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The Variation in Turkish Students' Reading Skills based on PISA 2009: The Effects of Socio-Economic and Classroom-Related Factors

Çiğdem Güzle Kayır[1] and Mehmet Erdoğan[2]

[1]Antalya Provincial National Education, Çalkaya Hacıaliler Secondary School, Antalya, Turkey, [2]Akdeniz University, Faculty of Education, Department of Educational Sciences, Antalya, Turkey

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ABSTRACT

The purpose of this study is to investigate the differences between low- and high- performing schools with regard to socio-economic factors and classroom activities in reading using Turkish PISA 2009 data set. 2302 students (961 females, 1341 males) selected among 2009 PISA administration in Turkey are considered for this study. Binary logistic regression analysis was performed to reveal the effects of socio-economic factors and selected school related factors on students' success in PISA 2009 reading test. Regression analysis indicated that high socio-economic status, disciplined classes, and the use of student-centered instructional strategy and elaboration strategy had positive effects on student's reading skills. On the other hand, student-centered measurement and evaluation strategies, memorization strategy and control strategy had negative effects on students' reading skills.

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Keywords:
Reading skills, socio-economic status, school activities, PISA 2009

Introduction

Human is a social being that has four main language skills; listening, speaking, reading and writing (Çam, 2006). One should listen to understand the others (Doğan,2011), read to learn new things (Çam,2006) , speak to express him/herself verbally and write to express himself in written language (Doğan,2009). Reading is one of these important skills that one should develop in a challenging world to keep up with the rapidly changing society and to be a life-long learner (Altun, Ekiz & Odabaşı, 2011; Aydın, Erdağ & Taş, 2011; Cogmen & Saracaloğlu, 2009). This skill is observed to be essential for the academic achievement students (Holloway, 1999) and necessary for successful participation in many part of the life (Cunningham & Stanovic, 1998). Reading skills are beyond an ability to read only, but at the same time it is a mental activity containing understanding, interpretation, syntheses and evaluation of the words perceived through the senses (Çiftçi, 2007). According to Demirel (2002), the first step of the reading process is to read well enough and the second step is to understand reading. Reading is meaningful when it is considered together with understanding. Reading is nothing, but soundtrack when understanding part is ignored (Yılmaz (2011). Reading skills requires mental processes such as; vision, attention, perception, memory, speech, synthesis, analysis, and interpretation (Coşkun, 2002; Yılmaz, 2011). Demirel (2002) defined reading skill as being able to describe the events and protagonists in a text, telling the time and the place that the incident occurred, estimating the meanings of the unknown word, finding the main idea of the text and expressing the text with one's own words. The reading skills is also perceived as 'capturing personal goals', 'increasing one's knowledge and potential on a particular issue', 'being an individual participant in the society', 'understanding, using and reflecting the written texts' and 'keening interest on the text' (Educational Research and Development Department –[EARGED], 2010).

[2] Corresponding author's address: Akdeniz University, Faculty of Education, Department of Educational Sciences, Antalya, Turkey
Tel: 02423106628
e-mail: mmerdogan@gmail.com
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Reading skill requires understanding and rebuilding. It doesn't matter how much time is allocated for reading, one cannot learn anything unless he/she understands well enough during reading (Egelioğlu, 1993). Some mental activities should be carried out by the reader (Kartal & Özteke, 2010) as Burns and Griffin (1998) listed; 1. grasping the principles of the alphabet, 2. phonetic awareness, 3. fluency in oral reading, 4.vocabulary and 5. reading comprehension (as cited in Coşkun, 2013). Çiftçi (2007) expresses that indicators of understanding are evaluating the text, adopting the information and expressing it in your own words. In parallel to this, Güngör and Açıkgöz (2006) claims that while reading one should understand the thoughts set forth in the text, comprehend the connection between ideas, compare them to their accumulation, put them in an order and choose what they want to keep in their memory. Namely, reading skill requires understanding and rebuilding the information which enables information to be written down in the long term memory (Demirel & Epçaçan, 2012).

Possessing reading skill is an important tool for capturing personal goals and it becomes more and more important day by day (Gürsakal, 2012) to be equiped with 21st century skills. Soon after the discovery of the manuscript, written texts has been started to be used to transfer information and make the reading skills one of the most important sources of learning; therefore, importance of having the reading skills has increased (Balcı, 2009; Topuzkanamış & Maltepe, 2010). However, obtaining knowledge is not the only benefit of reading, but also increases one's interpretive power and ensures in terms of being sociable, keeping up with the society and the world and developing ability to assess, to talk nicely and to learn thinking for individuals (Arıcı, 2008a; Dengiz, 2006).

Factors Associated with Reading Skills

Reading skills and its development were observed to be associated with several factors. Some of these factors are related with personal demographics and attributes, home environments and welfare, and some others are with outsider factors; teaching materials, instructional methods and strategies, and personal help.

Among the others, the association of students' demographic and background factors (e.g. Socio - Economic Status – SES, parental issues, gender, home environment etc.) with reading performance were much more reported in the previous studies. Güvendir (2014) found association of father education level and number of the books with reading performance. SES level (e.g. Geske & Ozola, 2008; Yalçın, Aslan & Usta, 2012) or SES indeces (a combination of parental income, occupation, or educational attainment) (e.g. Kirby, Parilla, & Pfeiffer, 2003; Rajchert, Zultak & Smulczyk, 2014; Park, 2008) was observed to be a factor that contributed to redaing performance in the previous studies. The students with their own rooms and the ones who take private courses were observed to have higher reading skills (Anılan, 2004; Coşkun, 2003). Çalışkan (2000) conducted a research with 3032 fifth graders and found that family education level and SES level contributed to reading skills. The higher the SES level and education level the parent had the higher reading skills their children demonstrated. Parent involvement, support at home and parent-school cooperation was found to make contribution to reading skills (Çelenk, 2003). The other study undertaken using PIRLS data to compare 25 countries in terms of how home literacy environment influence 4th graders' reading performance, Park (2008) found that home literacy activities, parental attitudes toward reading and also number of the books at home significantly associated with reading performance. Gelbal (2008) revealed the more the students had good home environment and welfare the more they had the reading performance.

As for teaching material and reading strategies, underlining, taking notes and following the thoughts were found to contribute to students' reading skills (Doğan, 2002; Yılmaz, 2008). However, very limited studies on this issue were accessed in the available literature that this makes the study significant. On the contrary, many of the studies in Turkish literature are more on reading habits which directly influence the development of reading skills. Gönen, Öncü and Işıtan (2004) examined the 5th to 7th graders' reading habits and reported that the families with high SES become more role models and purchase more books for their children. Şahin (2009) further reported that the higher SES means the more tendency to demonstrate reading habits for 5th to 8th graders. In another study carried out by Can, Türkyılmaz and Karadeniz (2010) with young adolescents, the effects of high family income and having self-room on reading habits are found to have positive but not meaningful association with reading habits.

PISA Assessment

Due to its relation with academic success and other life skills, reading skill and its development has been a focus of most recent studies. Even, international comparative studies over this topic has been undertaken to assess this skill and its associated factors. Countries which are aware of the importance of reading skills carry out many different activities to support and develop the individuals in a national sense, as well as they are able to assess their students in a wider platform through participation in the international assessment programs (Aslanoğlu, 2007). Turkey is one of these countries which participate in the international assessment programs such as Progress in International Reading Literacy Study (PIRLS), Trends International Mathematics and Science Study (TIMMS) and Programme for International Student Assessment (PISA) the results of which guide the Turkish educational policies. PISA is one these international assessment studies to which Turkey has been systematically attend since 2003. PISA, organized by Organisation for Economic Co-operation and Development (OECD), is one of the largest international assessment programs evaluating the quality, equity and efficiency of school systems of countries (OECD, 2010).

Programme for International Student Assessment 2009 offers the most comprehensive and rigorous international measurement for the reading skills of students (OECD, 2010) which is the main emphasis of the present study. PISA 2009 focused on reading to learn rather than learning to read. In other words, PISA aims to investigate whether the students can find the information they need in the written text, interpret it and use it or not, whether they they think about the text in a critical way according to their own experience and understanding or not, whether they read different texts written for different content and different purposes or not. For these aimes, students are shown different kinds of written texts, ranging from prose to lists, graphs and diagrams. They are set a series of tasks, requiring them to retrieve specific information, to interpret the text and reflect on and evaluate what they read. These texts are set in a variety of reading situations, including reading for personal use, occupational purposes, education and public use. And the range of difficulty of tasks allows for the description of seven levels of reading proficiency: Level 1b is the lowest described level, then Level 1a, Level 2, Level 3 and so on up to Level 6. Level 1b requires making simple connections between adjacent pieces of information; level 1a requires considering relevant factors in the task and in the text; level 2 it requires making a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes; level 3 requires connections, comparisons, explanations, evaluating a feature of the text and demonstrating a fine understanding of the text in relation to familiar, everyday knowledge; level 4 requires demonstrating an accurate understanding of long or complex texts whose content or form may be unfamiliar; level 5 requires locating and organizing several pieces of deeply embedded information, inferring which information in the text is relevant and finally level 6 requires demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text (OECD,2010).

In PISA 2009 for reading skills, Turkey is the thirty-ninth in sixty-five countries country with a mean score of 464 (EARGED, 2010). When comparing this result with PISA 2003 and PISA 2006, a rising graph of success is seen but this result is not well enough at the international level (Özenç & Arslanhan, 2010). In order to increase the success of a country or an individual in the field of reading skills, firstly the factors contributing to the reading skills should be examined in order to portray the wider perspective.

Rationale

Turkish Education system has recently undergone most significant reform attempts in all level of education since 2004. Compared to previous ones, new curricula put much more emphasize on developing skills in various areas, especially math, science and reading. One of the key areas emphasized in these reform studies is to find ways to develop students' reading skills. The survey of the literature about reading skills and literacy showed that reading skills are associated with and affected by several factors such as socio-economic factors (e.g. Geske & Ozola, 2008), classroom-related factors (e.g. Doğan, 2002), out-of-school factors (e.g. Waldfogel, 2012), affective factors (e.g. Epçaçan, 2012) and some others. Reading skill is the basis of all courses particularly in primary education so success in reading skill is necessary for one to be successful in Math, Science, etc. (Aslanoğlu, 2007). Therefore, this study trying to define the predictors of success factors of reading skills is significant in terms of leading one to improve his/her reading skill. It is also believed that the results of the present study will shed light on the curriculum development in the

systematic and never ending dynamic process of Turkey. Since curriculum development process is never ending, and also policy makers and curriculum developers in the field of education consider the research findings in this field, selecting classroom-related factors was prefered as well as students' demographic variables to investigate the effects of these variables on reading skills. In this sense, the results of this study will guide curriculum developers to find out what kind of reading texts should be included and which teaching strategies should be adopted to strengthen reading skills of students. It is believed that primarily studying on these factors but then other factors could help the curriculum developers revise the curriculum they are working on and shed light on their studies on curriculum renewal. In addition, the results of this study will also guide all educators, especially language teachers, to determine which strategies should be followed to improve reading skills of students, how the reading habit is acquired more effectively and how to organize the teaching environment. In addition to the findings, another factor that makes this study significant is its own data set. Available literature indicates only a few studies on reading skills and most of these existing studies focused more on reading habits (e.g. Can et al., 2010; Gönen et al., 2004; Şahin, 2009) rather than reading skills.

Purpose of Study

The general aim of the study is to differentiate the high and low performing schools with regard to socio-economic factors and school activities based on 2009 PISA average reading skills score. Following sub-research questions shaped and guided overall study.

Are there any significant differences between high and low performing schools in PISA 2009 reading test with regard to socio-economic factors, e.g. the level of welfare (How many rooms bath or shower, How many cars, How many televisions) technological equipment at home (Possessions computer, Possessions internet, Possessions software, How many computers), study place (Possessions study place, Possessions desk, Possessions dictionary, Possessions own room) and number of the books at home?
Are there any significant differences between high and low performing schools in PISA 2009 reading test with regard to variation in school activities; e.g. teaching strategy, measurement-evaluation strategy, classroom environment, reading strategy and teacher-student interaction?

Method

A casual-comparative research design, one of the correlational model, was used to investigate the differences between low and high performing schools on socio-economic factors and school activities in reading skills based on PISA 2009 Turkish data set. This research design compares at least groups of variables to reveal the factors influencing the outcome (Büyüköztürk, Çakmak, Akgün, Karadeniz & Demirel, 2010), and also identify "*possible causes of observed variations in the behavior pattern*" (p.11) of the participants (Fraenkel & Wallen, 2000).

Sample

The target population of PISA 2009 was 15-year-old students in various schools. In administration of PISA 2009 in Turkey, 4996 students were selected through using stratified random sampling procedure from 170 schools in 56 provinces. While %2 of selected schools were private, % 98 of it were public. Low and high performing schools in PISA reading test were selected in several steps for the present study resulted in a total number of 2302 students (961 females, 1341 males). First, total reading score of each school was calculated using PISA data set. There is more than one reading skill score in the data set. Average reading skills score was calculated by considering all these scores in the data set. Second, the schools participating in PISA 2009 with lover than 30 students were excluded from the sample since some multivariate comparisons require at least 30 students in each group (Field, 2009). Third, the school scores were listed from high to low. Then, %27 of the high scored schools and %27 of the low scored school were taken from the list and put into the new data set only including high and low scoring schools. The rest were considered as middle performing schools and not used for the study. While 35 high scores of schools are classified as high-performing schools in reading test the remaining 35 schools with low student scores in reading test are classified as low-performing schools within selected 70 schools.

Instrument

Programme for International Student Assessment 2009 instrument includes several parts. In the present study, only reading skill test and some parts of student questionnaire are considered for addressing to the research questions. The reason of selecting some items from the instrument is to assess the research questions. The dependent variable of the study is "reading scores of the selected school" while the independent variables are socio-economic status (the level of welfare, technological equipment at home, working place and number of the books at home) and classroom-related factors (teaching strategy, measurement-evaluation strategy, classroom environment, reading strategy and teacher-student interaction).

Reading skill test aims to find out whether 15-year-old students can find the information they need in the written texts, or they can interpret and use the information etc. There are more than 130 written texts and each of these texts is placed in different booklets. On the other hand, student questionnaire includes a total number of 42 items with regard to students' demographics (such as; age, sex, grade…), parental educational level, attitudes towards reading and classroom activities. For the present study, three items (Q20, Q21 and Q22) including twenty sub-items are found to be related to the socio-economic status of the students and four items (Q27, Q34, Q36, Q37 and Q38) including thirty-nine sub-items were found to be related to the school activities; e.g. teaching strategy, measurement-evaluation strategy, classroom environment, reading strategies and interaction between the teacher and students.

Table 1. Factor structures and loadings of selected items related to socio-economic status

	Components			
Items	F1	F2	F3	F4
Possessions computer	.941			
Possessions internet	.906			
How many computers	.784			
Possessions software	.700			
Possessions poetry		.756		
Possessions literature		.657		
How many books		.598		
Possessions art		.542		
Possessions technical reference books		.504		
Possessions textbooks		.450		
Possessions study place			.703	
Possessions desk			.629	
Possessions own room			.563	
Possessions dictionary			.534	
How many rooms bath or shower				.728
How many cars				.612
How many televisions				.588

Socio economic status (SES) level of students. The selected twenty sub-items are subjected to exploratory factor analysis (EFA) using the technique of principal component analysis (PCA) in order to examine the factor structure behind the socio-economic status. Initial solution of EFA showed four dimensions having Eigen values higher than 1. A scree plot also shows that four factors are in sharp descent which resulted in four dimensions. Three of the items did not load any factors. Thus, EFA was run again with 17 items for four factors using Oblimin Direct rotation method, which assumes the correlation among the factors, in order to observe item factor loadings and the items corresponding to these factors. The Kaiser-Meyer-Olkin (KMO) was .904 which verified the sampling adequacy for the analysis (Field, 2009). Bartlett's Test of Sphericity was significant, χ^2 (190) = 12764,236, $p < 0.01$. EFA derived four independent factors explaining 49.5 % of total variance. Three of the original 20 items were not considered for further analysis

and excluded from the data set due to the fact that their factor loadings were lower than 0.40 (Abell, Springer & Kamata, 2009). Table 1 presents factor loadings and factor structures based on EFA. These factors were named according to the common characteristics of the items loaded on the same factors, and also based on PISA 2009 report (OECD, 2010); the first factor was named as 'Technological Equipment' (technology that students have at their own home) , the second factor as 'Variety of Books' (the variety of the books – literature, textbook, poetry—that students have at their own home), the third factor as 'Study place' (a study environment that students have at their own home) and the fourth factor as 'Wealth' (the number of bathroom, cars and TV that students have at their own home).

Factor names, Eigen value scores and number of the items of each factor are given in Table 2 below. Eigen value of F1 was 5.60, of F2 was 1.63, of F3 was 1.16 and of F4 was 1.14.

Table 2. Factor names, Eigen values and number of items

Factor No	Factor Name	Abbreviation	Eigen Value	# of Items
F1	Technological Equipment	SES_TE	5.60	4
F2	Variety of Books	SES_VB	1.63	6
F3	Study place	SES_SP	1.16	4
F4	Wealth	SES_W	1.14	3

School activities. The items in relation to school activities are diverse. Thus, selected 39 items are subjected to EFA using PCA to examine the dimensionalities behind these activity-related items. Initial solution of EFA showed seven dimensions, each of which having Eigen values higher than 1. A Scree plot also showed that seven factors were in sharp descent, which resulted in seven dimensions. EFA was run again for seven factors using Oblimin Direct rotation method in order to observe item factor loadings and the items corresponding to these factors. The Kaiser-Meyer-Olkin (KMO) was .93 which verified the sampling adequacy for the analysis (Field, 2009). Bartlett's Test of Sphericity was significant, χ^2 (703) = 27883.941, $p < 0.01$. EFA derived seven independent factors explaining 52.84 % of total variance. Table 3 presents factor loadings and factor structures based on EFA.

Almost all of the items loaded on the seperate factors at the accaptable factor loading score, >.40 (Tabachnick & Fidell, 2001). However, the item named "Q27- Read text repeatedly" loaded on two factors at the same time. Even though factor loading scores of this item on two factors were close to one anaother, it was considered to be under factor 4 due to the fact that this item was theoretically associated with this factor. These factors are later named according to the common characteristics of the items loaded on the same factors, and also based on PISA 2009 report (OECD, 2010); the first factor was named as "Measurement and Evaluation Strategies", the second factor as "Understanding Strategies", the third factor as "Teacher-Student Interaction", the fourth factor as "Memorization Strategy", the fifth factor as "Disciplinary Climate", the sixth factor as "Teaching Strategies" and the seventh factor as "Control Strategies". All items scattered on seven factors were originally designed on a four point Likert type scale. Factor names, Eigen values, number of the items, total range scores and Cronbach's alpha (α) values of each factor are given in Table 4.

Table 3. Factor structures and loadings of selected items related to school activities

	Components						
Item Codes - Names	F1	F2	F3	F4	F5	F6	F7
Q38– Immediate feedback	.759						
Q38- Ask if understood	.709						
Q38 – Explain judgments	.707						
Q38– Student questions	.688						
Q38 – Discuss work	.681						
Q38– Check concentrating	.635						
Q38- Mark work	.630						
Q38- Motivating questions	.563						
Q38 –Explain expectations	.544						
Q27- Check if understood		.703					
Q27- Important points		.627					
Q27-Additional information		.583					
Q27- Figure out		.568					
Q27-Relate new information		.541					
Q27-Haven't understood		.517					
Q34- Really listen			-.842				
Q34- Interested in well-being			-.807				
Q34- Get along well			-.789				
Q34- Extra help			-.784				
Q34- Treat me fairly			-.783				
Q27- Memorize everything				.785			
Q27- Memorize details				.744			
Q27- Read many times				.720			
Q27- Read text repeatedly		.401		.468			
Q36- Noise and disorder					.824		
Q36- Long time to start					.814		
Q36- Wait for quiet					.806		
Q36- Cannot work well					.761		
Q36 – Students don't listen					.709		
Q37– Explain text						.797	
Q37- Better understanding						.793	
Q37– Express opinion						.689	
Q37– Recommend books						.567	
Q37– Time to think						.550	
Q37– Relate to lives						.517	
Q37- Build on knowledge						.423	
Q27- Useful outside school							-.710
Q27- Relate to experience							-.691
Q27- Real life							-.673

Table 4. Factor names, Eigen values, number of items, range and Cronbach's Alpha

Factor No	Factor Name	Abbrev.	Eigen Value	# of Items	Range	α
F1	Measurement & Evaluation Strategies	MAS	8.69	9	9-36	.86
F2	Understanding Strategies	US	3.02	6	6-24	.75
F3	Teacher-Student Interaction	TSI	2.87	5	5-20	.86
F4	Memorization Strategy	MS	2.28	4	4-16	.67
F5	Disciplinary Climate	DC	1.78	5	5-20	.84
F6	Teaching Strategies	TS	1.32	7	7-28	.84
F7	Control Strategies	CS	1.19	3	3-12	.65

As presented in Table 4 above, Eigen values of the factors are ranging from 8.69 to 1.19. Number of the items in each factor is various. Cronbach's alpha reliability coefficients of the factors are between .65 and .86.

Data Analysis

Data analysis was undertaken in two basic stages. At the first stage, data set including students' responses from 70 selected schools was subjected to descriptive statistics for data screening. Data was analyzed across possible missing cases and outliers. Missing values in each variable were found to be less than % 5 in each continuous variable which enables to consider the replaced with mean procedure (Çokluk, Şekercioğlu & Büyüköztürk, 2009). Then, the continuous variables were transformed into z scores to examine the outlier cases which may influence the normal distribution of the variables. Standardized z scores up to ±4 (Hair, Black, Rabin, Anderson & Tahtam, 2006) were not considered as potential outliers. For examing the differences between the low performing and high performing schools, binary logistic regression analysis was preferred because of the dependent variable with two categories. Having conducted the preliminary analyses, assumptions (e.g. sample size, singularity and multicollinearity) of binary logistic regression and thus binary logistic regression was carried out over the cleaned data.

Findings

Data screening process resulted in missing values in some variables with less than % 5. Replaced with mean procedures was undertaken for these variables. Analysis of standardized z scores indicated 26 cases with higher and/or lower than ±4. These cases were observed in the variable of "Study Place". Thus, these cases were excluded from the data set the sample size of which came down to 2276. In order to test the Multicollinearity and Singularity assumptions, multiple correlation analysis was run among the independent variables. The values of the correlation among the variables were ranged from .68 to -.27. This result proved that no multicollinearity was observed according to the .80 criteria and no singularity was observed according to 1 criterion (Tabacknic & Fidel, 2002). After satisfying the assumptions, descriptive statistics for the independents variables and later binary logistic regression was undertaken to differentiate the low and high performing schools. Mean scores and standard deviations of the total scores of each factor are summarized in Table 5.

Table5. Mean scores of high- and low-performing schools on factors of in-school activities

Factors	High-performing schools		Low-performing schools		Range
	$\overline{X}$	SD	$\overline{X}$	SD	
M&E Strategies	24.47	5.38	24.57	5.17	9-36
Understanding Strategies	18.27	3.09	17.09	3.42	6-24
Teacher-Student Interaction	15.14	3.07	15.24	2.97	5-20
Memorization Strategy	8.93	2.30	10.02	2.43	4-16
Disciplinary Climate	15.27	2.85	14.25	3.27	5-20
Teaching Strategies	20.04	4.32	15.24	3.02	7-28
Control Strategies	7.60	2.08	7.52	1.94	3-12

The table above presents students' rates on school activities in high and low performing schools. School related activities (seven factors in the present study) varied from high performing to low performing schools. Having presented the descriptive statistics (e.g. means and Sd), binary logistic regression was run to examine whether these factors along with the socio economic factors differentiate both of the groups. 70 schools were firstly divided into two groups; low-performing schools and high performing schools in terms of total scores of reading skills. This classification was used to determine the dependent variable in Binary Logistic Regression. Table 6 shows the classification of 70 schools.

Table 6. Classification of 70 schools according to reading skills (n=2276)

	School		Student	
	f	%	*f*	%
Low-performing	35	50	1086	47.71
High-performing	35	50	1190	52.29

Omnibus test of model coefficients which represents the change in the amount of information explained by the model was significant [χ^2 (11) = 957.63, p<.001]. This result indicated that a list of independent variables associated with SES and school activities were predictors which significantly differentiate the low and high performing schools in reading skills. Hosmer & Lemeshow test results were insignificant, [χ (8) = 7.38, p = .496] which refers that observed data were not significantly different from the predicted values from the model (Field, 2009). Being insignificant of this result means that model has an acceptable harmony. Classification table indicated that 76.4% of the cases in low and high performed groups were classified correctly using series of SES factors and classroom-related activities. Cox & Snell R^2 value indicating how much variances can be accounted by the lists of variables given in the model was .343. This result was proved that predictor variables explain the 34.3% of the variance of predicted variable, reading skills.

Wald statistics of the factors in the equation were significant which means that each factor contributed to the discrimination of low and high performed groups significantly (p< .01). Table 7 presents the test statistics of the factors entered in the equation.

Table7. Factors in the equation

Factors (Abbreviation)	β	S.E.	Wald	df	Sig.	Exp(β)
Teacher-student interaction (TSI)	-.056	.020	8.024	1	.005	.945
Measurement & Evaluation Strategies (MAS)	-.051	.014	13.069	1	.000	.950
Memorizing Strategy (MS)	-.238	.024	95.716	1	.000	.788
Understanding Strategy (US)	.176	.020	74.189	1	.000	1.193
Control Strategy (CS)	-.100	.030	10.941	1	.001	.904
Teaching Strategies (TS)	.071	.017	16.724	1	.000	1.074
Disciplinary Climate (DC)	.106	.018	34.696	1	.000	1.112
Technological Equipment (TE_SES)	.385	.059	43.038	1	.000	1.470
Variety of Books (VB_SES)	.766	.063	149.051	1	.000	2.152
Study place (SP_SES)	.498	.067	55.792	1	.000	1.646
Wealth (W_SES)	.423	.060	50.230	1	.000	1.526
Constant	-.914	.441	4.289	1	.038	.401

The equation of the model based on the table above is;

Predicted logit of (Reading Skills) = -0.914 - 0.056(TSI) – 0.051*(MAS) – 0.238*(MS) + 0.176*(US) – 0.1*(CS) + 0.106*(DC) + 0.385*(TE_SES) + 0.766*(VB_SES) + 0.498*(SP_SES) + 0.423*(W_SES)*

Based on the equation and their contribution to the discrimination of low and high performing schools, following table (Table 8) was created.

Table 8. Characteristics of high-performing and low-performing schools

	High-Performing Schools	Low-Performing Schools
Factors	1. Technological Equipment (SES)	1.Teacher-student interaction
	2.Variety of Books (SES)	2.Measurement&Evaluation Strategies
	3.Wealth (SES)	3. Memorizing Strategy
	4.Understanding Strategy	4. Control Strategy
	5.Teaching Strategies	
	6.Disciplinary Climate	
	7.Study place (SES)	

As presented in the table above, students of high performing schools have more technological equipment, variety of books and study place than the students of low performing schools, financial situation of their families is higher. Teachers of high performing schools preferred to use understanding strategy and student-centered teaching strategies in order to develop reading skills. But, the teachers of these schools created more disciplinary classroom environment. On the other hand, interactions among the teachers and the students were more enhanced in low performing schools, and teachers of low performing schools used student-centered measurement & evaluation strategies more frequently and students of low performing schools used memorization and control strategies.

Odds ratio [(1- Exp(β))*100] could be used to interpret the coefficients of significant variables in logistic regression (Çokluk et al., 2010). Teacher-student interaction, which means a good interaction between the teacher and the students, occurred more commonly in low performing schools and one-unit increase in the odds ratio of teacher-student interaction causes a decrease in the possibility of being successful in reading skills in the rate of 5.5% [(1-.945)*100]. Measurement and evaluation strategies, which means using student-centered evaluation in class, were used more commonly in low performing schools and one-unit increase in the odds ratio of measurement and evaluation strategies caused a decrease in the possibility of being successful in reading skills in the rate of 5% [(1-.950)*100]. Memorization strategy were used more commonly during reading in low performing schools and one-unit increase in the odds ratio of memorization strategy causes a decrease in the possibility of being successful in reading skills in the rate of 21.2% [(1-.788)*100]. Understanding strategy during reading occurred more commonly in high performing schools and one-unit increase in the odds ratio of understanding strategy causes an increase in the possibility of being successful in reading skills in the rate of 19.3% [(1-1.193)*100]. Control strategy variable during reading occurred more commonly in low performing schools and one-unit increase in the odds ratio of control strategy caused a decrease in the possibility of being successful in reading skills in the rate of 9.6% [(1-.904)*100]. Teaching strategies variable, which means using student-centered strategies in the class, occurred more commonly in high performing schools and one-unit increase in the odds ratio of teaching strategies caused an increase in the possibility of being successful in reading skills in the rate of 7.4% [(1-1.074)*100]. Disciplinary climate variable, which means quiet and teacher-dominant classes, occurred more commonly in high performing schools and one-unit increase in the odds ratio of disciplinary climate caused an increase in the possibility of being successful in reading skills in the rate of 11.2% [(1-1.112)*100]. Technological Equipment variable, which means having technological equipment at home, occurred more commonly in high performing schools and one-unit increase in the odds ratio of technological equipment caused an increase in the possibility of being successful in reading skills in the rate of 47% [(1-1.470)*100]. Variety of books variable, which means having variable kinds of books at home, occurred more commonly in high performing schools and one-unit increase in the odds ratio of variety of books caused an increase in the possibility of being successful in reading skills in the rate of 115.2% [(1-2.152)*100]. Study place variable,

which means having study place, occurred more commonly in high performing schools and one-unit increase in the odds ratio of study place caused an increase in the possibility of being successful in reading skills in the rate of 64.6% [(1-1.646)*100].Wealth variable, which means having a wealthy family, occurred more commonly in high performing schools and one-unit increase in the odds ratio of wealth caused an increase in the possibility of being successful in reading skills in the rate of 52.6 %[(1-1.526)*100].

Discussion

Low and high performing schools in reading skills based on PISA 2009 data were discriminated with regard to socio economic factors and school activities using binary logistic regression analysis in the present study. The binary model with several factors associated with socio-economic variables and classroom-related variables (activities) were found to be significant referring that proposed model was an effective model discriminating the low and high performing schools. Among others, socio-economic factors including the dimensions of technological equipment, variety of books, study place and wealth significantly contributed to the model. The impact of socio economic factors on students' reading skills was also observed in the results of previous studies (Akyüz & Pala, 2010; Anılan, 2004; Aslanoğlu, 2007; Aydın et. al., 2011; Babic & Baucal, 2011; Bradshaw, Ager, Burge & Wheater., 2010; Çalışkan, 2000; Coşkun, 2003; National Foundation for Educational Research, 2003; Rowe, 1995).

As found in the present study, the students having their own study place demonstrated higher reading skills than those who did not. This is in line with the results of the studies of Anılan (2004) and Coşkun (2003) who reported that students who had their own room and desk were more successful than the others. As asserted by Coşkun (2003) this result means that students not having study place may not find any chance to read in a room where all family members sitting, chatting and/or watching television together; on the other hand students having their own room could easily find a silent place to read and this makes their motivation increase. Additionally, students' not having a their own room and also desk causes him/her to find a place such as bed, armchair etc. Reading in a bed or on an armchair in the position of lying down may effect the student's desire and achievement of reading because this position makes one sleepy.

Students with technological equipment (e.g. computers, software program and internet access) at their home reported to have more success in reading than those having not such equipment. This result is parallel with the findings of some previous research studies. Acar (2015), Fuchs and Woessman (2005) reported significant and posisitve correlation between reading performance and ICT use. On the other hand, this result is in contradiction with the result of Gürsakal's study which shows that students having technological equipment are unsuccessful in reading, mathematics and science. Gürsakal (2012) explains this result as; students having technological equipment spend their time playing computer games and/or surfing on the net. However, Gürsakal handles technology according to the frequency of student's use of technology but study technology is only a subtitle used to determine the socio-economic status. Moreover, the target audience of the study is 15-year-old students having enough capacity to plan their study and manage their free time effectively. So, technological equipment doesn't affect the success of the successful students negatively.

The reading skills of the students having different kind of books such as; literature, poetry, course book, dictionary, technical reference books etc. and large number of books at home were observed to be much more higher than the ones having limited or no books. This is parallel with the results of Kutlu, Yıldırım and Bilican (2010) and National Foundation for Educational Research (2003) which reported that students having large number of books at home were more successful than the others.

As reported in previous studies (Anılan,1998; Anılan, 2004; Arıcı, 2008b; Coşkun, 2003; National Foundation for Educational Research, 2003; Çalışkan, 2000; Rowe, 1995), the students with high(er) level of family income tended to show high(er) reading skills. National Foundation for Educational Research (2003) explains this result as; students having a high family income can easily find and access the books outside of school.

In addition to the socio economic factors, seven other factors associated with variation in class activities significantly differentiated low and high performing schools in reading skills. Students in the disciplined classes demonstrated higher reading skills than the ones in more flexible classes. Similar result is also

observed in the report of OECD (2010) on reading skills. This result means that disciplined classroom should not be considered as an environment where the teacher is active and the student is passive, but it is the most suitable environment for the learning which is provided by teacher. The students in flexible environment may feel themselves totally free and deal with more off-task behaviors so that they could not engage in reading activities.

The other result found in the present study is that there is a better interaction among the teacher and the students in low performing schools than high performing ones. At this point, rather than interpreting as good interaction among the teacher and the students, this result reduces the students' reading skills; so it should be seen that high performing schools could be generally the High School of Science (Baysal & Erkan, 2012) in which different teachers give different kind of subjects; a student meets approximately fifteen teacher and also a teacher meets approximately two hundred students in a week. This situation is clearly presented in PISA 2009 national report of Turkey (EARGED, 2010). Thus, interaction between the teacher and students reduces necessarily in these schools, because teacher may not have opportunity to recognize their students well enough and devote time to each one (Yaman, 2006).

Student-centered measurement and evaluation strategy was found to be more commonly used in low performing schools. But when the descriptive data is analyzed, it is shown that student-centered measurement and evaluation strategies were used widely neither in low performing schools nor in the high performing schools. This situation could be primarily due to the shortness of time, class size (crowded classroom) and lack of teachers' knowledge about types of strategies. As Turkish curricula are very intense, the allotted time may not be enough to use such strategies all the time because student-centered measurement and assessment tools require a lot of time (Yaman, 2009). So, teachers undesire using these strategies. Any other reason of this situation is lack of teacher's knowledge on student-centered measurement and evaluation strategies (Coşkun, Gelen & Kan, 2009). Most of the teachers are unfamiliar with how to use the tools of these strategies and assess their results so they can't use due mainly to the fact that these strategies are new to them (Baykan, Ercan & Erdoğan, 2011).

The students using memorization strategy during the reading sessions demonstrated lower reading skills. The strategy of memorization is an ineffective way of learning and students using this strategy are able to answer only low level of questions because this type of learning will be meaningless and not improve their procedural knowledge so students can't interpret the text (Anagnostopoulou, Hatzinikita & Christidou, 2010). As students rely on memorizing strategies, they try to keep in memory with very little reprocessing (EAGED, 2010). To support this idea, Turan and Demirel (2010) express that memorizing is a way of superficial learning and students using this way can't internalize the learning. While using memorizing strategy, one has difficulty in associating the information with his/her real life and that unassociated information is noted on the short term memory, making the information short-lived (Beydoğan, 2010).

Using Understanding Strategy increased the achievement of reading. This is parallel with the results of Şengül (2011) which reported that using understanding strategy increases the achievement of reading As pointed out by Taşdemir (2010), understanding strategy is one of the pivotal qualifications that affect the academic achievement. While using this strategy, one should associate the information with his/her life and rebuilt it; which helps one to process the information to long term memory (Beydoğan, 2010).

Control strategy is generally used by the low-performing schools but the results of descriptive analysis show the opposite. This conflict between the results of descriptive analysis and Binary Logistic Regression proved that 'Control Strategy' variable possibly interacts with another variable(s) and /or was possibly affected by other variable(s) during the logistic regression. Meanwhile Coşkun (2013) reported that there are not any activities that encourage students to associate the different texts with each other using control strategies in any grade of Turkish curriculum. Therefore, Turkish students can be said not to use the control strategies while reading and this reduces their performance in reading.

Implications for Education

Large-scale dataset used in this study provides a window to understand the relation among the selected variables with the reading skills of 15-year-old Turkish students. In light of the results obtained from this study, it can be suggested that; curriculum developers should organize trainings on student-

centered teaching strategies and student-centered measurement and evaluation strategies to increase the effectiveness of these strategies and also activities should be included in the curriculum which help students learn understanding and control strategies and also use them effectively. Recent curriculum and development studies since 2004 have put much more emphasis on constructivism and student-centered learning environment in the classrooms (Coşkun & Alkan, 2010). However, present study indicated that students could not develop reading skills when student-centered measurement and evaluation strategies were implemented and the classroom environment was created based on student-teacher communication. This could mainly be because of lack of teachers' competencies on these strategies and teachers' ineffective creation of such environment. This could only be overcome by developing teachers' competencies regarding student-centered implementations through in-service training on these strategies. In many of the previous studies with teachers in various grades, these suggestions were already observed in the content analysis of studies on teachers views on new measurement and evaluation techniques (Baykan et. al. 2011) reporting that teachers viewed themselves not adequate to implement such techniques because of their lack of limited information on them.

However, an effective curriculum is inadequate to be successful; it should be supported by the schools and well integrated into the classroom. Above all; schools should provide every kind of books in the library, in this way students having difficulty in finding various kinds of books at home can read them by borrowing from the library. In addition to this, computers, the Internet access and educational software should be widespread within the schools which will help the students to obtain information affectively at school.And also schools should arrange quiet places where students study and/or read so students who don't have his/her own room and/or desk can read in these places. In this way; disadvantages arising from the socio-economic level being unchangeable can be minimized by schools.

Finally, teachers should use student-centered teaching strategies and student-centered measurement and evaluation strategies in addition to providing a disciplined classroom environment. They should encourage students to use reading strategies, especially understanding and control strategies.

Suggestions for Further Research

There were some limitations in the study due to the research design and purpose of the study. These could only be dealt with in further researches. This study only revealed the association among the selected factors and reading skills, but not focused upon the reasons behind these associations. Qualitative investigations seeking for the reasons and address the why question could be planned in further studies. Furthermore, the association of other factors such as out-of school factors, other socio-economic factors and school related factors assessed in the PISA study, on reading skills could be direction of further studies on reading skills. Family and their tendencies to reading, as a factor contributing to the reading skills, could be scrutinized in further studies. Başaran and Ateş (2009) reported positive influence of families' tendencies to tell story on their children's' attitudes toward reading skills.

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