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ANALYSIS OF THE RELATIONSHIP BETWEEN STUDENTS' SUCCESS IN MATHEMATICS AND OVERALL SUCCESS

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ABSTRACT

In recent years, parents in Turkey have mobilized for their children to pass exams and attend the schools they want, which affects children's success and psychology severely. In this context, this study investigates the relationship between second level primary 7th and 8th grade students' math success and overall success in terms of the variables of parents' educational background and gender. The study was conducted with 472 students in Istanbul during the 2010-2011 academic year. The data was collected from the students' 2011 SBS (Elementary Proficiency Exam) results. This research was designed in the relational analysis model. The SPSS16.0 statistical package was used for the statistical analyses of the research data. Independent group t-test and ANOVA were used in the data analysis depending on the variables. The method of the Pearson product-moment correlation coefficient was used in the analysis of the relationship between dependent variables. According to the results of the findings, a significantly positive relationship was observed between students' overall and math success and there were significant relationships between the variables in terms of parents' educational background. A significant difference was observed in favor of female students in terms of gender. Some suggestions were presented moving from the fact that parents' educational background affects students' math success and overall success.

Key Words: Education, Elementary Proficiency Exam, math success, parents' level of education.

INTRODUCTION

The need for education continues to increase and to change in quality throughout history. Today, however, in parallel with scientific and technological developments and with rapid increase in the production and accumulation of information, this need is increasing by accelerating day by day. Although education needs quality in every field as a whole; when the importance of mathematics in scientific and technological

development is considered, it is inevitable that mathematics education has a significant place and weight in all education systems since a qualified education cannot be thought without mathematics.

The teaching of mathematics, which is the strongest means for the order and organization of the developing world, and acquisition of mathematical skills has become more important than before (Betz, 1978). According to the report by United States National Research Council (1989), basic skills of Mathematics and geometry are required for specialization in the seventy five percent of all occupations. Tobias (1978) emphasized the importance of basic high school mathematics knowledge in the examinations done for recruitment in the army, public and private sectors. When the "education level" in Mathematics which has such importance for society and human life is considered for Turkey, this level cannot be said so pleasant. The results of the examinations done nationally and internationally show that students are not successful enough especially in the field of Mathematics (Berberoglu, 2007).

The results of the examinations held nationally and internationally; and research works applied both in internatioanal examinations and assessments such as PISA and TIMSS and in national ones such as SBS and OKS show that Turhish students in primary education are not successful enough especially in the field of Mathematics. On the other hand, the vision of the mathematics teaching program which was newly developed by the Ministry of Education depends on the principle that every child are able to learn Mathematics (Ersoy, 2006'dan akt: Yüksel-Şahin, 2008). However, when 2008 SBS results are examined, it is seen that students answered 41 % of the Mathematics questions. Considering the point needed for passing grade in primary schools is 45, students attending SBS (Turkey in total) failed in Mathematics with 41 points (Erdoğan, 2010).

Examinations have an important place in an individual's teaching process (Semerci, 2007). Today, a person's life is affected by examinations, and lots of decisions are made regarding his/her life according to success in those examinations (Zoller ve Chaim'den akt: İlgar, 2010). Without disregarding the presence of many factors effecting success in examinations, when the studies done in the field are analyzed, education level of students' parents is seen as a crucial factor. When considered within the frame of Bandura's social learning approach, the effect of positive models in a child's academic development will be great. Considering that newspaper, book, and magazine reading habits of parents with a high education level are more advanced; it can be stated that those parents will be a positive model for their child since parents are the most influential role models in raising their children (Yıldız, 2010).

Another factor in succeeding is parents' consistency. The self-confidence of children whose parents display consistent behaviors will be stronger (Poyraz, 2012). It is an expected situation that individuals with high self-confidence are more successful than those with low self-confidence. Stressing the importance of creating achievement motivation to reach success, Ülgen (2007) expressed that family is very influential in creating achievement motivation. Parents who want their children to succeed in a short time assign them responsibility, and from time to time, they have trouble while waiting for their children to carry out that responsibility. At that moment, they take up their children's duty. This prevents the formation of self-motivation in the child which is essential for success (Poyraz, 2012). It is expected that attitudes of parents with higher education level are more positive.

In this context, this study has been planned with the idea of investigating the presence of positive relationship which is thought between overall examination success and mathematics success. In addition to that, it has been analyzed whether overall success and mathematics success differ according to gender and parents' education level. It is thought that findings of the research will illuminate researchers, mathematics educationalists and parents, besides contributing to the literature.

Aim of the Research

The aim of this research is to analyze the relationship between primary school second level students' success in mathematics and overall success. In accordance with this purpose, in the sub-problems of the research, it has been investigated whether students' overall success and their success in mathematics differ according to the variables of gender and parents' education level.

METHOD

The research is in the form of survey (descriptive suvey). Survey model aims to describe a situation which existed in the past or still exists as it is (Karasar, 2005).

Participants

7th grade primary school students who are having education in the Anatolian side of the Province of Istanbul form the population of this research. And 7th grade students who were chosen by random method from randomly chosen three counties in the Anatolian side of Istanbul form the sample of the research.

Data Collection Tools

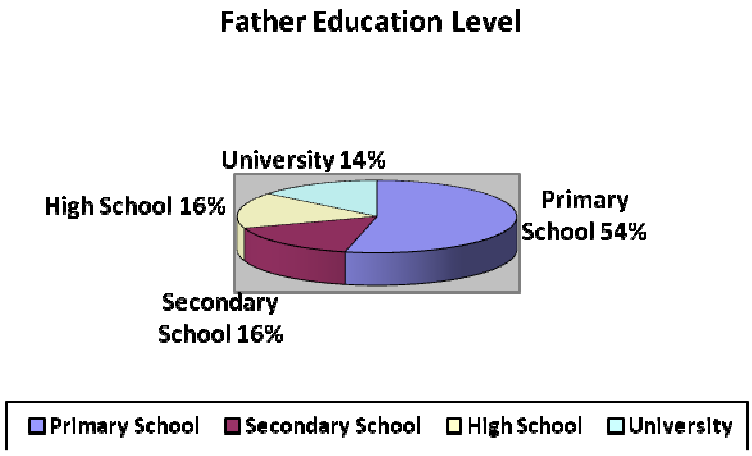
In the research, in order to obtain demographic information (mother education level-father education level), Personal Information Questionnaire which was developed by the researcher was used. For overall success, students' total exam points in the Placement Test which was done in the year of 2011 were used. As a criterion for success in mathematics, students' net scores in the same exam were used.

Data Analysis

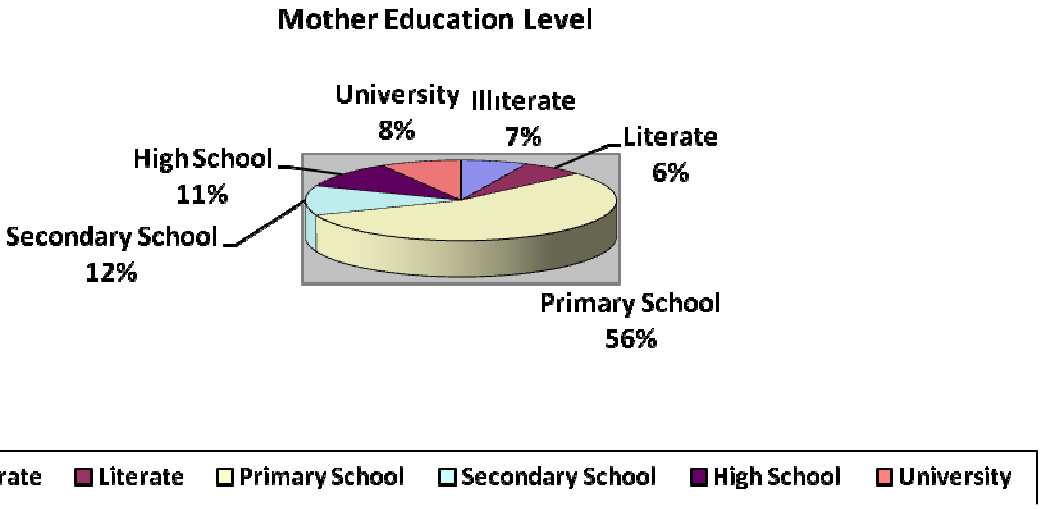
In accordance with the general purpose of the study, necessary statistical analysis of data collected regarding to the problems to be answered was carried out by using SPSS 16.0 packet program. In the analysis of the data, independent group t test, Kruskal Wallis-H test and Anova were used depending on the variables. And the analysis of the relationship between dependent variables was calculated by applying Pearson Product Moment Correlation Coefficient technique.

FINDINGS

First in this part, demographic data regarding to mother and father education levels in the research is given.



When students' father education level is analyzed, it is seen that a great majority of fathers with 54 percent are primary school graduates. Fathers of the students joining the research have the degree of primary school graduation at least. In the rest 46 percent, secondary school and high school graduate fathers are 16 percent, and university graduate fathers are 14 percent.



When the education levels of the mothers joining the research are looked upon, it is seen that there is a large span. The rate of illiterate mothers is % 7, and solely literate mothers' rate is again % 7. Similar to fathers' education level, primary school graduate mothers have the largest part in the diagram with % 55. Secondary school graduate mothers with % 12, high school graduate mothers with % 11 and university or higher level graduate mothers with % 8 share the rest % 31 portion.

In this section, findings obtained as a result of the research are given. Firstly, the analysis of the relationship between students' overall success and their success in mathematics is dealt with and data related to this finding is shown in Table 1.

Table 1: The Results of Pearson Product Moment Correlation Analysis Which Was Applied To Determine The Relationship Between Students' Overall Success And Their Success In Mathematics

Variables	N	r	p
Mathematic Score SBS Score	261	,869	,000

In Table 1, it is seen that the value of Pearson Product Moment Correlation Coefficient which was applied to determine the relationship between students' overall success and their scores in mathematics is (r=,869; p<.001). According to this result, it is seen that there is a meaningful positive relationship between overall success and success in mathematics.

One of the sub-problems of the research is to analyze students' overall success and their success in mathematics according to the gender variable. Data about the findings of this analysis is given in Table 2 and 3.

Table 2: The Results of Unrelated Group T-Test Which Was Done To Determine Whether Students' Overall Success Differ According To the Gender Variable

Score	Groups	N	$\bar{x}$	SD	t test		
					Sd	t	p
SBS Score	Male	107	339,11	80,09	259	-,898	,37
	Female	154	348,12	79,45			

In the Table 2, as a result of the independent group t-test which was done to determine whether SBS points make a meaningful difference according to the gender variable, it is seen that there is not a meaningful difference [t (259)=-,89; p›0,05] between male students (X=339,11) and female students (X=348,12).

Table 3: The Results of Unrelated Group T-Test Which Was Done To Determine Whether Students' Success in Mathematics Differ According To the Gender Variable

Score	Groups	N	$\bar{x}$	SD	t test		
					Sd	t	p
Mathematic Score	Male	107	8,23	4,61	259	,219	,827
	Female	154	8,10	4,77			

In the Table 3, as a result of the independent group t-test which was done to determine whether mathematics scores make a meaningful difference according to the gender variable, it is seen that there is not a meaningful difference [t (259)=,21; p›0,05]between male students (X=8,23) and female students (X=8,10).

As one of the sub-problems of the research, findings regarding to the analysis of students' overall success according to the variable of mother and father education level are given in Table 4 and 5. Findings regarding to the analysis of students' success in mathematics according to the variable of mother and father education level are given in Table 6 and 7.

Table 4: The Results of One-Way Variance Analysis (ANOVA) Which Was Done To Determine Whether Students' Overall Success Differ According To the Variable of Father Education Level

Score	Groups	N, SS ve $\bar{x}$ Variable			Source of Variation	ANOVA Results				
		N	$\bar{x}$	SD		S. S.	Sd	M. S.	F	p
SBS Score	Primary	140	319,34	64,94	Between G.	454206,5	3	151402,16	32,37	,000
	Middle	42	323,26	72,98						
	High	42	367,62	70,52	Within G.	1201741,13	257	4676,03		
	University	37	438,11	73,25						
		261	344,58	79,8	Total	1655947,6	260			

In The Table 4, as a result of one-way variance analysis (ANOVA) which was done to determine whether students' SBS points make a meaningful difference according to the variable of father education level, it is seen that the difference among the groups of father education level [F (3-257)=32,37; p‹,001] is statistically meaningful. Complementary post-hoc technique has been used to determine between which groups the difference is. Accordingly, it is seen that students whose fathers are university or higher education graduates have a higher overall success than the ones whose fathers are primary, secondary and high school graduates.

As for overall success of the students whose fathers are high school graduates, in comparison to the ones whose fathers are primary and secondary school graduates, a meaningful difference is seen in favor of high school graduates. According to these findings, it is seen that as father education level increases, so does their children's success.

Table 5: The Results of Kruskal Wallis-H Test Which Was Done To Determine Whether Students' Overall Success Differ According To the Variable of Mother Education Level

Score	Groups	N	M. S.	X^2	Sd	p
SBS Score	Illıterate	18	93,81	82,16	5	,000
	Literate	17	116,26			
	Primary	145	110,03			
	Middle	31	122,24			
	High	28	200,21			
	University	22	235,3			
	Total	261				

As seen in the Table 5, Kruskal Wallis Test was applied to with the aim of determining whether students' SBS points make a meaningful difference according to the variable of mother education level. As a result of the analysis, a meaningful difference in the scale total point (x^2= 82,16, p‹.001) was found statistically between the sequence average of the groups. As a result of the Mann Whitney-U tests which were done to determine between which groups the meaningful difference was; a meaningful difference was seen between the SBS points of the ones whose mothers graduated from high school or their equivalents, the ones whose mothers graduated from university or higher level, and the SBS points of the ones whose mothers are illiterate, literate, primary school graduates or secondary school graduates. Also a meaningful difference is seen between the students whose mothers are graduates of university or a higher level and the ones whose mothers are graduates from high school and their equivalents. All of the meaningful differences are in favor of the children whose mothers have a high education level.

Table 6: The Results of One-Way Variance Analysis (ANOVA) Which Was Done To Determine Whether Students' Success in Mathematics Differ According To the Variable of Father Education Level

Score	Groups	N, SS ve $\bar{x}$			Source of Variation	ANOVA Results				
		N	$\bar{x}$	SD		S. S.	Sd	M. S.	F	p
Mathematic Score	Primary	140	6,69	3,64	B. Groups	1776,01	3	592	37,73	,000
	Middle	42	7,07	4,31						
	High	42	8,83	4,2	W. Groups	4032,52	257	15,69		
	University	37	14,32	4,4						
	Total	261	8,18	4.72	Total	5808,53	260			

In The Table 6, as a result of one-way variance analysis (ANOVA) which was done to determine whether students' scores in mathematics make a meaningful difference according to the variable of father education level, it is seen that the difference among the groups of father education level [F (3-257)=37,73; p‹,001] is statistically meaningful. Complementary post-hoc technique has been used to determine between which groups the difference is. Accordingly, it is seen that mathematics success of the students whose fathers are university or higher education graduates is a higher than the mathematics success of ones whose fathers are

primary, secondary and high school graduates. And mathematics success of the students whose fathers are high school graduates is higher than the success of the ones whose fathers are primary and secondary school graduates.

Table 7: The Results of Kruskal Wallis-H Test Which Was Done To Determine Whether Students' Success in Mathematics Differ According To the Variable of Mother Education Level

Score	Groups	N	S. S.	X^2	Sd	p
Mathematic Score	Illıterate	18	107	76,84	5	,000
	Literate	17	104,24			
	Primary	145	110,55			
	Middle	31	122,87			
	High	28	198,79			
	University	22	231,3			
	Total	261				

As seen in the Table 7, Kruskal Wallis Test was applied to with the aim of determining whether students' scores in mathematics make a meaningful difference according to the variable of 'mother education level'. As a result of the analysis, a meaningful difference in the scale total point (x^2= 76,84; p‹.001) was found statistically between the sequence average of the groups. As a result of the Mann Whitney-U tests which were done to determine between which groups the meaningful difference was; a meaningful difference was seen between the mathematics scores of the ones whose mothers graduated from high school or their equivalents, the ones whose mothers graduated from university or higher level, and the mathematics scores of the ones whose mothers are illiterate, literate, primary school graduates or secondary school graduates. Also a meaningful difference is seen between the students whose mothers are graduates of university or a higher level and the ones whose mothers are graduates from high school and their equivalents. All of the meaningful differences are in favor of the children whose mothers have a high education level.

DISCUSSION AND CONCLUSION

As a result of the findings, it is seen that there is a strong meaningful relationship between the overall success and mathematics success of the students in the sample. This result is a striking sing of the relationship between success in mathematics and overall success. It is clearly seen that overall success of the students who are successful in mathematics is high; and that, on the other hand, overall success of the students who are unsuccessful in mathematics is low. That the mathematics coefficient used in the calculation of SBS overall success point is high causes the mathematics to affect the overall success more. On the other hand, the possibility of being successful in other lessons is high for the students who are successful in a lesson, like mathematics, hard to succeed in and requiring regular study. Since mathematics lesson requires regular study, students have the obligation of practicing daily intermittent study system to succeed. Intermittent study is a more effective study strategy for learning to be long lasting (Kaya, 2012). For the students who gain the habit of intermittent study in mathematics, the possibility of using this habit in the study of other lessons is high. This means that students who are successful in mathematics are able to learn other subjects effectively and permanently. This situation may be leading to a high overall success for the students who are successful in mathematics. On the other hand, mathematics is related to every discipline. Describing mathematics as the most significant tools improving thinking, Umay (2003) stated that mathematics education is one of the most important building stones of basic education, or even the most important one. Hence, it can be said that all the positive developments and conveniences in life are related to mathematics. It is not possible to watch and follow the developments produced in any discipline sufficiently without enough mathematics culture (Işık and

Bekdemir, 1998). Considering mathematics is so important and its effect on success is so clear, it is an expected situation that overall success of the students who are successful in mathematics is high. In addition to that, another finding is that there is not a meaningful difference in terms of overall success and success in mathematics. It is known that gender is not the sole effect, and less important than education levels of families or income (Sammons, 1995).

When the findings of the research are analyzed, the effect of mother and father's education level is clearly seen in both overall success and success in mathematics. Students' overall success, besides their success in mathematics, differs according to mother and father's education level. It is known that family is extremely effective upon child's attitudes. As mother and father's education levels increase, they deal with education problems like creativity and motivation more effectively. Children of those families have, at the same time, the skill of arranging their study programs and free time by themselves. Therefore, as mother and father's education levels increase, it can be said that the child's confidence develops and level of success increases depending on providing the child with more academic guidance and support (Özan ve Yüksel, 2003). Researches show that the children whose parents are interested in their children's education develop better in terms of basic intellectual, academic and language skills; realize psycho-social adaptation and the attitude of behaving independently on a high level; and display less attitude problems in schools (Gürşimşek and et al., 2007). The fact that there is a positive relationship between the education level of parents who are graduates from high school or a higher level and their children's success might be attributed to that educated parents develop positive attitudes toward their children. In his study with Pakistani students, Ahmad and Khan (2012) found out that success of education increases as the socio-economic level of families increases. He states that children whose parents are educated get higher points in the examinations they take. Apart from that, it can be said that educated parents' giving importance to education, their culture levels and students' chance of getting help from their parents when needed contributed to this result. Moreover, in Şeker's research, it is determined that there is a positive relationship between parents' dealing with their children's education and students' academic success. In Şeker's study (2009), the relationship between parents' involvement, their school attitudes and academic success was tested on the basis of SBS points (Cited, İpek, 2011). The findings of our study show consistency with the findings of the studies done by Ahmad and Khan (2012) and Şeker (2009). It can be stated that educated parents have better school attitudes, are more willing to be involved in school environment and have more self-confidence in parent involvement.

RECOMMENDATIONS

- Overall success and success in mathematics can be analyzed with different variables thought effective in success
- Findings studied in this research can be evaluated on the level of primary and secondary school students from different steps.
- Overall success and success in mathematics can be evaluated in different grades in terms of gender.
- Parents' levels of effecting students' condition in terms of both overall success and success in mathematics can be analyzed qualitatively for both parents and students, and the situation can be put forward in a concrete way.
- Practices and education activities for increasing parents' education level should be given more importance.

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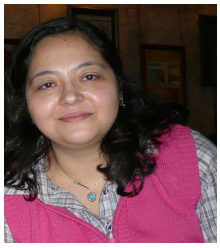

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