated with schools (see Appendix A). The estimation revealed that schools varied significantly in terms of TEOG scores ($t = 15.129$, $p < 0.001$). Intraclass correlation coefficient (ICC) for Model 1 was calculated, and it was seen that the difference in scores stems from schools ($\chi^2 = 327.23$, $p < 0.001$). The ratio of this difference was calculated as 37%, and this result indicated that the substantial variance in TEOG scores could be accounted for by schools (and 63% by Level 1 variables). In this respect, schools where students pursued their education could create a difference in TEOG scores.

The Effects of Student and Parental Indicators on TEOG Scores

To test Research Question 2, a random intercepts model of HLM (Model 2) was specified in which student- and parent-related predictors (Level 1) were included. Final estimation of fixed effects showed the significant student- and parent-related factors which may have had an effect on TEOG scores either in a positive or negative direction (see Appendix A). It was seen that breakfast frequency of students had a positive influence on the scores, that is, students who have breakfast more frequently are more successful on the TEOG exam. On the other hand, students' participation in sports and extracurricular activities created negative effects on the scores, which means the scores tend to decrease when students join these sorts of activities more frequently. However, participation in scientific projects and composition contests affected students'

achievement positively. When the materials available at home were considered, having a calculator influenced scores positively, while more than two TVs at home had a negative impact. In addition, internet use either to study or for fun had a negative impact on students' TEOG scores. Several variables related with students' educational activities and study habits predict their achievement as well. For instance, GPA and achievement certificates students received in the previous term predicted their scores positively. Also, it was found that students who had private lessons to support their learning were more successful than the others. Students who spent more time studying for Turkish and history courses had better exam scores.

In addition to the student-related variables, several parental factors were found to have created a change on the scores. For example, fathers' education level predicted scores positively, and students who had fathers with higher levels of education (above bachelor's degree) performed better on the exam. Furthermore, mothers who were born in Turkey had a positive influence on students' achievement compared to the mothers born in different countries. Additionally, monthly family income and the amount of money spent for children's education predicted students' performance positively. Families who earn more and spend more for education increase their children's TEOG scores. Finally, the educational goals that parents set for children had a positive impact on their performance. The higher goals the parents expect (finish a bachelor's degree or higher), the more successful the students are in TEOG exam.

The ratio of Level 1 variables to explain the variance in TEOG scores was calculated by means of variance components reached in random intercepts model. The result of the estimation indicated that Level 1 predictors explain the variance of TEOG scores up to 84% significantly (χ^2 = 238.22117, df = 3, $p < 0.001$).

Impact of School Effectiveness on Scores

The means as outcomes regression model of HLM (Model 3) was specified to test Research Question 3, the influence of school effectiveness (Level 2) on TEOG scores. According to the estimations, the school effectiveness variable had a significant effect on TEOG scores (t = 5.68, df = 3, $p < 0.001$). By using the variance component values, the ratio of school effectiveness to explain Level 2 variance was calculated. The result revealed that 85% of the variability in the TEOG scores could be explained by the school effectiveness factor. Thus, 85% of the 37% school factor found in the initial analysis stems from school effectiveness, which means the school effectiveness variable predicts TEOG scores significantly (χ^2 = 37.52, $p < 0.001$).

The Effect of Interactions Between Student and Parental Indicators and School Effectiveness on Scores

Random intercepts and slopes model (Model 4) was specified to test Research Question 4. The effect of interactions between Level 1 (student and parent factors) and Level 2 (school effectiveness) variables on TEOG scores was analyzed (see Appendix A).

The interaction of the number of cell phones at home and school effectiveness had a negative impact on achievement. When students have more cell phones at home that belong to family members and study at less effective schools, their scores tend to decrease. Also, the students who completed online assignments given by the teacher and studied at more effective schools performed better in the exam. In addition, the interaction of better GPA and more effective schools created significantly better results. Finally, students who studied at more effective schools and got private lessons on the religion course were more successful on the TEOG exam.

The ratio of these interactions to explain the variance in TEOG scores was calculated by means of variance components reached in random intercepts and slopes model. The results reported that cross interactions between school effectiveness (Level 2) and Level 1 factors created significant variability in TEOG scores. However, these interactions explained only 0.3% of the change in the outcome variable.

Multilevel Analysis of the Student- and Parent-Related Predictors and Socioeconomic Status of Schools

In order to investigate whether school SES and the interaction between school SES and student and parental variables predict TEOG scores, multilevel analyses were conducted. The summary of the analyses is given in Appendix B, which shows the results of the HLM model created including Level 1 (student and parent related factors) and Level 2 (school socioeconomic status) variables and the interactions of the variables in two levels. Results of this model are explained below in detail.

The Impact of School Socioeconomic Level on TEOG Scores

To answer the fifth research question, similar HLM analyses were repeated by including a school SES variable into the model and disregarding school effectiveness this time (see Appendix B). Means as outcomes regression model (Model 1) used for this analysis indicated significant results. The school SES variable had a significant effect on students' scores ($t = 4.827$, $p < 0.01$). In order to determine the ratio of school SES to explain Level 2 variance, R^2_{Level2} was calculated. The values reached in means as outcomes regression analysis

revealed that SES could explain the variability in TEOG scores up to 76%. In other words, 76% of the 37% school factor found in the initial analysis stemmed from school socioeconomic level, which means school SES predicts TEOG scores significantly (χ^2 = 61.93749, df = 4, p < 0.001).

The Effect of Interactions Between Student and Parental Indicators and School SES on Scores

Random intercepts and slopes model (Model 2) analysis was repeated by including the school SES variable to find an answer to the sixth research question. The results showed that cross interactions between school SES (Level 2) and Level 1 factors created significant variability in TEOG scores (Appendix B).

The estimation of fixed effects in random intercepts and slopes model revealed the significant interactions of several Level 1 variables and SES. According to the findings, the cross interaction of frequency in participation in theater clubs and SES had a positive influence on scores (t = 2.191, p < 0.05), which means the scores increased when students in high SES schools participated more in theater clubs. In addition, cross interaction of having a dictionary at home and SES affected scores positively (t = 2.373, p < 0.05). However, findings showed that the cross interaction of SES and number of cell phones at home created a negative impact on scores. This means that as the number of cell phones increased at homes of students in high SES schools, the scores declined significantly (t = -2.059, p < 0.05). In contrast, when the number of tablets increased, the scores of students in high SES schools increased as well (t = 2.253, p < 0.05). Similarly, students who used the internet to complete assignments given by the teacher and who attended high SES schools had significantly better scores (t = 2.196, p < 0.05). Also, the interaction of GPA and SES created a positive impact on scores (t = 5.733, p < 0.001). In high SES schools, when the GPA increases, scores tend to ascend. Another significant interaction was determined between the status of having private lessons and SES (t = 2.722, p < 0.05). This finding shows that when students attend high SES schools and take private lessons to support their studies, they receive better scores on the TEOG Exam. Finally, the interaction of students' educational goals and SES revealed positive effects on scores. In the student questionnaire, educational goals were categorized as (1) to finish high school; (2) to be accepted to a university program; (3) to finish a 2-year vocational program; (4) to get a bachelor's degree; (5) to get a master's degree; and (6) to get a PhD. HLM takes the final category as the reference category; according to this, as the educational goal of students in high SES schools increases, TEOG scores tend to rise. The effect of the interactions was statistically significant (χ^2 = 287.62807, df = 3, p < 0.001). Explained variance of this model was calculated, and the

results showed that cross interactions between school SES (Level 2) and Level 1 factors created significant variability in TEOG scores. However, these interactions explained only 1% of the change in the outcome variable.

Comparison of School Effectiveness Based on Socioeconomic Status

The final aim of the study was to answer Research Question 7 by investigating whether the effectiveness of schools varied according to the SES of the neighborhoods in which schools were located. The School Effectiveness Scale was administered in low SES and high SES schools, and the data were analyzed with the Mann-Whitney U test, as the points given in five subscales did not show normal distribution. The results indicated that school effectiveness varied significantly in administrator, student, parent, and school atmosphere factors in favor of high SES schools (see Table 6). Rank mean values reached in the analysis for each subscale were consistently higher for high SES schools, which may suggest that these schools are more effective than low SES schools.

Table 6. Difference of School Effectiveness Based on SES

Factor	SES	N	Rank Mean	U	p
Administrator Effectiveness	Low	87	108.59	8054.000	$p < 0.05$*
	High	124	127.45		
Teacher Effectiveness	Low	87	110.91	7794.000	$p > 0.05$
	High	124	125.35		
Student Effectiveness	Low	87	71.80	12174.000	$p < 0.001$***
	High	124	160.68		
Parent Effectiveness	Low	87	80.02	11253.500	$p < 0.001$***
	High	124	153.25		
School Atmosphere Effectiveness	Low	87	92.40	9867.500	$p < 0.001$***
	High	124	142.08		

Note. *$p < 0.05$ **$p < 0.01$ ***$p < 0.001$.

The analysis of the items in the administrator effectiveness factor revealed that managers in high SES schools emphasize the goals of the school more clearly, organize frequent meetings to provide knowledge and coordination, support teachers' professional development more, and take requests and complaints into consideration more seriously. Also, students in high SES schools were found to be more motivated, had more positive relationships with schoolmates, felt more belonging to the school, had lower rates of disciplinary problems, and had a better chance to finish high school and be accepted to a university program. These students were also more aware of the achievement level expected from them. In addition, it was found that parents in high SES schools participated more frequently in the educational, extracurricular, and

counseling activities, were more aware of the expectations of the school from them, and visited school and teachers more to talk about their children. Finally, the results pointed out that high SES school buildings and surroundings were more orderly, and frequent meetings on student achievement were held in these schools.

Compared to the high SES schools, it was found that in low SES schools the goals were not clearly emphasized, the frequency of meetings with staff was lower, teachers' professional development was not well supported, and requests and complaints were not much taken into consideration. From the student perspective, in low SES schools, students were less motivated, the relationships among schoolmates were not positive, and the rate of disciplinary problems was higher. In addition, in low SES schools, the rate of parents' involvement in school-related activities was lower. Also, it was found that the physical conditions and atmosphere of low SES schools were worse than high SES schools.

However, when teacher effectiveness was considered, no significant difference was identified between low SES and high SES schools. This might have resulted from the teacher designation regulations of the Ministry of Education in Turkey. According to these regulations, teacher candidates have to take a nationwide, large-scale test and receive a certain score or higher as a prerequisite to apply for the position. Candidates who fulfill the security, health, and educational requirements are assigned to the schools in three Ministry-determined education regions in Turkey by drawing lots. These regions have been defined according to the geographical, economic, and social development level of the cities (Region 1 shows higher development level, whereas Region 3 shows lower development level). When teachers are assigned, they have to complete their compulsory service of between three and five years according to the regions (in Region 3, compulsory service is for at least three years, and this duration increases while the development level of the region increases). Also, teachers receive points for their service each year (receiving more points in less developed regions, villages, etc.). Teachers who collect higher points have the opportunity to be reassigned; this means when their years of experience increase, teachers can move to more developed regions or city centers instead of rural areas or less developed cities. In our study, we found that teacher effectiveness showed no significant difference between low and high SES schools. Based on the regulations of the Ministry, enthusiastic, well-educated, and professionally competent teachers might be working not only in high SES schools but also in low SES schools to complete their compulsory service or to collect points.

Discussion

The results of the study indicated that schools in Turkey created differences in students' achievement. Although the Coleman Report (Coleman et al., 1966) suggested that schools have little impact on achievement, later studies rebutted this claim. Papanastasiou (2000) found that school-related factors influenced students' achievement on TIMSS exams. Similarly, findings of this study revealed that 37% of the variation in the scores resulted from schools (and 63% from student- and parent-related variables).

Tsereteli et al. (2011) and Nyagosia et al. (2013) stated that students in more effective schools had better scores on standard achievement tests. Results of this study concur with the literature as well. In addition, it was found that student- and parent-related factors created variability, either positively or negatively, in scores. The results of the study indicate that several student- and parent-related variables explain the variance of scores significantly, up to 84%.

In addition, the SES of the schools was found to influence results for students on the transition exam. This finding confirms the literature. Teachman (1987) and Matsen et al. (1999) asserted that students in high SES schools have better access to cultural and educational resources and have better GPAs and higher scores on achievement tests.

The cross-level interactions of school effectiveness and SES of schools with micro level variables had little meaning, as in each HLM analysis they explained a negligibly small proportion of the variance in scores. Therefore, it may be assumed that instead of the interaction effects, the main effects of Level 1 and Level 2 variables create greater influence on academic achievement. In fact, as Mathieu et al. (2012) asserts, this finding might have resulted from the sample size in Level 1. With a larger sample size in the micro level, a higher rate of variance created by cross-level interactions might have been found.

The results of the study also indicated that the SES of the school created changes in school effectiveness. This finding concurs with the literature. Bosker (1997) stated that private schools and schools located in city centers were more effective according to scores on PISA exams. Similarly, Basque and Bouchamma (2013) found that available school facilities and neighborhood factors had an impact on students' mathematics scores.

Based on the findings, it is suggested that schools should make attempts to develop their effectiveness. More funds for schools in disadvantaged neighborhoods to improve their facilities should be provided by Ministry of Education. Also, counseling programs should be organized to inform parents and students about the parent- and student-related factors hindering academic achievement. Practitioners should identify students from low SES families and guide them

to possible financial or educational opportunities such as scholarships. What is more, strong relationships between parents and the school should be established with frequent PTA meetings, and parents should be informed about how to best support their children.

Transition from middle school to high school is a critical period in all education systems around the world. Similar to the Turkish education system, in many countries students are admitted to high schools based on their scores on large-scale tests or on their previous achievements. Therefore, the results of this study are not only specific to Turkish context, but may give insights to other decision makers, parents, teachers, and students in different parts of the world.

Conclusion

This study investigated the impact of student-, parent-, and school-related variables on eighth grade students' academic achievement on transition exams in state secondary schools during the 2015–16 school year in Eskişehir, Turkey and the relationships of these variables using HLM. Data were obtained from schools located in high and low socioeconomic neighborhoods via three instruments designed by the researchers. HLM analyses were carried out by categorizing student- and parent-related variables in the micro level and school SES and school effectiveness in the macro level. Also, the relationship between the socioeconomic levels of the neighborhoods where schools were located and their effectiveness was investigated.

The findings of the study revealed that 37% of the variation in high school transition exam scores were accounted for by schools, and 63% were by micro level variables. When the impact of student- and parent-related indicators were taken into consideration, it was found that 84% of the micro level effect was explained by the variables included in the study. Namely, the higher frequency of having breakfast during the week, higher rate of participation in scientific and literary projects, having a calculator available for self-use, having a better GPA last term, attending private lessons more, studying more on Turkish and history, having a better educated father and more family income, higher educational expenditures for the child, and parents setting higher educational goals for the child created positive changes on exam scores. On the other hand, higher frequency of attendance to sports activities and student clubs, more TVs at home, more time spent on the internet, and having a mother who was not native each caused a change on scores in a negative direction. The analysis of the impact of a dichotomous school effectiveness variable on scores indicated that 85% of the macro level effect was caused by this indicator. When another analysis was conducted using the school SES indicator, it was found that 76%

of the macro level effect on scores was accounted for by school SES. However, the interactions of the significant micro and macro level variables did little to explain the change on scores. Finally, the findings indicated that the schools located in high SES neighborhoods were more effective than the ones in disadvantaged neighborhoods. In particular, administrators, students, parents, and school atmosphere better reflect the effectiveness qualities in high SES schools, while no significant difference was observed related to teacher effectiveness in high and low SES schools.

Limitations and Suggestions for Further Research

This study is limited with the participants in central Eskişehir in the 2015–16 education year. For further studies, data from participants in different geographical areas could be used, and analyses could be repeated to see the bigger picture of the situation. Similarly, data from different countries could be used to make comparisons and generalizations. The number of schools and the participants may be conceived as another limitation. Inclusion of a higher number of schools from high and low SES neighborhoods could create a change in the results. In addition, data were not collected from average SES schools to see the differences more sharply in this study. Enlarging the data set with this category may be an idea for further research. Also, the findings of this study could be compared with the outcomes of previous years in order to determine the consistency of significant variables over time and to make reasonable steps to improve educational decisions in terms of inclusion or exclusion of students.

References

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, *44*(5), 427–445.

Atila, M. E., & Özeken, Ö. F. (2015). Temel eğitimden ortaöğretime geçiş sınavı: Fen bilimleri öğretmenleri ne düşünüyor? [Exam for transition from primary education to secondary education: What do science teachers think?]. *Ondokuz Mayıs University Journal of Education, 34*(1), 124–140. doi:10.7822/omuefd.34.1.7

Austin, W., & Totaro, M. W. (2011). High school students' academic performance and internet usage. *Journal of Economics and Economic Education Research, 12*(1). Retrieved from http://www.alliedacademies.org/articles/high-school-students-academic-performance-and-internet-usage.pdf

Avşar, A. Ş., & Yalçın, S. (2015). Öğrencilerin okuma başarılarını açıklayan ailesel değişkenlerin CHAID analizi ile belirlenmesi [Determining the parental variables that explain students' reading success by using CHAID analysis]. *Eğitim ve Bilim, 40*(179), 1–9.

Ayub, N. (2010). Effect of intrinsic and extrinsic motivation on academic performance. *Pakistan Business Review, 27*(1), 363–372.

Baltaş, A. (2003). *Öğrenme ve sınavlarda üstün başarı* [High performance in learning and exams]. İstanbul: Remzi Kitabevi, 20. Basım.

Barber, B. K., & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research*, *19*, 3–30.

Basque, M., & Bouchamma, Y. (2013). Academic achievement in effective schools. *Alberta Journal of Educational Research, 59*(3), 503–519.

Benner, A. D. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review, 23*(3), 299–328. doi:10.1007/s10648-011-9152-0.

Benner, A. D., & Graham, S. (2009). The transition to high school as a developmental process among multiethnic urban youth. *Child Development*, *80*, 356–376.

Bidjerano, T., & Dai, D. Y. (2007). The relationship between the big-five model of personality and self-regulated learning strategies. *Learning and Individual Differences*, *17*(1), 69–81.

Bollen, R. (1996). School effectiveness and school improvement. In D. Reynolds, R. Bollen, B. Creemers, D. Hopkins, L. Stoll, & N. Lagerweij (Eds.), *Making good schools: Linking school effectiveness and school improvement* (pp. 1–19). London, UK: Routledge.

Bonaccio, S., Reeve, C. L., & Winford, E. C. (2012). Text anxiety on cognitive ability tests can result in differential predictive validity of academic performance. *Personality and Individual Differences*, *52*(4), 497–502. doi:10.1016/j.paid.2011.11.015

Bosker, R. J. (1997). An international comparative school effectiveness study, using literacy data. In J. Scheerens & R. Bosker (Eds.), *The foundations of educational effectiveness* (Chapter 7). Oxford, UK: Pergamon.

Boyacı, A., Öz, Y., & Akay, E. (2018). Multilevel analyses on the contribution of principal's educational leadership skills on student achievement. In I. H. Amzat (Ed.), *Predictive models for school leadership and practices* (pp. 97–119). Hershey, PA: IGI Global.

Broussard, S. C. (2002). *The relationship between classroom motivation and academic achievement in first and third graders* (Unpublished master's thesis). Louisiana State University, School of Human Ecology, Baton Rouge.

Brown, J. L., Beardslee, W. H., & Prothrow-Stith, D. (2008). *Impact of school breakfast on children's health and learning: An analysis of the scientific research.* Retrieved from http://us.stop-hunger.org/files/live/sites/stophunger-us/files/HungerPdf/Impact%20of%20School%20Breakfast%20Study_tcm150-212606.pdf

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models. Applications and data analysis methods*. Newbury Park, CA: Sage.

Carini, R., Kuh, G., & Klein, S. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education, 47*(1), 1–32.

Chen, J., & Lin, T. F. (2008) Class attendance and exam performance: A randomized experiment. *The Journal of Economic Education, 39*(3), 213–227. doi:10.3200/JECE.39.3.213-227

Chen, Y. F., & Peng, S. S. (2008). University students' internet use and its relationships with academic performance, interpersonal relationships, psychosocial adjustment, and self-evaluation. *CyberPsychology & Behavior, 11*(4), 467–469. doi:10.1089/cpb.2007.0128

Coleman, J. S., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfeld, F., & York, R. (1966). *Equality of educational opportunity*. Washington, DC: US Government Printing Office.

Çelenk, S. (2003). Okul başarısının ön koşulu: Okul aile dayanışması [Prerequisite of school achievement: School–family collaboration]. *İlköğretim-Online E-dergi, 2*(2), 28–34.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1), 1–44.

Dearing, E. (2008). Psychological costs of growing up poor. *Annals of the New York Academy of Sciences, 30*, 1–9.

Diaz, A. L. (2003). Personal, family, and academic factors affecting low achievement in secondary school. *Electronic Journal of Research in Educational Psychology, 1*(1), 43–66.

Edmonds, R., & Frederiksen, J. (1979). *Search for effective schools: The identification and analysis of city schools that are instructionally effective for poor children.* Cambridge, MA: Center for Urban Studies, Harvard University. (ED 170 396)

Elmacıoğlu, T. (1998). *Başarıda aile faktörü* [Family factors in achievement]. İstanbul.

Engin, A. O., Özen, Ş., & Bayoğlu, V. (2009). Öğrencilerin okul öğrenme başarılarını etkileyen bazı temel değişkenler [Some basic variables influencing students' school learning successes]. *Sosyal Bilimler Enstitüsü Dergisi, 3*, 125–156.

Ergene, T. (2011). The relationships among test anxiety, study habits, achievement, motivation, and academic performance among Turkish high school students. *Eğitim ve Bilim*, *36*(160), 320–330.

Eskişehir Odunpazarı Belediyesi. (2010). *2010 yılında uygulanacak asgari arsa ve arazi metrekare birim değerleri* [Current values of the minimum land properties and building plots to be used in 2010]. Eskişehir, Turkey: Odunpazarı Belediye Başkanlığı, Mali Hizmetler Müdürlüğü.

Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress, & Coping, 24*(2), 167–178. doi:10.1080/10615806.2010.488723

Farsides, T., & Woodfield, R. (2003). Individual differences and undergraduate academic success: The roles of personality, intelligence, and application. *Personality and Individual Differences, 34*, 1225–1243.

Ferguson, R. F. (1991). Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation, 28*(2), 465–498.

Goldstein, H. (1995). *Multilevel statistical models* (2nd ed.). London, UK: Edward Arnold.

Goldstein, H. (1999). *Multilevel statistical models*. London, UK: Institute of Education.

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ.* New York, NY: Bantam Books.

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82*(3), 525–538.

Gottfried, A. W., Gottfried, A. E., Bathurst, K., Guerin, D. W., & Parramore, M. M. (2003). Socioeconomic status in children's development and family environment: Infancy through adolescence. In M. Bornstein & R. Bradley (Eds.), *Socioeconomic status, parenting, and child development* (pp. 189–207). Mahwah, NJ: Lawrence Erlbaum.

Gunuc, S. (2014). The relationship between student engagement and their academic achievement. *International Journal on New Trends in Education and Their Implications, 5*(4), 216–231.

Güleç, S., & Alkış, S. (2003). İlköğretim birinci kademe öğrencilerinin derslerdeki başarı düzeylerinin birbiriyle ilişkisi [Relations among primary school students' course performances]. *İlköğretim-Online E-Dergi, 2*(2),19–27.

Hattie, J. (2003). *Teachers make a difference, What is the research evidence?* Paper presented at the ACER Research Conference, Melbourne, Australia. Retrieved from http://research.acer.edu.au/research_conference_2003/4/

Hearn, J. C. (2006). *Student success: What research suggests for policy and practice.* National Postsecondary Education Cooperative's National Symposium on Postsecondary Student Success. Retrieved from http://nces.ed.gov/npec/pdf/synth_Hearn.pdf

Hijazi, S. T., & Naqvi, S. M. M. R. (2006). Factors affecting students' performance. *Bangladesh e-Journal of Sociology, 3*(1), 1–10.

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

İpek, C. (2011). Velilerin okul tutumu ve eğitime katılım düzeyleri ile aileye bağlı bazı faktörlerin ilköğretim öğrencilerinin seviye belirleme sınavları (SBS) üzerindeki etkisi [The effects of parent's educational involvement, school attitudes, and some family related factors on the primary school students' national level assessment test scores]. *Pegem Eğitim ve Öğretim Dergisi, 1*(2), 69–79.

Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior, 26*(6), 1237–1245. doi:10.1016/j.chb.2010.03.024

Kola, A. J., & Sunday, O. S. (2015). A review of teachers' qualifications and its implication on students' academic achievement in Nigerian schools. *International Journal of Educational Research and Information Science, 2*(2), 10–15.

Kubey, R. W., Lavin, M. J., & Barrows, J. R. (2001). Internet use and collegiate academic performance decrements: Early findings. *Journal of Communication, 51*(2), 366–382.

Kusurkar, R. A., Cate, T. J. T., Vos, C. M. P., Westers, P., & Croiset, G. (2013). How motivation affects academic performance: A structural equation modeling analysis. *Advances in Health Sciences Education, 18*, 57–69. doi:10.1007/s10459-012-9354-3

Laidra, K., Pullmann, H., & Allik, J. (2007). Personality and intelligence as predictors of academic achievement: A cross-sectional study from elementary to secondary school. *Personality and Individual Differences, 42*(3), 441–451. doi:10.1016/j.paid.2006.08.001

Landin, M., & Perez, J. (2015). Class attendance and academic achievement of pharmacy students in a European university. *Currents in Pharmacy Teaching and Learning, 7*, 78–83. doi:10.1016/j.cptl.2014.09.013

Lee, V., & Burkam, D. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school.* Washington, DC: Economic Policy Institute.

Lezotte, L. W. (2010). *What effective schools do: Re-envisioning the correlates.* Indianapolis, IN: Solution Tree.

Li, P., & Pan, G. (2009). The relationship between motivation and achievement: A survey of the study motivation of English majors in Qingdao Agricultural University. *English Language Teaching, 2*(1), 123–128.

Lounsbury, J. W., Gibson, L. W., Sundstrom, E., Wilburn, D., & Loveland, J. M. (2004). An empirical investigation of the proposition that "School is Work": A comparison of personality–performance correlations in school and work settings. *Journal of Education and Work, 17*(1), 119–131.

Luyten, H., Scheerens, J., Visscher, A., Maslowski, R., Witziers, B., & Steen, R. (2005). *School factors related to quality and equity. Results from PISA 2000.* Paris, France: OECD.

Margetts, K. (1999, July 14–17). *Transition to school: Looking forward.* Paper presented at the AECA Conference, Darwin, Australia.

Mathieu, J. E., Aguinis, H., Culpepper, S. A., & Chen, G. (2012). Understanding and estimating the power to detect cross-level interaction effects in multilevel modeling. *Journal of Applied Psychology, 97*, 951–966.

Matsen, A. S., Hubbard, J. J., Gest, S. D., Tellegen, A., Garmmezy, N., & Ramirez, M. (1999). Competence in the contexts of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology, 11*, 143–169.

Mohzan, M. A. M., Hassan, N., & Halil, N. A. (2013). The influence of emotional intelligence on academic achievement. *Procedia–Social and Behavioral Sciences, 90*, 303–312.

Mortimore, P., Sammons, P., Stoll, L., Lewis, D., & Ecob, R. (1988). The effects of school membership on pupils' educational outcomes. *Research Papers in Education, 3*(1), 3–26.

Moscoso, R. Y. (2000). *The effects of school characteristics on student academic performance* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Falls Church, VA.

Neisser, U., Boodoo, G., Bouchard, T. J., Jr., Boykin, A. W., Brody, N., Ceci, S. J.,…Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist*, *51*, 77–101.

Nyagosia, P. O., Waweru, S. N., & Njuguna, F. W. (2013). Factors influencing academic achievement in public secondary schools in Central Kenya: An effective school perspective. *Educational Research International, 2*(2), 174–184.

Odeh, R. C., Oguche, O., Angelina, I., & Dondo, E. (2015). Influence of school environment on academic achievement of students in secondary schools in zone "A" Senatorial District of Benue State, Nigeria. *International Journal of Recent Scientific Research, 6*(7), 4914–4922.

Özer, Y., & Anıl, D. (2011). Öğrencilerin Fen ve Matematik başarılarını etkileyen faktörlerin yapısal eşitlik modeli ile incelenmesi [Examining the factors affecting students' science and mathematics achievement with structural equation modeling]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 41*, 313–324.

Papanastasiou, C. (2000). Internal and external factors affecting achievement in mathematics: Some findings from TIMSS. *Studies in Educational Evaluation, 26*, 1–7. doi:10.1016/S0191-491X(00)00002-X

Park, S.-Y. (2005). Student engagement and classroom variables in improving mathematics achievement. *Asia Pacific Education Review, 6*(1), 87–97.

Poropat, E. A. (2009). Meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin*, *135*(2), 322–338.

Reynolds, D., & Creemers, B. (1990). School effectiveness and school improvement: A mission statement. *School Effectiveness & School Improvement, 1*(1), 1–3.

Roderick, M. (2003). What's happening to the boys? Early high school experiences and school outcomes among African American male adolescents in Chicago. *Urban Education*, *38*, 538–607.

Roeser, R. W., Eccles, J. S., & Freedman-Doan, C. (1999). Academic functioning and mental health in adolescence: Patterns, progressions, and routes from childhood. *Journal of Adolescent Research*, *14*, 135–174.

Sammons, P., Hillman, J., & Mortimore, P. (1995). *Key characteristics of effective schools: A review of school effectiveness research*. London, UK: OFSTED.

Sanders, W. L., & Rivers, J. C. (1996). *Cumulative and residual effects of teachers on future student academic achievement.* Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center.

Scheerens, J. (2000). *Improving school effectiveness*. Paris, France: UNESCO, International Institute for Educational Planning.

Scheerens, J. (2013). *What is effective schooling? A review of current thought and practice*. Retrieved from the International Baccalaureate Organization website: https://www.ibo.org/globalassets/publications/ib-research/continuum/what-is-effective-schooling-report-en.pdf

Spera, C. (2005). A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. *Education Psychology Review, 17*(2), 125–146. doi:10.1007/s10648-005-3950-1

Spilt, J. L., Hughes, J. N., Wu, J. Y., & Kwok, O. M. (2012). Dynamics of teacher–student relationships: Stability and change across elementary school and influence on children's academic success. *Child Development, 83*(4), 1180–1195.

Spinks, R., Arndt, S., Caspers, K., Yucuis, R., McKirgan, L. W., Pfalzgraf, C., & Waterman, E. (2007). School achievement strongly predicts midlife IQ. *Intelligence, 35*(6), 563–567. doi:10.1016/j.intell.2006.10.004

Srinivasan, P. (2015). Exploring the influences of teacher's intelligence and emotional intelligence on students' academic achievement. *American Journal of Educational Research, 3*(9), 1159–1162. doi:10.12691/education-3-9-15

Stein, A. D., Wang, M., DiGirolamo, A., Grajeda, R., Ramakrishnaan, U., Ramirez-Zea, M.,…Mattorell, R. (2008). Nutritional supplementation in early childhood, schooling, and intellectual functioning in adulthood: A prospective study in Guatemala. *Archives of Pediatric Adolescent Medicine, 162*(7), 612–618.

Tarım, K. (2005). *Sınıf öğretmenlerinin başarısız olarak algıladıkları öğrencilere yönelik tutum ve davranışları* [Teachers' attitudes and behaviors towards students perceived as unsuccessful] (Unpublished master's thesis). Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.

Teachman, J. D. (1987). Family background, educational resources, and educational attainment. *American Sociological Review, 52*, 548–557.

Teddlie, C., Stringfield, S., & Reynolds, D. (2000). Context issues within school effectiveness research. In C. Teddlie & D. Reynolds (Eds.), *The international handbook of school effectiveness research* (pp. 160–185). London, UK: Falmer.

Tor, H. (2008). Çocuğun okul başarısında ailenin rolü [Parents' role on a child's achievement at school]. In A. M. Sünbül (Ed.), *Eğitime yeni bakışlar 2* (pp. 195–205). Konya, Turkey: Eğitim Akademi Yayınları.

Trudeau, F., & Shephard, R. J. (2008). Physical education, school physical activity, school sports, and academic achievement. *International Journal of Behavioral Nutrition and Physical Activity, 5*(10).

Tsereteli, M., Martskvishvili, K., & Aptarashvili, I. (2011). The impact of public high school management system on academic achievement. *Problems of Education in the 21st Century, 32*, 121–128.

Vermetten, Y. J., Lodewijks, H. G., & Vermunt, J. D. (2001). The role of personality traits and goal orientations in strategy use. *Contemporary Educational Psychology*, *26*, 149–170.

Weiser, D. A., & Riggio, H. R. (2010). Family background and academic achievement: Does self-efficacy mediate outcomes? *Social Psychology of Education, 13*, 367–383. doi:10.1007/s11218-010-9115-1

Wilson, S. M., Floden, R. E., & Ferrini-Mundy, J. (2001). *Teacher preparation research: Current knowledge, gaps, and recommendations.* Seattle, WA: Center for the Study of Teaching and Policy.

Yelgün, A., & Karaman, İ. (2015). Düşük sosyoekonomik düzeydeki mahallede bulunan bir ilköğretim okulunda akademik başarıyı düşüren faktörler nelerdir? [What are the factors decreasing academic achievement in a primary school located in a low socioeconomic status neighborhood?]. *Eğitim ve Bilim, 40*(179), 251–268.

Yıldırım, İ. (2000). Akademik başarının yordayıcısı olarak yalnızlık, sınav kaygısı ve sosyal destek [Loneliness, test anxiety, and social support as predictors of academic achievement]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 18*, 167–176.

Yıldırım, İ. (2006). Akademik başarının yordayıcısı olarak gündelik sıkıntılar ve sosyal destek [Daily hassles and social support as predictors of academic achievement]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 30*, 258–267.

Zhan, M. (2006). Assets, parental expectations and involvement, and children's educational performance. *Children and Youth Services Review, 28,* 961–975.

Zuzovsky, R. (2009). Teachers' qualifications and their impact on students' achievement: Findings from TIMMS–2003 data in Israel. *IERI Monograph Series: Issues and Methodologies in Large Scale Assessment, 2*, 37–62.

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Appendix A. HLM Results for the Effect of Student- and Parent-Related Predictors and School Effectiveness on Scores

Variable	Model 1		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE
Level 1 (individual level)								
Intercept	345.33***	22.83	345.79***	10.42	344.90***	7.93	345.80***	10.42
Breakfast frequency			2.67*	1.27	3.02*	1.27	3.03*	1.32
Freq. of sport activities			-4.50*	1.81	-4.42*	1.81	-4.35**	1.88
Freq. of student clubs			-6.63**	2.45	-6.15**	2.46	-3.03*	1.32
Freq. of scientific projects			7.61*	3.72	7.61*	3.76	7.21*	3.81
Freq. of composition contests			12.05***	3.61	12.40***	3.63	9.39**	3.83
Having a calculator			10.15**	3.38	10.74**	3.37	7.82*	3.63
Number of TVs at home			-4.75*	1.93	-4.85*	1.94	-2.90	2.03
Using internet at home to study			-5.24***	1.47	-5.64***	1.47	-4.04**	1.53
Using internet at home for fun			-3.95**	1.23	-4.18***	1.23	-3.11*	1.26

Appendix A, continued

Time spent in internet café to play games			-4.50*	1.83	-4.94**	1.84	-5.67**	1.87
GPA last term			4.27***	0.25	4.23***	0.25	5.12***	0.31
Certificate received last term			19.33***	3.95	19.29***	3.98	9.61**	4.37
Having private lessons			11.65*	5.42	11.06*	5.45	10.44*	5.85
Self-study time for Turkish			1.98*	0.96	1.71*	0.96	0.81	1.93
Self-study time for history			6.92**	2.53	6.72**	2.53	6.90**	2.53
Father education level			3.68*	1.56	3.69*	1.57	2.11*	1.64
Monthly family income			0.0024*	0.001	0.0024*	0.001	0.0026*	0.001
Mother homeland			-27.96**	9.37	-26.30**	9.41	-30.15**	11.90
Education expenditure			0.007*	0.003	0.007*	0.003	0.007*	0.003
Parents' education goal for students			4.35***	1.24	4.46***	1.25	5.60***	1.28
Level 2 (school level)								
School Effectiveness					49.10***	8.64	48.66***	8.64
Cross Level								
Number of cell phones X school eff.							-5.23*	2.39
Internet homework X school eff.							6.72*	3.09
GPA X school eff.							1.80***	0.29
Private lesson on religion X school eff.							7.86*	3.53

Note. For Level 1 n = 667; for Level 2 n = 211.

*p < 0.05 **p < 0.01 ***p < 0.001.

Appendix B. HLM Results for the Effect of Student- and Parent-Related Predictors and School SES on Scores

Variable	Model 1		Model 2	
	β	SE	β	SE
Level 1 (individual level)				
Intercept	341.91***	8.77	342.99***	10.77
Breakfast frequency	3.02*	1.27	3.03*	1.32
Freq. of sport activities	-4.42*	1.81	-4.35**	1.88
Freq. of student clubs	-6.15**	2.46	-3.03*	1.32
Freq. of scientific projects	7.61*	3.76	7.21*	3.81
Freq. of composition contests	12.40***	3.63	9.39**	3.83
Having a calculator	10.74**	3.37	7.82*	3.63
Number of TVs at home	-4.85*	1.94	-2.90	2.03
Using internet at home to study	-5.64***	1.47	-4.04**	1.53
Using internet at home for fun	-4.18***	1.23	-3.11*	1.26
Time spent in internet café to play games	-4.94**	1.84	-5.67**	1.87
GPA last term	4.23***	0.25	5.12***	0.31
Certificate received last term	19.29***	3.98	9.61**	4.37
Having private lessons	11.06*	5.45	10.44*	5.85
Self-study time for Turkish	1.71*	0.96	0.81	1.93
Self-study time for history	6.72**	2.53	6.90**	2.53
Father education level	3.69*	1.57	2.11*	1.64
Monthly family income	0.0024*	0.001	0.0026*	0.001
Mother homeland	-26.30**	9.41	-30.15**	11.90
Education expenditure	0.007*	0.003	0.007*	0.003
Parents' education goal for students	4.46***	1.25	5.60***	1.28
Level 2 (school level)				
School SES	84.63**	17.53	83.50**	12.54
Cross Level				
Participation in theater club X SES			15.31*	6.99
Having a dictionary X SES			43.66*	18.40
Number of cell phones X SES			-8.20*	3.99
Number of tablets X SES			8.15*	3.62
Internet homework X SES			12.45*	5.67
GPA X SES			3.11***	0.54
Having private lessons X SES			30.71**	11.26
Students' education goal X SES			5.90*	2.68

Note. For Level 1 $n = 667$; for Level 2 $n = 211$.
*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$.

Appendix C. School Effectiveness Scale

Please choose the appropriate option considering the school you are currently working. *1 refers to never; 5 means always.* For each item choose only one option and mark with (X). Do not skip an item without choosing any options.

Statements	1-Never	2-Seldom	3-Sometimes	4-Often	5-Always
Principal and vice principals in this school....	1	2	3	4	5
1. emphasize school goals clearly.					
2. hold meetings to provide knowledge and coordination.					
3. support teachers' professional development.					
4. include teachers in the administrative decision making process.					
5. include teachers in the educational decision making process.					
6. trust teachers.					
7. take comments and complaints into consideration.					
Teachers in this school...	1	2	3	4	5
8. are enthusiastic.					
9. are satisfied with their job.					
10. feel doing their job is more important than the school they work in.					
11. work with other teachers and administrators harmoniously.					
12. have similar goals and beliefs.					
13. make effort for their professional development.					
14. have satisfactory professional competency.					
15. care about students.					
16. are good role models for students.					
Students in this school...	1	2	3	4	5
17. are highly motivated.					
18. feel belonging to the school.					
19. have positive relationships with their peers.					
20. have low rates of disciplinary problems.					
21. have the capacity to finish high school successfully.					
22. have the capacity to be accepted to a university program.					
23. have the capacity to finish a university program.					
24. are aware of the high achievement level expected from them.					
25. are proud of their school.					
Parents in this school ...	1	2	3	4	5
26. participate in the educational activities.					
27. participate in the extracurricular activities.					
28. participate in the counseling activities.					
29. know what the school expects from them.					
30. can talk with teachers about their children without hesitation.					
31. visit the school and teachers frequently.					
In this school	1	2	3	4	5
32. students' academic achievement is frequently discussed in meetings.					
33. lessons start and finish on time.					
34. the building and surroundings are neat and clean.					