



## Türk Öğrencilerinin PISA 2003-2006-2009 Dönemlerindeki Okuma Becerilerini Yordayan Sosyoekonomik ve Kültürel Değişkenlerin Araştırılması\*

H. Deniz GÜLLEROĞLU\*\* Safiye BİLİCAN DEMİR\*\*\*

Nükhet DEMİRTAŞLI\*\*\*\*

**ÖZ.** Okuma okuryazarlığı becerileri eğitim ortamlarında ve günlük yaşantıda sıklıkla kullanılan becerilerden biridir. Ailenin ekonomik, kültürel ve sosyal yapısı çocuğun akademik başarısını (öğrenme kapasitesini) etkiler. Bu araştırmanın amacı, 2003-2006 ve 2009 PISA uygulamaları için öğrencilerin okuma becerilerini en iyi yordayan sosyoekonomik ve kültürel düzey değişkenlerini belirlemektir. Bu amaçla Türk öğrencilere ait PISA verilerine (2003-2006- 2009 uygulamaları) OECD'nin web sitesinden ulaşılmıştır. Yordayıcı değişkenler (anne ve babanın eğitim durumu, ailenin sosyo-ekonomik düzeyi, kültürel olanaklar ve evdeki eğitim kaynakları) indeks değerleri ile analize dahil edilmiştir. Verilerin analizinde adımsal çoklu regresyon analizi tekniği kullanılmıştır. Araştırmanın bulguları her üç PISA uygulaması için en iyi yordayıcı değişkenlerin sırasıyla evdeki eğitim kaynakları, anne ve babanın eğitim durumu ve kültürel olanaklar olduğunu göstermiştir. Araştırmanın bulguları ilgili literatürle desteklenerek tartışılmıştır.

**Anahtar sözcükler:** PISA okuma okur-yazarlığı, evdeki eğitim kaynakları, anne ve babanın eğitim durumu

\* Bu çalışma, 11<sup>th</sup> European Conference on Psychological Assessment (31 Ağustos- 3 Eylül 2011), Riga, Latvia'da sözlü bildiri olarak sunulmuştur.

\*\* Yrd. Doç. Dr., Ankara Üniversitesi, Eğitim Bilimleri Fakültesi, Ankara, Türkiye.

E-mail: denizgulleroglu@yahoo.com

\*\*\* Yrd. Doç. Dr., Kocaeli Üniversitesi Eğitim Fakültesi, Kocaeli, Türkiye. E-mail: safiye.demir@kocaeli.edu.tr

\*\*\*\* Prof. Dr., Ankara Üniversitesi Eğitim Bilimleri Fakültesi, Ankara, Türkiye. E-mail: mukhet@yahoo.com

## ÖZET

**Amaç ve Önem:** Okuma becerileri günlük yaşamda ve eğitim ortamlarında kritik öneme sahip bir beceridir. Uluslararası Öğrenci Başarılarını Belirleme Projesi (PISA)'de “okuma becerileri okuryazarlığı” ile okumanın etkin bir biçimde bir amaca veya göreve yönelik olarak gerçekleştirilmesi” ifade edilmektedir. PISA projesi OECD üyesi ülkelerdeki 15 yaş grubu öğrencilerin günümüz bilgi çağında karşılaşabilecekleri problemlerle ne ölçüde baş edebileceklerini belirlemek amacıyla okuma becerileri, fen okuryazarlığı ve matematik okuryazarlığı alanlarında uygulanmaktadır. PISA’da sadece bu alanlardaki yeterlikler değil, bununla ilişkisi olabilecek öğrencinin ev ve aile yaşantısına ilişkin sosyal, kültürel ve ekonomik göstergeleri ortaya koyan yoklamalar da yapılmaktadır. PISA sınavı uygulamaya katılan her ülke gibi Türkiye için de oldukça anlamlıdır, çünkü sonuçlar, öğrenci performansının yanında, öğrencinin okuma becerileri üzerinde etkili olan aile ve ev yaşamına ilişkin de bilgi vermektedir. PISA sonuçları ülkelerin eğitim sistemlerinin önemli bir göstergesidir. PISA uygulaması Türkiye’deki eğitim politikaları ve öğretim programlarının gözden geçirilip, yenilenmesine olanak sağlayan önemli bilgiler sunmuştur. Bu çalışmanın amacı, 2003-2006 ve 2009 PISA uygulamalarında okuma okuryazarlığı becerilerini yordayan sosyoekonomik ve kültürel değişkenleri belirlemek ve bu dönemlere ait yordayıcıların tutarlı olup olmadığını araştırmaktır.

**Yöntem:** Bu çalışmada, Türkiye’nin 2003-2006 ve 2009 PISA uygulamaları okuma becerileri verileri kullanılmıştır. Veriler, OECD’nin resmi web sitesinden alınmıştır. Araştırmada, Türkiye’deki 15 yaş grubu öğrencilerin 2003-2006 ve 2009 PISA okuma becerilerini yordayan değişkenlerin belirlenmesi amaçlandığından, araştırma ilişkisel bir araştırmadır. Araştırmanın evrenini her üç döneme katılan 15 yaş grubu Türk öğrenciler oluşturmaktadır. Araştırmanın örneklemini ise, 2003-2006 ve 2009 PISA uygulamalarının gerçekleştirildiği bölgelere ve okul türlerine göre tabakalandırılarak rastgele seçilen 15 yaş grubu öğrenciler oluşturmaktadır. PISA uygulamaları okuma becerileri testlerini içerir. Okuma becerileri testleri öğrencilerin okuduğu bir metni anlama, yorumlama ve anladığını yeni bir durumda uygulayabilme becerilerini ölçmeyi amaçlar. Verilerin çözümlenmesinde adimsal çoklu regresyon analizi tekniği kullanılmıştır. Araştırmada, öğrencilere ilişkin okuma becerileri puanı regresyon analizine ölçüt değişken olarak dahil edilmiştir. Anne ve babanın eğitim durumu, sosyal ve kültürel olanaklar ve evdeki eğitim kaynakları gibi yordayıcı değişkenler ise indeks değerleri ile analize dahil edilmişlerdir.

**Bulgular:** Verilerin çözümlenmesi sonucunda, her üç dönem için de öğrencilerin okuma becerilerini yordayan değişkenlerin sırasıyla evdeki eğitim kaynakları, anne ve babanın eğitim durumu ve kültürel olanaklar olduğu bulgusuna ulaşılmıştır. PISA 2003 uygulaması için en iyi yordayıcılar sırasıyla evdeki eğitim kaynakları ( $\beta= 0.26$ ;  $p< 0.001$ ), anne ve babanın eğitim durumu ( $\beta= 0.21$ ;  $p< 0.001$ ) ve kültürel olanaklardır ( $\beta= 0.21$ ;  $p< 0.001$ ). Bu değişkenler hep birlikte PISA 2003 uygulaması okuma becerilerindeki varyansın %20'sini açıklamaktadır. PISA 2006 uygulaması için en iyi yordayıcılar evdeki eğitim kaynakları ( $\beta=0.16$ ;  $p< 0.001$ ), anne ve babanın eğitim durumu ( $\beta= 0.21$ ;  $p< 0.001$ ) ve kültürel olanaklardır ( $\beta= 0.15$ ;  $p< 0.001$ ). Bu değişkenler hep birlikte PISA 2006 uygulaması okuma becerilerindeki varyansın %14.4'ünü açıklamaktadır. PISA 2009 uygulaması için ise en iyi yordayıcılar sırasıyla yine evdeki eğitim kaynakları ( $\beta= 0.22$ ;  $p< 0.001$ ), anne ve babanın eğitim durumu ( $\beta= 0.20$ ;  $p< 0.001$ ) ve kültürel olanaklardır ( $\beta= 0.113$ ;  $p< 0.001$ ). Bu değişkenler hep birlikte PISA 2009 uygulaması okuma becerilerindeki varyansın % 21.6'sını açıklamaktadır.

**Tartışma ve Sonuç:** Araştırmanın bulguları her üç PISA dönemi için de öğrencilerin okuma becerilerini yordayan değişkenlerin tutarlı bir şekilde sırasıyla evdeki eğitim kaynakları, anne ve babanın eğitim durumu ve kültürel olanaklar olduğunu göstermektedir. Bu bulgular, birçok araştırmanın bulgusu ile paralellik göstermektedir. Evdeki eğitim kaynakları her üç dönem için de okuma becerilerini yordayan en iyi değişkendir. Bu bulgu, Türk öğrencilerin evdeki eğitimsel kaynakları ne kadar zengin ve çeşitli olursa (kendine ait bir çalışma masası, bilgisayar, internet bağlantısı, kitaplar vb.) okuma becerilerinin de o kadar iyi olduğu anlamına gelmektedir. Bu bulgu, yurtiçi ve yurtdışında yapılan birçok araştırmanın bulguları ile tutarlılık göstermektedir. 2003-2006 ve 2009 PISA dönemleri için yordayıcı değişkenlerden bir diğeri de anne ve babanın eğitim durumudur. Anne ve babanın eğitim düzeyleri arttıkça öğrencilerin okuma becerileri puanları da artmaktadır. Araştırmalar ailenin sosyoekonomik düzeyi ile öğrenci başarısı arasında yüksek düzeyde bir ilişkinin olduğunu desteklemektedir. Eğitim düzeyi yüksek olan anne ve babalar çocuklarının performansını olumlu yönde etkileyecek biçimde, evlerinde zengin okuma kaynakları ve ortamları oluşturma çabası içindedirler, aynı zamanda çocuklarından beklentileri de daha yüksektir. Kültürel olanaklar da 2003-2006 ve 2009 PISA uygulamalarında Türk öğrenciler için diğer bir yordayıcı değişkendir. Bu bulgu, Türk öğrencilerin evdeki kültürel olanakları zengin olduğu takdirde (klasik edebi eserlere, şiir kitaplarına ve sanatsal çalışmalara sahip olma gibi) okuma becerilerinin de yüksek olduğu anlamına gelmektedir. Birçok araştırma bulgusu da göstermektedir ki, kültürel olanakları zengin bir ev ortamında yaşayan bireylerin okuma-yazma bilgi ve becerileri daha iyidir.





## The Prediction of Turkish Students' Reading Literacy Skills by SES Related Variables for PISA 2003-2006-2009\*

H. Deniz GÜLLEROĞLU\*\* Safiye BİLİCAN DEMİR\*\*\*  
Nükhet DEMİRTAŞLI\*\*\*\*

**ABSTRACT.** Reading literacy is a crucial skill in educational settings and daily life. The economic, cultural and social status of the family does influence the children's learning in various ways. Literature shows a particular strong relationship between family background and reading performance. The purpose of this study is to determine the best predictors of reading literacy by the variables of parental education, family wealth possessions, cultural possessions, home educational resources for PISA 2003, 2006, 2009. For this purpose, Turkey's PISA data (2003, 2006, and 2009) on Reading Literacy is retrieved from OECD's official website. In these data, the predictive variables (parental education, family wealth possessions, cultural possessions, home educational resources) are indicated as index values. The stepwise procedure of multiple regression analysis was carried out to the data. According to the results of the analyses, the best predictors for each term are respectively, home educational resources, parental education and cultural possessions. The findings are discussed with the related literature.

**Key words:** PISA reading literacy, home educational resources, parental education

---

\* This research was presented as a paper at the 11th European Conference on Psychological Assessment (31 August- 3 September 2011) in Riga, Latvia.

\*\* Assist. Prof. Dr., Ankara University, Faculty of Educational Sciences, Ankara, Turkey.  
E-mail: denizgulleroglu@yahoo.com

\*\*\* Assist. Prof. Dr., Kocaeli University, Faculty of Education, Kocaeli, Turkey.  
E-mail: safiye.demir@kocaeli.edu.tr

\*\*\*\* Prof. Dr., Ankara University, Faculty of Educational Sciences, Ankara, Turkey.  
E-mail: nmukhet@yahoo.com

## INTRODUCTION

Understanding and reflecting on all kinds of information is essential if individuals are to be able to participate fully in knowledge-based society. In a rapidly changing world, the quantity and type of written materials are increasing and more and more people use these materials for getting information. For example, in law, commerce, science and daily communication, written documents and written procedures are used and one has to be able to understand these written materials in order to function in these domains. In this respect, reading has a vital role in acquiring knowledge directly and in interpreting it. The European Commission (2001) defines the foundational nature of reading literacy skills as “key to all areas of education and beyond, facilitating participation in the wider context of lifelong learning and contributing to individuals’ social integration and personal development”.

Reading literacy is an important component in the concept of human capital, which is linked to both the social and economic life of individuals and nation (OECD, 2001). Economists have for many years developed models showing generally that a country’s education levels are a predictor of its economic growth potential. In a recent study, several Canadian economists examined relationships between literacy levels and economic performance over a long period. They found that the average literacy level of a nation’s population is a better predictor of economic growth than educational achievement (Coulombe, Tremblay, & Marchand, 2004). In respect to educational achievement, reading literacy is a foundation for achievement in other subject areas within the educational system (Cunningham & Stanovich, 1998; Smith, Mikulecky, Kibby, & Dreher, 2000).

The multiple factors play a role in the development of reading, and in predicting whether a child will be a successful reader or will instead have difficulty in acquiring this skill that is so crucial for academic and life achievement (McCardle, Scarborough, & Catts, 2001). Reading opens the doors for learning mathematics, science, social studies, literature, language arts, and all other subjects. Children who are capable readers succeed in these subjects, read for pleasure and personal growth, and develop self-confidence in their abilities that proper them through school (Ngwudike & Searcy, 2004). However, the child who has difficulties in reading tends to also have risks of truancy and dropping out of school (National Science Foundation [NSF], 1999). Researches show that children who cannot read well are more likely to drop out of school and become destined to low-paying jobs throughout their lives (United States Department of Education, 2000).

In this rapidly growing competitive global economy, countries participate in a number of international assessments that measure reading achievement of their students against international benchmarks. Some of these international assessments are organized by the Organization for Economic Cooperation and Development (OECD). It has been stated that especially OECD indicator studies provide extensive information about the state and ranking of its education system compared with those of other members, have become ever more powerful in creating competition between OECD member countries, thus influencing domestic education policies (Henry 2001; Rinne, Kallo, & Hokka 2004; Rubenson 2008).

One of the studies organized by OECD is the Program for International Student Assessment [PISA]. The primary aim of the PISA was to compare 15-year old students at a given level of schooling in key subjects, such as Mathematics, Reading and Science across countries. PISA is unique in that it differs from other international assessments. While other international assessments focus on curriculum frameworks, PISA emphasizes the application of knowledge to real life situations. PISA, which began in 2000, operates on a 3-year cycle. Each assessment cycle focuses on one of the three types of literacy in particular: science, mathematics and reading. Turkey has been participating PISA studies since 2003. According to PISA results, the average proficiency of Turkish 15-year old students at each domain has been ranked below the OECD mean. In terms of general reading literacy achievement mean, Turkey was in the 32<sup>nd</sup> row among the 40 countries in PISA 2003, in the 37<sup>th</sup> row among the 56 countries in 2006 and in the 41<sup>st</sup> among the 65 countries in 2009.

The findings from PISA provide a valuable indicator of a country's educational system; they also provide information about other factors that are related to performance. PISA results are significant for Turkey, because it gives educational researchers and policy makers comprehensive data not only on student achievement, but also on family background and home environment factors that can determine reading academic success. The results of PISA 2003 have presented important information to guide the revision of the educational policies and teaching programs in Turkey. In this context, primary school programs have been renewed with a learner-centred perspective and put into practice in the first section of the primary education since 2004.

The major focus domain of PISA 2009 was reading literacy. In PISA 2009, reading literacy was defined as an individual's capability to understand, use and reflect on written texts in order to achieve one's goal, to develop one's knowledge and potential, and to participate effectively in one's society (OECD, 2009). In PISA, reading literacy assessment includes different types of questions. Some questions require students to select or produce simple responses, such as multiple-choice or closed-constructed

response items. In PISA 2009, student reading assessment results are interpreted within six different proficiency levels which are defined as international levels. In each of the proficiency level, the skills that the students could perform are defined. Increasing proficiency levels (from level 1 to level 6) imply the ability to perform tasks of increasing complexity.

PISA also serves a larger purpose for interpreting test results and assessing educational policies through its collection of background information. For this purpose, PISA gives surveys to collect data on the student, student's family and institutional factors that can help to explain differences in reading literacy performance. One of survey is the student questionnaire on which students provide information about themselves. The questionnaire attempts to collect extensive background data on students regarding socio-economic measures such as parents' occupations and education, home resources, immigration status, and reading engagement outside of school.

In current study, the best predictors of reading literacy skills were examined across PISA 2003, 2006 and 2009 data in terms of students' socio economic and cultural status (parental education, parental education, family wealth possessions, cultural possessions, home educational resources). Related literature shows a particular strong relationship between family background and reading performance, based on the assumption that reading activities are more likely to take place at home an early age (De Jong & Leseman, 2001; Hawes & Plourde, 2005).

In general, educational outcomes have been shown to be influenced by family background in many different and complex ways (Saha, 1997). Parents' educational background, occupation, and related economic status also have a bearing on the family's resources beyond school in support of their children's learning, in terms of, for example, books, computers, magazines, hobbies, language courses or private tuition. Hence the economic, cultural and social capital of the family does influence the children's learning in various ways, either promoting or hindering it (Bourdieu, 1986; Steensel, 2006).

In this context, knowing which factors are related to the students' reading literacy performance can provide important opportunities to guide educational policies. We need to understand how student background variables relate to and interact with each other in the development of reading skills. As it is known, PISA results give education researchers and policymakers comprehensive data on student reading literacy achievement and on family background and home factors that determine reading successful students. The results of the data analysis that follow will bring to focus the impact family background and their learning environment at home on the achievement of 15-year old students.



## METHOD

### Sample and Data

Turkey, as an OECD country, has been participating to PISA study since 2003. For this study, PISA Reading Literacy data of Turkey used which are obtain from its 2003, 2006, 2009 applications. Based on the concept of “life-long learning,” the PISA tests assess students’ ability to use their knowledge and skills in real-life situations rather than how well they had mastered a specific school curriculum. In this study, the data of PISA (2003, 2006, and 2009) reading literacy were retrieved from OECD’s official web site ([www.oecd.org](http://www.oecd.org)). The population of study was 15-year old students. In each country, like Turkey a two-stage stratified sampling method was used. In the first stage, schools were sampled by probability proportional to size. In the second stage, 35 students were selected a list of 15-year-old students in each sampled school. Turkey’s data were constituted from PISA 2003, 2006, and 2009 and it is presented in Table 1.

**Table 1.** *The number of students according to PISA periods and gender groups*

15 year old participants	2003	PISA periods 2006	2009
Girls (n) %	2090 (57%)	2290(46.3%)	2445 (48.9%)
Boys (n) %	2765 (43%)	2652(53.7%)	2552(51.1%)
Total	4855	4942	4997

As it can be seen from Table 1, there were total of 4855 Turkish students who had participated in PISA 2003. Among 4855 participants, 2090 (57%) of them were girls and 2765 (43%) of them were boys. 4942 students participated in PISA 2006. Among them, 2290 (46.3%) were girls while 2652 (53.7%) were boys. Finally, a total of 4997 students took part in PISA 2009 of which 2445 (48.9%) were girls and 2552 (51%) were boys.

### Measures

In this study, reading literacy score was entered as a criterion variable in regression analyses for each PISA term.

**Reading Literacy Skills Test.** PISA assessments contain reading literacy tests. Reading literacy measures how well 15-year-old students are

able to apply different reading processes to a wide range of reading materials, such as the kinds of forms they receive from their governments, the kinds of articles they read in their local newspapers, the kinds of manuals they read for work or school, or the kinds of books or magazines they read for entertainment. In PISA, reading literacy is assessed in relation to the text format, reading processes and situations (OECD, 2009). In terms of text format, continuous and non-continuous texts are used. Continuous texts are organized in sentences and paragraphs and non-continuous texts present information in lists, forms, graphs, or diagrams. Reading processes refer skills that student use while reading. Reading literacy is assessed not only students' basic reading skills but also their proficiency in accessing and retrieving information, interpreting text, reflecting on its contents and reflecting on its form and features. Reading literacy tests have several purposes, for example, a text may be written for people's personal use; public use; occupational use or educational use.

PISA provides an overall reading literacy scale for reading texts, drawing on all the questions in the reading assessment, as well as scales for three aspects (1) reading-access and retrieve, (2) integrate and interpret, (3) reflect and evaluate and two text formats (1) continuous text and (2) non-continuous text. The metric for the overall reading scale is based on a mean for OECD countries set at 500 with a standard deviation of 100. In this study, reading literacy was considered as a criterion variable.

In the PISA application, students answer a subgroup of the questions determined before. The performance of student was not accepted as a point in the distribution of students' success, but besides the answers of each student, students' readiness, the answers of the students having the similar readiness and answer pattern were taken into account. As a result, for each student, theoretical success distribution was generated and the five plausible values selected randomly from the distribution were advised to be used in statistical operations. For this research purpose, a median value of five plausible reading literacy scores was calculated. Thus one reading literacy score was produced for each PISA study term that is one reading literacy score was entered as a criterion variable in each regression analysis for each PISA term.

In order to determine the best predictors of reading literacy skills across PISA 2003, 2006 and 2009 data, student questionnaire indices were entered as predictor variables in each regression analysis. Detailed information about these was given below.

**Student questionnaire indices.** The PISA context questionnaires included numerous items on student characteristics. Some of the items were designed to be used in analyses as single items in the analysis. However, most questionnaire items were designed to be combined in order to measure latent constructs that cannot be observed directly. For these items, different indices were computed by transformations or scaling procedures.

In PISA surveys, there are two different kinds of indices: simple indices and scale indices. In current study, educational level of parents was used as a simple indice. These indices were constructed through the arithmetical transformations or recording of one or more items. Parental education index is defined by the International Standard Classification of Education (ISCED) in PISA. The index scores for highest educational level of parents were also recoded into estimated years of schooling (PARED). The PARED is constructed by recoding educational qualifications into the following categories: (0) None; (1) ISCED1 (primary education); (2) ISCED2 (lower secondary); (3) ISCED Level 3B or 3C (vocational/pre-vocational upper secondary); (4) ISCED 3A level 4= secondary school and up, and/or ISCED 4 (non-tertiary post-secondary); (5)ISCED level 5B ( vocational tertiary); and (6) ISCED 5A, 6 (theoretically oriented and post graduate) (OECD, 2009).

In this study, household possessions were used as questionnaire scale indices. In PISA surveys, students reported the availability of 13 different household items at home. Table 2 shows the wording of items and their allocation to the three indices.

**Table 2.** *Items are used to measure household possessions and home background*

ITEMS	WEALTH	CULTPOS	HEDRES
In your home, do you have;			
A desk to study at			x
A room of your own	x		
A quiet place to study			x
A computer you can use for school work			x
Educational software			x
A link to internet	x		
Your own calculator			x
Classic literature		x	

Books of poetry		x	
Works of art		x	
Books to help with your school work			
A dictionary			x
A dishwasher			x
How many of these are there at your home?			
Cellular phone	x		
Televisions	x		
Computers	x		
Cars	x		

Four different indices were derived from these items: (1) family wealth possessions (WEALTH), (2) cultural possessions (CULTPOS), (3) home educational resources (HEDRES) and (4) home possessions (HOMEPOS). Due to the variable of Home possessions (HOMEPOS) consist of WEALTH, CULTPOS and HEDRES and it has high correlations with another predictor variables (multicollinearity), it was not inserted as a predictor variable to the data. Since WEALTH was not computed as an indice in PISA 2003, it was not inserted as a predictor variable for PISA 2003 term. These indices were inserted as a predictor variable to PISA 2006 and 2009 data.

The above mentioned variables are given as indices in the original data. In this study WEALTH, CULTPOS, HEDRES and PARED indices were used as continuous predictors in regression analyses. The descriptive statistics of the predictor variables in the study are presented in Table 3.

**Table 3.** *Descriptive statistics for CULTPOS, HEDRES, HOMEPOS, PARED and WEALTH*

Variables	PISA periods											
	2003				2006				2009			
	M	SD	Min	Max	M	SD	Min	Max	M	SD	Min	Max
CULTPOS	-.00	.93	-1.27	1.34	-.00	.94	-1.55	1.27	.51	.68	-1.11	1.82
HEDRES	-.37	1.20	-4.29	.67	-.65	1.30	-4.33	1.38	.48	1.27	-3.36	2.13
HOMEPOS	-.50	.93	-3.35	2.04	-1.05	1.15	-5.87	2.85	-.73	1.38	-6.50	4.83
PARED	8.98	.93	0	16	8.64	3.54	3	15	8.76	3.62	3	16
WEALTH	-	-	-	-	-1.49	1.00	-3.86	2.29	-1.01	1.24	-7.10	3.56

**Data Analyses**

The data were analyzed with the stepwise procedure of multiple regression analysis. Stepwise procedure of multiple regression analysis was applied to PISA 2003, 2006 and 2009 data in order to determine the best predictors of reading literacy score for each term. In this study, PARED, WEALTH, CULTPOS, and HEDRES were considered as predictors and reading literacy was considered as criterion variable in analysis for each PISA term.

First of all, basic assumptions of multiple regression (normality, linearity, homoscedasticity, multicollinearity) were checked for each data set. Normality was checked through histograms of the standardized residuals. The residual plots and scatter plots were used for checking linear or nonlinear relationship. Scatterplots showed linear relationships with standardized residuals by predicted values. Homoscedasticity was checked by visual examination of a plot of the standardized residuals by the regression standardized predicted value. To detect multicollinearity, correlations between all pairs of predictors and measures of the eigenvalues of the data matrix including variance inflation factors (VIF) were computed. The bivariate correlations between predictor variables in the study are presented in Table 4.

**Table 4.** *Bivariate correlations between predictor variables*

Variables	PISA periods											
	2003				2006				2009			
CULT POS	1											
HED RES	.45	1										
PARED	.31	.38	1									
WEALTH	--			1								
CULTPOS					1							
HEDRES					.33	1						
PAR ED					.26	.39	1					
WEALTH					.31	.67	.44	1				
CULTPOS									1			
HEDRES									.44	1		
PAR ED									.29	.40	1	
WEALTH									.40	.69	.46	1

According to the results of bivariate correlations at Table 4, moderate positive correlations were found between predictor variables. The variance inflation factors for each predictor variable were shown in Table 5.

**Table 5.** *Variance inflation factors (VIF) for each predictor*

PISA periods			
Variables	2003	2006	2009
CULTPOS	1.29	1.16	1.28
HEDRES	1.32	1.90	2.04
PARED	1.17	1.29	1.31
WEALTH	-	1.97	2.08

If  $VIF_j \geq 10$ , then there is a problem with multicollinearity (Keith, 2006). According to Table 5, VIF changed between 1.16 and 2.08, so it can be concluded that there is no multicollinearity problem.

After each data set met basic assumptions of regression analyses, the main analyses were carried out by SPSS 13.0.

## FINDINGS

The results of stepwise regression analysis for the best predictors of reading literacy in PISA 2003 were presented in Table 6.

**Table 6.** *The Results of stepwise regression analysis for the best predictors of reading literacy in PISA 2003*

Predictor Variable	B	SE B	$\beta$
Constant	431.125	2.872	
CULTPOSS	8.868	1.327	0.098*
PARED	4.276	0.281	0.212*
HEDRES	19.018	1.049	0.268*
$R^2$		0.201	
F		405.839*	

\* $p < 0.001$

According to the results of stepwise multiple regression analysis at Table 6, the multiple correlation coefficient -which shows the relationship between dependent variable reading skills and independent variables- is  $R = 0.449$ . All predictors together are accounted for 20.1% of the variance ( $F_{(3,4829)} = 405.839$ ;  $p < 0.001$ ). As it can be seen from Table 6, home

educational resources (HEDRES) is the best predictor for reading literacy scores of PISA 2003 participants ( $\beta= 0.268$ ;  $p< 0.001$ ) which means that home educational resources has an important role on students' reading literacy scores. The second predictor is parental education ( $\beta= 0.212$ ;  $p< 0.001$ ) and the third predictor is CULTPOS ( $\beta= 0.098$ ;  $p< 0.001$ ). The findings of this study showed that, the independent variables which predict the dependent variable reading literacy- are all together accounted for 20.1 % of the variance. This amount is a relatively moderate amount which means there are another variable that will predict reading literacy score.

Results for PISA 2006 data were shown in Table 7. In this term, the variable WEALTH was inserted as a predictor variable to data.

**Table 7.** *The Results of stepwise regression analysis for the best predictors of reading literacy in PISA 2006*

Predictor Variable	B	SE B	$\beta$
Constant	423.347	4.307	
PARED	3.879	0.354	0.165*
HEDRES	14.440	1.262	0.227*
CULTPOS	13.354	1.162	0.151*
WEALTH	-3.797	1.542	-0.046**
R <sup>2</sup>		0.144	
F		205.977*	

\* $p < 0.001$ , \*\* $p < 0.05$

According to the results of stepwise multiple regression analysis at Table 7, the multiple correlation coefficient which shows the relationship between dependent variable reading literacy and independent variables is  $R= 0.380$ . All the variables together are accounted for 14.4% of the variance in reading literacy score ( $F_{(3, 4888)} = 205.977$ ;  $p < 0.001$ ). As can be seen in Table 7, the best predictor of the reading literacy score for PISA 2006 is HEDRES ( $\beta= 0.227$ ;  $p < 0.001$ ) which means that having educational resources at home (a desk to study, a quiet place to study, a computer for school work, educational software, calculator, dictionary, books to help with school work) has an important impact on development of students' reading literacy skills. The second predictor is parental education ( $\beta= 0.165$ ;  $p < 0.001$ ) which gives information about the fathers' and mothers' educational levels of the participants. The third predictor is cultural possessions (classic literature, books of poetry, and works of art at home) ( $\beta= 0.151$ ;  $p < 0.001$ )

and the fourth predictor is WEALTH ( $\beta = -0.046$ ;  $p < 0.05$ ). The findings of this study showed that, the independent variables which predict the reading literacy score are all together accounted for 14.4 % of the variance. Although 14.4 % of variance might seem small to predict reading literacy, the studies as in the present study in which educational and personal variables are not controlled, this amount of predictability is considered as significant.

Results for PISA 2009 data were presented in Table 8.

**Table 8.** *The Results of stepwise regression analysis for the best predictors of reading literacy in PISA 2009*

Predictor Variable	B	SE B	$\beta$
Constant	418.867	3.480	
PARED	4.420	0.310	0.207*
HEDRES	13.502	1.112	0.221*
CULTPOS	10.632	1.151	0.133*
WEALTH	2.388	1.152	0.038**
R <sup>2</sup>		0.213	
F		329.450*	

\* $p < 0.001$ , \*\* $p < 0.05$

According to the results of stepwise multiple regression analysis at Table 8, the multiple correlation coefficient which shows the relationship between dependent variable reading literacy and independent variables- is  $R = 0.462$ . All the variables together are accounted for 21.3 % of the variance ( $F_{(4, 4857)} = 329.450$ ;  $p < 0.001$ ). As can be seen in Table 8, HEDRES is the best predictor ( $\beta = 0.221$ ;  $p < 0.001$ ) for reading literacy scores of PISA 2009 participants which means that having educational resources at home (a desk to study, a quiet place to study, a computer for school work, educational software, calculator, dictionary, books to help with school work) has an important impact on development of students' reading literacy skills. The second predictor of reading literacy is PARED ( $\beta = 0.207$ ;  $p < 0.001$ ) which means that the educational level of the parents' has a significant effect on development of students' reading literacy skills. The third predictor is CULTPOS ( $\beta = 0.133$ ;  $p < 0.001$ ) and the fourth predictor is WEALTH ( $\beta = 0.038$ ;  $p < 0.001$ )



## DISCUSSION

The purpose of this study was to find out the best predictors of reading literacy skills across PISA 2003, 2006 and 2009 data in terms of students' socio economic and cultural status. According to the results of the analyses, the best predictors for each term are respectively, home educational resources, parental education and cultural possessions. In a multitude of previous studies, variables related to the students' socio economic status as well as parents' education, economical and cultural resources at home have been consistently identified as significant in explaining or being associated with reading literacy performance (Ainley, 2003, Diaconu, 2004; Elley, 1994; Fredriksson, 2002; Johansone & Foy 2004; Lehmann, 1996; OECD, 2001, 2002, Schulz, 2005; Woessmann & Fuchs, 2004). For example, data for PISA 2000 shows that SES difference is the strongest single factor associated with performance and accounts for about one-fifth of all variation in student reading literacy scores (OECD 2001).

Home educational resources are the best predictor of reading literacy in PISA 2003, 2006 and 2009. This finding can be summarized by stating that Turkish students perform well in reading when they have rich educational resources at home like having a desk to study, a computer, an internet link, books etc. It can be concluded that learning through activities by using home educational resources can enhance children's reading skills and knowledge. This result is consistent with the findings of other studies (Aikens & Barbarin, 2008; Bradley, Corwyn, Burchinal, Pipes & Garcia, 2001). In PISA 2000, there was a positive relationship between the extent of home educational resources and reading achievement (OECD, 2001; Şengul, 2011). In other words, as home educational resources increases students' reading achievement also increase.

According to the research findings, parental education which gives information about the fathers' and mothers' educational level of the participants predicts the students' reading literacy score in PISA 2003, 2006 and 2009. As the parental educational level increases, students' reading literacy scores also increase in all three PISA terms. A strong relationship has been found between the socio economic status of a student's parents and a student's learning outcomes. Similar findings were determined in quite a few studies about PISA (Lemke, Calsyn, Lippman, Jocelyn, Kastberg, Liu, Roey, Williams, Kruger, & Bairu, 2001; West, Denton, & Reaney 2000; Williams, Levine, Jocelyn, Butler, & Haynes, 2000; Thorpe, 2006). Research has shown that highly educated parents are more likely to provide a rich home literacy environment, as well as having higher expectations for their child's performance, all of which can positively affect students' performance on the assessments (Hernandez 1993 cited in Lemke, Sen, Johnston, Pahlke, Williams, Kastberg, & Jocelyn, 2005). Parents with higher

SES are able to provide their children with the financial support and home resources for individual learning. They also tend to provide a more stimulating home environment in order to promote their cognitive development.

Cultural possessions are another predicting variable of students' reading literacy score in PISA 2003, 2006 and 2009. This finding can be summarized by stating that Turkish students perform well in reading when they have rich cultural possessions at home like classic literature, books of poetry, and works of art. It can be concluded that learning through activities by using cultural possessions at home can enhance children's reading skills and knowledge. In other words, having rich cultural possessions at home supports the learning positively and develop students' higher order thinking skills. This result is consistent with the findings of other studies (Lee, & Burkam, 2002; Nonoyama, 2006).

15 years old children can be considered as young adults; school environment and peer relations are important on their life. However, 15-year old children's parental education level and SES still have significant effect on their reading literacy skills. When we look at the big picture, this situation reminds us again the importance of equality in educational opportunities and average of national schooling year. Turkish Statistical Institute (TSI, 2013) reported that the average schooling of the population in lower secondary education was 93%, in upper secondary education was 70% and in higher education it was reported as 38%. Comparing the average of schooling at ISCED (5-6) between Turkey and European countries, schooling ratio was found to be 21.3 % in EU-27 countries whereas it was 18% in Turkey (EUROSTAT, 2012). Governments always should have responsibility to take necessary measures which provide equality in terms of family income in nationwide. All educational policies and strategies drive by governments should minimize differences between social levels. In this context, the system of education should work in order to give equal educational environment to the students who come from different socioeconomic status and culture. Organizing the educational environment through this purpose would increase the quality and the efficiency of the educational activities.

In order to generalize to similar situations, which were studied and presented in this article is a topic for further work. For example, the relationship between family background, home possessions and reading literacy variables can be tested some detailed analyses like structural equation modeling. Besides, these modeling studies can be examined for different school types and gender groups in Turkish data. Hierarchical models are available to identify the direct and indirect effects of these variables on reading literacy. If these variables are used for next PISA application terms, trend analysis will be able to be studied.

## REFERENCES

- Aikens, N., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology*, 100(2), 235-251.
- Ainley, J. (2003). Early literacy and numeracy achievement influences ENTER scores. *ACER Research Highlights*, 2003, p. 8-9.
- Bourdieu, P. (1986). The Forms of Capital. In J. G. Richardson, & P. Bourdieu (Eds.), *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood Press.
- Bradley, R. H., Corwyn, R. F., Burchinal, M., Pipes McAdoo, H., & Garcia Coll, C. (2001). The home environments of children in the United States. Part II. Relations with behavioral development through age thirteen. *Child Development*, 72(6), 1868-1886.
- Coulombe, S., J.-F. Tremblay, & S. Marchand (2004). *Literacy Scores, Human Capital and Growth Across Fourteen OECD Countries* (Catalogue no. 89-552-MIE, no. 11). Ottawa: Statistics Canada.
- Cunningham, A. E. & Stanovich, K. E. (1998). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, 33, 934-945.
- De Jong, P. F., & Leseman, P. M. (2001). Lasting effects of home literacy on reading achievement in school. *Journal of School Psychology*, 39(5), 389-414.
- Diaconu, D. (2004, May). *The effects of early literacy activities upon reading achievement in grade four in Eastern European countries*. Paper presented at the 1st IEA International Research Conference, Lefkosia, Cyprus.
- Elley, W.B. (1994). *The IEA study of reading literacy: Achievement and instruction in thirty-two school systems*. Oxford, UK: Pergamon Press.
- Eurostat (2012). *School enrolment and early leavers from education and training*. Retrieved August 23, 2013, from [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/School\\_enrolment\\_an\\_early\\_lavers\\_from\\_education\\_and\\_training](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/School_enrolment_an_early_lavers_from_education_and_training)
- European Commission (2001). *European report on the quality of school education: Sixteen quality indicators*. Luxembourg: Office for Official Publications of European Communities.
- Fredriksson, U. (2002). *Reading skills among students of immigrant origin in Stockholm*. Doctoral dissertation, Stockholm University, Institute of International Education.
- Hawes, C. A., & Plourde, L. A. (2005). Parental involvement and its influence on the reading achievement of 6<sup>th</sup> grade students. *Reading Improvement*, 42(1), 47-57.
- Henry, M. (2001). *The OECD, globalisation, and education policy*. 1st ed. Amsterdam/New York: Pergamon.
- Johansone, I. & Foy, P. (2004). PIRLS 2001 results in the context of the European Union expansion. *Proceedings of the IRC*, 3, 36-45.

- Keith, T. (2006). *Multiple regression and beyond*. PEARSON Allyn & Bacon.
- Lee, V. E., & Burkam, D. T. (2002). *Inequality at the Starting Gate: Social Background Differences in Achievement as Children Begin School*. Retrieved from <http://www.epinet.org/content.cfm?id=617#exec> .
- Lehmann (1996). Reading literacy among immigrant students in the United States and the Former West Germany. In Binkley, M., Rust, K., & Williams, T. (Eds.), *Reading literacy in the international perspectives* (pp. 101–114). Washington, DC: National Center for Education Statistics, Department of Statistics.
- Lemke, M., Sen, A., Johnston, J.S., Pahlke, E., Williams, T., Kastberg, D., & Jocelyn, L. (2005). *Characteristics of U.S. 15-Year-Old Low Achievers in an International Context: Findings from PISA 2000 (NCES 2006-010)*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Lemke, M., Calsyn, C., Lippman, L., Jocelyn, L., Kastberg, D., Liu, Y.Y., Roey, S., Williams, T., Kruger, T., & Bairu, G. (2001). *Outcomes of learning: results from the 2000 program for international student assessment of 15-year-olds in reading, mathematics, and science literacy (NCES 2002-115)*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- McCardle, P., Scarborough, H. S., & Catts, H. W. (2001). Predicting, explaining, and preventing children's reading difficulties. *Learning Disabilities Research and Practice. Special Issue: Emergent and early literacy: Current Status and Research Directions*, 16(4), 230–239.
- Nonoyama, Y. (2006). *A Cross-National, Multi-Level Study of Family Background and School Resource Effects on Student Achievement*. Unpublished doctoral thesis. Columbia University, Columbia.
- National Science Foundation. (1999). *Preparing our children Math and science education in the national interest*. Washington, DC: United States Government Printing Office.
- Ngwudike, B.C., & Searcy, R.R. (2004). An overview of the Progress in International Reading Literacy Study (PIRLS) 2001: Achievement of the United States fourth-grade students in international context. *The Mississippi Reading Journal*, 4(1), 12-17.
- OECD (Organisation for Economic Co-operation and Development) (2009). *PISA 2006 technical report*. Paris, France: OECD Publications.
- OECD (Organisation for Economic Co-operation and Development) (2002). *Reading for change. Performance and engagement across countries*. Paris: OECD.
- OECD (Organisation for Economic Co-operation and Development) (2001). *Knowledge and skills for life. First results from PISA 2000*. Paris: OECD.
- Rinne, R., J. Kallio, & S. Hokka (2004). Too eager to comply? OECD education policies and the Finnish response. *European Educational Research Journal* 3, 454–84.

- Rubenson, K. (2008). OECD education policies and world hegemony. In *The OECD and transnational governance*, ed. R. Mahon and S. McBride, 242–59. Vancouver, Canada: UBC Press.
- Saha, L.J. (1997). Aspirations and expectations of students. In L.J. Saha (Ed.), *International Encyclopedia of the Sociology of Education* (pp.512-517). Oxford: Pergamon.
- Schuller, T. 2005. Constructing international policy research: The role of CERI/OECD. *European Educational Research Journal*,4,170-9.
- Smith, M. C., Mikulecky, L., Kibby, M. W. & Dreher, M. J (2000). What will be the demand of literacy in the workplace in the next millennium? *Reading Research Quarterly*, 35(3), 378-383.
- Steenseel, R.V. (2006). Relations between socio-cultural factors, homeliteracy environment and childrens' literacy development in the first years of primary education. *Journal of Research in Reading*, 29 (1), 367-382.
- Şengül, A. (2011). *Türk öğrencilerinin PISA2009 okuma becerilerini açıklayan değişkenlerin chaid analizi ile belirlenmesi*. Yayınlanmamış Yüksek Lisans Tezi, Ankara Üniversitesi Eğitim Bilimleri Enstitüsü.
- Turkish Statistical Institute (TSI). Retrieved August 23,2013 from [www.tuik.gov.tr/PreIstatistikTablo.do?istab\\_id=135](http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=135)
- United States Department of Education. (2000). *Before it's too late: A report to the nation from the National Commission on Mathematics and Science Teaching for the 21st Century*. Washington, DE: United States Government Printing Office.
- West, J., Denton, K., & Reaney, L. (2000). *The Kindergarten Year (NCES 2001-023)*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Williams, T., Levine, D., Jocelyn, L., Butler, P., & Haynes, J. (2000). *Mathematics and Science in the Eighth Grade: Findings from the Third International Mathematics and Science Study (NCES 2000-014)*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Woessmann, L. , & Fuchs, T. (2004). *Computers and student learning: Bivariate and multivariate evidence on the availability and use of computers at home and school*. CESIFO Working paper Series No: 1321

