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The relationship between the students' academics achievement and their socioeconomic level: cross regional comparison

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Abstract

This study aims to investigate the effects of familial variables (education of the parents and family income) on the academic achievement (in mathematics, reading skills and science) of 15-year-old students in Turkey with respect to regional diversity. The study was carried out based on the data obtained from the PISA 2006 research in Turkey. The independent variables of the research are education level of the parents, and average annual income; the dependent variables are the students' proficiency levels in science, mathematics and in reading skills. The general result of the research is that familial variables affect students' academic achievement. Familial variables affect students academic achievement in mathematics most and their reading skills least. As regional developmental level decreases, effects of familial variables on academic achievement decrease as well.

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Keywords: Academic achievement; socio-economic level; familial variables; income; regional differences.

1. Introduction

Learning is the product of family, society and peer interaction as much as formal education (Engin-Demir, 2008). Eweniyi,(2005) states that there are personal and institutional reasons for students' low academic achievement. It is also stated that personal reasons are related to intelligence, knowledge, and abilities of the individual while institutional reasons are related to family and effects of the parents, housing and living conditions. According to Organisation for Economic Co-operation and Development (OECD, 2005), academic achievement depends not only on the factors in school but also on the socio-economic environment where students grow up.

It is also indicated that a child's academic achievement depends on the effects of the social, economic and cultural powers of the environment. However, some research results are contradictory related to effects and

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importance of these powers on academic achievement (Engin-Demir, 2008). Debates on this issue dates back to 1960s. According to the research “Equality of Opportunity in Education” conducted in the USA by Coleman and colleagues; the qualitative and quantitative features of school have no important effects on student achievement. In this research, it is stated that academic achievement of students is shaped by the familial and social factors out of schools (Köse, 2007). Heyneman and Loxley (1989) state there are differences between the effects of family and school on student achievement depending on developmental levels of the countries. As developmental level of the society increases, the effect of the family on student achievement increases and the effect of the school decreases. On the other hand, as developmental level of the society decreases, the effect of the family on student achievement decreases and the effect of the school increases. The result of the study based on PISA 2003 results supports Heyneman and Loxley’s (1989) study (Wößmann, 2004; OECD, 2005). In OECD countries, one out of five of the variables seen among the students can be explained by socioeconomic variables of the students’ environment, but this rate can show great differences among countries. In Germany, socioeconomic status of the students can account for 23% of their academic performances. On the other hand, socioeconomic status of the students can only account for 12% of their academic performances in Japan (Wößmann, 2004; OECD, 2005). Chevalier and Lanot (2002), however, argue that a powerful interaction between family structure and school structure affects students’ academic achievement to a great extent.

According to research findings, disadvantageous situations such as low income and low education level in the family, negative attitudes of the family, and negative relations with the neighbors have a negative effect on students’ academic achievement. It appears that the familial environment where the child grows up has an important effect on academic achievement. Chiu (2007), depending on the findings of 41 countries, investigated how socioeconomic status of family affected the academic achievement of 15-year-old students in science. According to that research, socioeconomic statuses of the family and education resources (cultural structure of the family, educational level of the parents and of the siblings) have important effect on student’s academic achievement in science. According to the results of the Fuchs and Wößmann (2004) study, which makes use of the data of PISA, socioeconomic status of the family is more influential on the reading skills than on mathematics or science.

Rothman (2003) states that the children from low socioeconomic status do not have a study condition at home which would affect their academic achievement at school. However, Davis-Kean (2005) argues that socioeconomic status of the family has an indirect rather than direct effect on academic achievement of the student. Checci (2005) states educational level of parents is also an important factor for academic achievement of the student. Davis-Kean (2005), however, state that average time of study by parents is an influential factor on students’ academic achievement. Chevalier and Lanot (2002) also state that students’ academic achievement and family income are closely related, but the most important factor is the family’s educational level. Blanden and Gregg (2005) argue that family income is influential on children’s educational gains. According to PISA research, economic situation of a student’s family affects his academic achievement. To these results, though this relationship is complex, it has positive effects. It can be said that the students whose family incomes are high are more successful than those whose are low. As a result of the social policies adapted in some OECD countries, financial condition does not bear an obstacle for academic achievement. The students whose family incomes are at the lowest level are seen in the highest level of achievement in Finland and in Japan (PISA, 2003: 143). In their study conducted in England, Blanden and Gregg (2004) come up with some findings which support those of PISA report. Additionally, according to results of cross country comparison study carried out by Chiu (2007), depending on income distribution in the country, there is a strong relationship between family income and academic achievement in science. Chevalier and Lanot (2002) state students’ academic achievement decreases gradually in families whose economic power is low, but this is not a clear finding indicating its effects on the child’s educational output.

Geographical factors also play a role in families’ decisions to allow their children to have education. Generally, in urbanized parts of the countries, it is seen that the children have more chances to have education. Modernization level of a region and regional condition for work opportunities affect families’ decisions to allow their children to have education (Smits, 2007). The research results show that student’s academic achievement can be influenced by the socioeconomic variables where the student grows up. Field studies indicate that the effects of socioeconomic

factors affecting the achievement may change depending on the education level, social policies of the country, developmental situation of the country and on the time (OECD, 2005).

This study aims to investigate the effects of familial variables (education of the parents and family income) on regional ground on the academic achievement (in mathematics, reading skills and science) of 15-year-old students in Turkey.

2. Method

This study was conducted based on the data of PISA 2006 database compiled for Academicians and Researchers as a result of PISA 2006 research in Turkey (MEB, 2008). Marmara, Aegean, Mediterranean, Middle Anatolia, Black Sea, East Anatolia, Southeast Anatolia and İstanbul regions were taken as geographical regions. Distribution of students in compiling data for the research according to regions is shown in Table 1. According to Table 1, data was compiled from 4600 students having education in state schools across Turkey.

Table 1. Average values related to education levels of the parents, mathematics, reading and science achievement averages of 15-year-old students across regions

Regions		Educational level of the mother (ISCED)	Educational level of the father (ISCED)	Household income (national currency)	Mathematic Achievement	Reading Achievement	Science Achievement
Marmara	↓	1351	1351	1350	1351	1351	1351
	↕	1,74	2,40	2,11	421,25	452,97	422,21
Middle Anatolia	↓	785	785	785	785	785	785
	↕	1,81	2,80	2,07	433,09	456,65	430,31
Aegean	↓	596	596	596	596	596	596
	↕	2,12	2,82	2,11	455,94	479,32	448,67
Mediterranean	↓	649	649	649	649	649	649
	↕	2,09	2,82	2,13	456,87	477,56	452,92
Black Sea	↓	574	574	574	574	574	574
	↕	1,64	2,61	1,99	430,37	446,45	434,96
East Anatolia	↓	313	313	313	313	313	313
	↕	1,05	2,18	1,81	376,79	414,77	387,67
South East Anatolia	↓	332	332	332	332	332	332
	↕	1,05	1,94	1,82	389,45	413,48	387,60
Turkey	↓	4600	4600	4599	4600	4600	4600
	↕	1,74	2,56	2,05	428,61	454,22	428,09

The studies investigating the relationship between students' academic achievement level and socioeconomic structure of the family have been conducted in many countries. In these studies, as familial variables, dimensions such as family income, education level of the parents, vocational status of the parents, family type, place of residence, language spoken within the family, ethnic root, previous education, behaviors and abilities gained are taken (Finnie, et al., 2005; OECD, 2005; Köse, 2007; van Ewijk, 2006). In general, while investigating the effect of familial variables on student's academic achievement, in some studies the relationship related to the variables were investigated one by one. On the other hand, in some studies, this was investigated by determining the socioeconomic level of the family. According to Köse (2007), socioeconomic features of the family are characterized by the indicators of education level of the parents, family income, place of residence, the status of father's job, and number of siblings. Hakinen et al.,(2003) defined socioeconomic status level of the family based on the variables such as education level of the parents, their professions and family income.

In our study, education level of the parents, and average annual income were taken as independent variables. As dependent variables, the students’ proficiency levels in science, mathematics and in reading skills were taken.

In order to determine the common and relative effects of independent variables on dependent variables across geographical regions, simple linear regression statistics technique was used. In commenting on the analysis results, significance was rated through $p < .05$ level.

3. Results

The regression analysis results related with effect of familial variables on mathematics achievement of 15-year-old students across geographical regions in Turkey were shown in Table 2. According to Table 2, common relative effect of familial variables on mathematic achievement of 15-year-old students is meaningful in all regions except for East Anatolian region ($p = .420$). When regression coefficients are examined, it can be said that familial variables have the highest effect in Aegean Region ($r^2 = .257$), and the least effect in South East Region ($r^2 = .024$) on mathematic achievement of 15-year-old students. In average, 16.6% of variation in mathematics achievement of 15-year-old students is determined through familial variables in Turkey.

Table 2. The regression analysis results across geographical regions in Turkey related to effect condition of familial variables on mathematic achievement of 15-year-old students

Regions	R	F Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. F Change
					R Square Change	df2		
Marmara	,329	,108	,106	73,80	,108	54,31	1346	,000
Central Anatolia	,501	,251	,248	72,73	,251	87,04	781	,000
Aegean	,507	,257	,254	87,36	,257	68,43	592	,000
Mediterranean	,378	,143	,139	85,31	,143	35,93	645	,000
Black Sea	,377	,142	,137	76,58	,142	31,43	570	,000
East Anatolia	,095	,009	-,001	74,64	,009	,94	309	,420
South East Anatolia	,156	,024	,015	60,95	,024	2,72	328	,044
Turkey	,407	,166	,165	79,24	,166	304,34	4595	,000

Predictors: (Constant), Household income (national currency) Q15, Educational level of father (ISCED), Educational level of mother (ISCED) Dependent Variable: Mathematic Achievement

The regression analysis results related to effect of familial variables on reading achievement levels of 15-year-old students across geographical regions in Turkey were shown in Table 3. According to Table 3, familial variables have meaningful effect on reading achievement of 15-year-old students in other regions except for East Anatolian region ($p = .460$) and South East Anatolian region ($p = .184$).

When regression coefficients are examined, it is seen that familial variables have the highest effect in Mediterranean Region ($r^2 = .138$), and the least effect in Marmara Region ($r^2 = .064$) on reading achievement of 15-year-old students. In average, 10.7% of variation in reading achievement of 15-year-old students is determined through familial variables in Turkey.

Table 3. The regression analysis results across geographical regions in Turkey related to effect condition of familial variables on reading achievement of 15-year-old students

Regions	R	F Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. F Change
					R Square Change	df2		
Marmara	,257	,066	,064	72,632	,066	31,696	346	,000
Central Anatolia	,371	,138	,134	75,650	,138	41,520	781	,000

Aegean	336	,113	,109	76,658	,113	25,171	592	,000
Mediterranean	377	,142	,138	78,245	,142	35,601	545	,000
Mack Sea	350	,123	,118	74,302	,123	26,577	570	,000
East Anatolia	091	,008	-,001	76,473	,008	,863	309	,460
South East Anatolia	121	,015	,006	64,373	,015	1,621	328	,184
Turkey	328	,108	,107	76,201	,108	85,208	595	,000

Predictors: (Constant), Household income (national currency) Q15, Educational level of father (ISCED), Educational level of mother (ISCED) Dependent Variable: Reading Achievement

The regression analysis results related with the effect of familial variables on science achievement levels of 15-year-old students across geographical regions in Turkey were shown in Table 4. According to Table 4, familial variables have meaningful effect on science achievement of 15-year-old students in other regions except for East Anatolian region ($p=,175$) and South East Anatolian region ($p=,116$). When regression coefficients are examined, it can be said that familial variables have the highest effect in Aegean Region ($r^2=,221$), and the least effect in Marmara Region ($r^2=,107$) on science achievement of 15-year-old students. It can be said that in average, 16.10% of variation in science achievement of 15-year-old students is determined through familial variables in Turkey.

Table 4. . The regression analysis results across geographical regions in Turkey related to effect condition of familial variables on science achievement of 15-year-old students

Regions	R	F Square	Adjusted R Square	Standard Error of the Estimate	Change Statistics			Sig. F Change
					R Square Change	Change	df2	
Marmara	,330	,109	,107	67,494	,109	54,974	1346	,000
Middle Anatolia	,459	,211	,208	67,285	,211	69,557	781	,000
Aegean	,474	,225	,221	77,684	,225	57,279	592	,000
Mediterranean	,424	,180	,176	76,985	,180	47,218	645	,000
Mack Sea	,396	,157	,152	69,889	,157	35,330	570	,000
East Anatolia	,126	,016	,006	65,911	,016	1,661	309	,175
South East Anatolia	,134	,018	,009	55,896	,018	1,984	328	,116
Turkey	,403	,162	,161	71,625	,162	296,134	4595	,000

Predictors: (Constant), Household income (national currency) Q15, Educational level of father (ISCED), Educational level of mother (ISCED) Dependent Variable: Science achievement

4. Conclusion

Several of the studies state that many of the variables related with family affect students' academic achievement. In general, the results of our study also support those studies. However, familial variables show differences in their effects on different academic achievement fields. Generally, familial variables have the highest effect on math and the least effect on reading academic achievement of 15-year-old students. These results are in contradiction with Fuches and Wößmann's study (2004). When a cross regional comparison is made, familial variables have the most meaningful effect on mathematics achievement of 15-year-old students living in Aegean region and the least meaningful effect on mathematics achievement of 15-year-old students living in South East Anatolian region. Familial variables do not have a meaningful effect on academic achievement of 15-year-old students in East Anatolian region. As regional developmental level decreases, effects of familial variables on academic achievement decrease, too. In East Anatolian and South Anatolian regions, the education levels and annual average income levels of the families are low, at the same time, mathematics, reading and science achievement levels of 15-year-old students living in those regions are also low (Table 1). The study results of Heyneman and Loxley (1989) overlap with these results. Heyneman and Loxley (1989) state that there are differences among the effects of family and school on student achievement according to developmental levels of the countries.

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