

The Place of the Scientific Magazines in the Life of 7th Grade Students: The Relation between the Attitude towards Science and Technology Lesson, the Scientific Literacy and Scientific Magazines¹

By

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Abstract

In this study, the place and the role of the scientific magazines in Turkey in the life of the 7th grade students were investigated. In this concept, the effects of the scientific magazines on the attitudes of science and technology lesson and scientific literacy of the 7th grade students were investigated in terms of various variables. Survey method from descriptive research models has been used. Student Recognition Form, Science and Technology Lesson Attitude Scale and the Scientific Literacy Scale were used in order to determine which science magazines students follow, to learn how often they follow science magazines, to determine how often science magazines are read in the family and to determine the demographic characteristics such as the gender and parents' education level. A city was elected in each of the seven regions in Turkey. Scales which were prepared, were sent one city per one region to selected public school in these cities and applied to 7th grade students at these schools. So, 7th grade students revealed their views on scientific magazines. The data was analyzed on the SPSS program. Results of the research revealed that there is a significant difference among levels of the students' attitudes towards science and technology lessons and among levels of the students' scientific literacy according to gender, the father's education level. A significant relationship between the levels of scientific literacy and students' attitudes towards science and technology lesson was found. In addition to this, it has been seen that students were mostly made connections between scientific magazines and science and technology lesson.

Keywords: *Attitude towards Science and Technology Lesson, Scientific Literacy and Scientific Magazines*

1. Introduction

Various scientific magazines published around the world aim to inform readers about concepts of science and technique, to elaborate scientific and technological change that takes place around the world, to enable people to have a general worldview. There are many scientific magazines which are prepared for adults and also for kids specially. Reading these magazines can help to have positive attitude to science and also can be useful to improve scientific literacy of the people.

Attitude is an emotional state of being ready or a tendency of individuals towards to act to accept or refuse an object, group, individual, institution or thought (Ozguven, 1998). Senemoglu (2011) has defined the attitude as an attained inner state which affects the choice in the individual activities against very different situations, a group of things, individuals and events. Factors such as gender, age, the education level of family, the number of students at classes, the relationship with teacher, the methods of teaching, wishes to have a carrier within science domain, the interest regarding professions, opinions against technique and scientists, the way of cognitive thinking of people affect attitudes of students (Bilgin and

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Karaduman, 2005; Halladyna and Shanghnessy, 1982). The attitudes towards science play its role at students' decision as to improve their knowledge of science; at their choice of science education as their profession and at their use of scientific concepts and methods in a productive way (PISA 2006, 2007). The perceptions of young people regarding science and scientists are related with their attitudes and their opinion of scientific knowledge and its applications as well as these perceptions are depended on their individual, professional and social wishes (Christidou, 2011). Learning science starts when one wonders something at his/her own childhood and then child discovers and explores something with the help and courage of his/her teacher. As Kaya (2012) states students, at their learning process, gain an attitude towards scientific knowledge, scientific process skills and science domain. The role of students' attitudes is important at their success at science class and at their love with science (Genc, 2001).

Science and technology do not only appear on books. They confront us at each documentary on TV, on news in a newspaper, in an essay on a magazine. These types of media institutions are communication tools that surround around students and that have somehow affect on their lives. As Long and Steinke (1996) has stated, environmental events affect behaviours, attitudes, values and motivations of people. A child who watched a scientific experiment carried successfully could develop a positive attitude towards science (Long and Steinke, 1996). Since scientific magazines are media institutions such as television, students who subscribed to a scientific magazine and follow it with interest is to be expected to develop a positive attitude towards science.

Students spend two-thirds of their lives outside school. They learn science and technology lesson not only within the school building, but also outside schools with different ways. The research of Falk and Dierking (2000) has showed that students' visiting science museums has eased their learning some science concepts such as force, movement. The science education provided with activities outside of schools increases attitudes towards science. Activities outside of school such as the reading of science magazines and books, visiting science museums, watching programmes about science on tv, joining to science clubs improve students' attitude towards science domain (Kaya, 2012). Sources such as newspapers, science magazines, television that people benefited to get information may have a positive affect on people about science (Nisbet, Scheufele, Shanahan, Moy, Brossard, & Lewenstein, 2002;) and people can develop positive attitudes towards science using these sources (Long and Steinke, 1996). Informal science education is an education which is mainly carried with various channels outside schools. Informal science education covers activities such as watching television, reading extracurricular books, reading magazines and newspapers, visiting museums and science centers. (Stockmayer and Gilbert, 2003 cited in Kavak, Tufan and Demirelli, 2006; Scearce, 2008). Students are participating in informal education when they are engaged in learning outside of the classroom curriculum. It is important to understand if informal education has an effect on students' attitudes toward learning science (Finley, 2012).

The affect of various materials used in informal science education on people's becoming literate of science has a big role (Stockmayer and Gilbert, 2003 cited in Kavak, Tufan and Demirelli, 2006; Miller, 2002). The scientific literacy requires scientific thinking on evidence and skills to practice scientific point of view into reality as well as it requires them to be understood (PISA 2006, 2007). In the research of Baz (2003), scientific literacy has been determined as understanding what is read, interpreting what is seen and what is read, skills of being curious and inquisitive, investigative and creative. It could also be defined as an ability that is required for logical thinking about science regarding economical, individual and social situations which is possible to be confronted during life (Mbajiorgu, 2003). According to a report (Science for all American) published by American Association for The Advancement Of Science-AAAS a person who is scientific literate is the person who knows basic concepts and principles regarding science, who is accustomed to nature and is aware of diversity and wholeness of nature, who can use the ways of scientific thinking and scientific knowledge for his/her individual and social aims, who understands that science, mathematics and technology are related to each other (Glynn ve Muth, 1994).

Many people get knowledge about science through television, internet, newspaper and magazines. Obtaining knowledge through these sources is the main factor of scientific literacy (Hodson, 2008). Then, magazines that have scientific knowledge may have their affect on scientific literacy. According to Glynn and Muth (1994), for someone who is not literate of science, it is difficult to make a comment or being critical about a scientific subject related to social and educational issues published on a newspaper.

Miller (2002) has stated that materials used in science education ensures scientific literacy and expressed that these sources are web sites, libraries, scientific books and essays in scientific magazines and newspapers. Baz (2003) has established that students who have modern studying tools such as encyclopaedia, computer, internet, video, vcd at their home understand what they read better and as a result they become more investigative and creative. Gocmencelebi and Ozkan (2011) have concluded that students' level of connecting their knowledge with daily life who read newspaper, magazine which have content of science has increased. Keskin (2008) has concluded that students' level of scientific literacy has increased according to their level of reading scientific magazine. He/She also explained that students' following convenient scientific magazines for learning topics they wonder, advancement on science and technology, scientific knowledge which is necessary on daily life differentiates scientific literacy levels. Different informal resources have affect on people's scientific literacy level (Miller, 2002). Informal resources such as essays on science domain in newspapers, scientific web sites, museums, scientific books make an important contribution to the level of scientific literacy of people (Scearce, 2008).

The aim of this study is to establish that the place of current scientific magazines published for children in Turkey on lives of 7th grade students; whether or not the levels of the attitudes to science and technology lesson and the scientific literacy levels of these students are related with various demographical features and following a scientific magazine; and also to which lessons students relate scientific magazine. The relationship between attitude and scientific literacy is also determined.

2. Method

Research Model

In this research, survey method from descriptive research models has been used. Survey method requires collecting various data to define some features of a group (Buyukozturk, 2012). Survey method can be expressed by the concept of field scanning. The study of field scanning is a type of research carried to specify the current situations. This type of study seeks answers to questions of what the situation of events is that wanted to be elaborated deeper and where we are. In this kind of researches, the number of sample is kept quite large. The easiest way of reaching large number of sample is surveys and scales (Cepni, 2010, p.65).

The study has been carried with 7th grade students who get education at one school from 7 major cities of which each was chosen from 7 regions of Turkey. All schools chosen in study have been determined by being attentive to which they are among schools that have high numbers of classes. Sample has been constituted with the method of typical case sampling from the purposeful sampling method which is one of the methods of non-random sampling methods. Typical case sampling is a sample method that was constituted by a typical situation from high numbers of situations that take place in universe regarding research problem of sample (Buyukozturk, 2012).

Universe and Sample

The universe and sample of research have been constituted by, respectively, all the 7th grade students in Turkey and in total 567 7th grade students who get education at each city that have been chosen for Turkey's seven region at the education year of 2012-13. The reason of that sample has been chosen from seven different regions is that results collected represent a sample collected from whole Turkey, not from only one place.

Data Collecting Tools

In the research, Student Information Form and Science and Technology Lesson Attitude Scale and Scientific Literacy Scale have been used.

Student Information Form prepared by researchers has been used with the aim of having information about students' current demographical features such as education levels of parents, the gender of students; determining the level of reading or not a scientific magazine in family and student's his/her own level of following a scientific magazine in order to specify which scientific magazines he/she reads, and if he/she reads and to learn which lessons student relates to scientific magazines which he/she reads.

In the study, 22 item five score likert type attitude scale in the book of "Science and Technology Program Teacher Guide" (MEB, 2006) published in 2006 by National Education Secretary has been used to measure attitude of students towards science and technology lesson. Estimated Cronbach Alpha coefficient to measure the result of validity analysis which has been carried was found as 0,897.

Scientific Literacy Scale developed by Keskin (2008) has been used to determine the levels of scientific literacy levels of students. Scale consists of 34 multiple-choice questions and its reliability coefficient is 0,81. In this study, estimated Cronbach Alpha coefficient of scale was found as 0,824.

Analysis of the Data

Data collected from Student Information Form, Attitude Scale of Science and Technology Lesson and Scientific Literacy Scale exercised on study group was assessed by using SPSS (Statistics Programme for Social Sciences) packaged software.

With the aim of determining whether or not each of groups has shown a normal distribution, Shapiro-Wilks Test has been used for groups whose number is below than 50 and Kolmogorov Smirnov Test (K-S) has been used for group whose number is above than 50 (Buyukozturk, 2011, p.42). It has been seen that groups generally have not shown normal distribution at the result of two tests and because of this, non-parametric tests have been used. Results of the analyses are given with tables for the attitude of science and technology lesson and scientific literacy comparatively on the same table for the same variation. So the reader can see the effect of the same variation for both attitude and scientific literacy comparatively.

3. Results

In table below the information about the demographic features of the sample and the place of the scientific journals on the life of the 7th grade students are given.

Table 1: Descriptive statistics related to variables of gender, mother education level, father education level, reading frequency of scientific journals in the family, following scientific magazines

Variables	Category	f	%
Gender	Female	287	51
	Male	280	49
Mother education Level	Primary-Secondary	345	61
	High School	128	23
	College(Two years)	13	2
	Undergraduate (Four years)	28	5
	Graduate/Postgraduate	7	1
	Other	46	8
Father education Level	Primary-Secondary	304	54
	High School	158	28
	College(Two years)	25	4

	Undergraduate (Four years)		48	8
	Graduate/Postgraduate		9	2
	Other		23	4
Reading frequency of scientific journals in the family	Subscriber		49	9
	Once in a few months		201	35
	Once-twice in a year		144	25
	None		173	30
Following scientific magazines	Bilim Çocuk	Yes	248	44
		No	319	56
	TRT Çocuk	Yes	106	19
		No	461	81
	National Geographic Kids	Yes	62	11
		No	505	89
	Türkiye Çocuk	Yes	20	4
		No	547	96
	Other	Yes	45	8
	No magazine following		77	14

In Table 1 the information about the demographic features of the sample and the place of the scientific journals on the life of the 7th grade students are given as gender, mother education level, father education level, reading frequency of scientific journals in the family, following scientific magazines are given with frequencies and percentiles. The attitude points and scientific literacy points of the students are analyzed separately and the results are given below in orderly.

Table 2: Mann-Whitney U test results for the variation by “gender” of the students’ attitude and the scientific literacy points

	Gender	N	Rank Average	Rank Total	Z	U
ATTITUDE	Girls	287	298,13	85563,00	36125,00	0,038*
	Boys	280	268,52	75465,00		
SCIENTIFIC LITERACY	Girls	287	320,32	91932,00	29756,00	0,00*
	Boys	280	246,77	69096,00		
	Total	567				

*p<0,05

In the table above Mann-Whitney U test results for the variation of the points of the attitude and the scientific literacy related to gender differences are given. According to the table, there is a significant statistical difference between the attitude points of girls and boys on behalf of the girls. Also; there is a significant statistical difference between the scientific literacy points of girls and boys on behalf of the girls.

Table 3: Kruskal Wallis Test results for the variation by “mother education level” of the points of the attitude and the scientific literacy

Mother education level	Attitude					Scientific Literacy				
	N	Rank Average	df	χ^2	P	Rank Average	df	χ^2	p	
Primary-Secondary	345	271,74	5	8,862	0,12	279,38	5	2,579	0,77	
High School	128	302,66				283,20				
College(Two years)	13	331,38				302,96				
Undergraduate (Four years)	28	345,38				324,23				

Graduate/Postgraduate	7	259,21	324,86
Other	46	277,03	284,78

According to the Table 3 there is no statistically significant difference between the rank averages of the attitude points ($\chi^2=8,862$; $p>0,05$) and the scientific literacy points ($\chi^2=2,579$; $p>0,05$) related to mother education level of the students.

Table 4: Kruskal Wallis Test results for the variation by “father education level” of the points of the attitude and the scientific literacy

Father education level	Attitude					Scientific Literacy			
	N	Rank Average	df	χ^2	P	Rank Average	df	χ^2	P
Primary-Secondary	304	257,32				267,13			
High School	158	305,22				302,67			
College(Two years)	25	336,92				266,48			
Undergraduate (Four years)	48	350,93	5	21,958	0,001*	363,56	5	19,518	0,002*
Graduate/Postgraduate	9	256,72				201,72			
Other	23	304,3				263,96			

* $p<0,05$

According to the Table 4 there are statistically significant differences between the rank averages of the attitude points ($\chi^2=21,958$; $p<0,05$) and the scientific literacy points ($\chi^2=19,518$; $p<0,05$) related to father education level of the students. For the determination of these differences for which groups Mann-Whitney U test was conducted.

Table 5: Mann-Whitney U test results for the variation by “father education level ”of the points of the Attitude and the Scientific Literacy

Father education Level	Attitude					Scientific Literacy			
	N	Rank Average	Rank Total	U	P	Rank Average	Rank Total	U	P
Primary-Secondary	304	217,93	66251	19891	0,002*	221,75	67411	21051	0,029*
High School	158	257,61	40702			250,27	39542		
Primary-Secondary	304	161,56	49114	2754	0,022*	165	50161	3799	0,998
College(Two years)	25	206,84	5171			164,96	4124		
Primary-Secondary	304	168,51	51226,5	4866,5	0,00*	168,12	51108	4748	0,00*
Undergraduate (Four years)	48	227,11	10901,5			229,58	11020		
Primary-Secondary	304	157,19	47784,5	1311,5	0,83	158,11	48064,5	1031,5	0,208
Graduate/Postgraduate	9	150,72	1356,5			119,61	1076,5		
Primary-Secondary	304	162,14	49289,5	2929,5	0,19	164,15	49901,5	3450,5	0,917
Other	23	188,63	4338,5			162,02	3726,5		
High School	158	90,5	14298,5	1737,5	0,33	93,59	14786,5	1724,5	0,31
College(Two years)	25	101,5	2537,5			81,98	2049,5		

High School	158	99,53	15725	3164	0,08	98,83	15615,5	3054,5	0,04*
Undergraduate (Four years)	48	116,58	5596			118,86	5705,5		
High School	158	84,62	13369,5	613,5	0,49	85,49	13508	475	0,09
Graduate/Postgraduate	9	73,17	658,5			57,78	520		
High School	158	90,98	14374,5	1813,5	0,99	92,5	14614,5	1580,5	0,313
Other	23	91,15	2096,5			80,72	1856,5		
College(Two years)	25	36,12	903	578	0,79	28,32	708	383	0,012*
Undergraduate (Four years)	48	37,46	1798			41,52	1993		
College(Two years)	25	18,7	467,5	82,5	0,24	18,68	467	83	0,25
Graduate/Postgraduate	9	14,17	127,5			14,22	128		
College(Two years)	25	25,76	644	256	0,52	24,54	613,5	286,5	0,98
Other	23	23,13	532			24,46	562,5		
Undergraduate (Four years)	48	29,97	1438,5	169,5	0,31	31,45	1509,5	98,5	0,01*
Graduate/Postgraduate	9	23,83	214,5			15,94	143,5		
Undergraduate (Four years)	48	37,8	1814,5	465,5	0,29	40,15	1927	353	0,014*
Other	23	32,24	741,5			27,35	629		
Graduate/Postgraduate	9	14,83	133,5	88,5	0,53	14,17	127,5	82,5	0,38
Other	23	17,15	394,5			17,41	400,5		

*p<0,05

In the table above the results for the variation of the attitude points and scientific literacy points of the students related to their father's education levels are given. According to the table attitude points differentiate between Primary-Secondary/High School; Primary-Secondary/College (two years) and Primary-Secondary/Undergraduate (four years) grads. Scientific literacy points differentiate between Primary-Secondary/High School; Primary-Secondary/Undergraduate (four years); High School/Undergraduate (four years) and College (two years)/Undergraduate (four years) grads.

Table 6: Kruskal Wallis Test results for the variation by “reading frequency of the scientific magazines in the students’ family” of the points of the attitude and the scientific literacy

Reading frequency of the scientific magazines in the family	Attitude					Scientific Literacy				
	N	Rank Average	df	χ^2	p	Rank Average	df	χ^2	p	
Subscriber	49	340,19				273,57				
Once in a few months	201	299,00	3	21,021	0,00*	296,64	3	2,084	0,55	
Once-twice in a year	144	297,11				273,06				
None	173	239,74				281,37				

According to the Table 6 there is statistically significant difference between the rank averages of the attitude points ($\chi^2=21,021$; $p<0,05$) related to reading frequency of the scientific magazines in the students' family. For the determination of these differences for which groups Mann-Whitney test was conducted. There is no statistically significant difference between the rank averages of the scientific literacy points ($\chi^2=2,084$; $p>0,05$) related to reading frequency of the scientific magazines in the students' family.

Table 7: Mann-Whitney U test results for the variation by “reading frequency of the scientific magazines in the students’ family” of the attitude points

Reading frequency of the scientific magazines	N	Rank Average	Rank Total	U	p
Subscriber	49	139,48	6834,5	4239,5	0,1
Once in a few months	201	122,09	24540,5		
Subscriber	49	107,89	5286,5	2994,5	0,1
Once-twice in a year	144	93,3	13434,5		
Subscriber	49	142,83	6998,5	2703,5	0,00*
None	173	102,63	17754,5		
Once in a few months	201	173,55	34884,5	14360,5	0,9
Once-twice in a year	144	172,23	24800,5		
Once in a few months	201	205,36	41276,5	13797,5	0,001*
None	173	166,75	28848,5		
Once-twice in a year	144	176,59	25429,5	9923	0,002*
None	173	144,36	24974,5		

* $p<0,05$

According to the Mann-Whitney U results for the variation of the attitude points of the students according to the reading frequency of scientific magazines in their family there is a statistically significant difference between the groups of subscriber and never on behalf of the subscriber. In addition to this the attitude points of the students those the scientific magazines being read once in a few months and once-twice in a year in their family are statistically higher than the attitude points of the students those scientific magazines never being read in their family.

Table 8: Mann-Whitney U test results for the variation by “following of the scientific magazines” of the points of the attitude and the scientific literacy

Scientific magazines	Following situation	N	Rank Average	Rank Total	U	p
Bilim Çocuk	Yes	248	320,30	79434,5	30553,5	0,0*
	No	319	255,78	81593,5		
TRT Çocuk	Yes	106	281,02	29788	24117	0,8
	No	461	284,69	131240		
National Geographic Kids	Yes	62	328,18	20347	12916	0,02*
	No	505	278,58	140681		
Türkiye Çocuk	Yes	20	240,08	4801,5	4591,5	0,2
	No	547	285,61	156226,5		
Other	Following magazines in the scale	345	195,66	67501,5	7709	0,9
	Following other	45	194,31	8744		

		magazines				
SCIENTIFIC LITERACY	Bilim Çocuk	Yes	248	305,49	75762,5	
		No	319	267,29	85265,5	34225,5 0,006*
	TRT Çocuk	Yes	106	263,28	27907,5	22236,5 0,15
		No	461	288,76	133120,5	5
	National Geographic Kids	Yes	62	297,77	18462	14801 0,48
		No	505	282,31	142566	
	Türkiye Çocuk	Yes	20	315,63	6312,5	4837,5 0,38
		No	547	282,84	154715,5	
	Other	Following magazines in the scale	345	196,34	67737	7473 0,68
		Following other magazines	45	189,07	8508	

*p<0,05

In the table above Mann-Whitney U test results are given for the variation of the points of the attitude and the scientific literacy related to situation of the following of the scientific magazines for kids. According to the results the attitude points differentiate positively for the Bilim Çocuk and the National Geographic Kids followers related to other scientific magazine followers and scientific literacy points differentiate positively for the National Geographic Kids followers related to other scientific magazine followers.

Table 9: Situation of the relating the courses of the school with the kids scientific magazines for 7th graders

Courses	Scientific Magazines									
	Bilim Çocuk		TRT Çocuk		Nat.Geo.Kids		Türkiye Çocuk		Other	
	F	%	f	%	F	%	f	%	f	%
Science and Technology	190	76,6	59	56,2	53	85,5	11	55	26	57,8
Turkish	52	21	30	28,6	9	14,5	5	25	9	20
Social Sciences	65	26,2	35	33,3	20	32,3	8	40	11	24,4
Mathematics	72	29	26	24,8	19	30,6	6	30	11	24,4
Technology and design	117	47,2	43	41	31	50	12	60	21	46,7
Visual Arts	60	24,2	36	34,3	16	25,8	8	40	15	33,3
Musics	32	12,9	21	20	6	9,7	7	35	7	15,6

In the Table 9 the results to which lessons students relate scientific magazines which they read has been given with their frequency and percentage values. When table is analyzed as a whole, while students who read Bilim Çocuk (Science Kid), TRT Çocuk (TRT Kid) and National Geographic Kids relate the content of these magazines most to Science and Technology lessons; they relate it to Music lesson least. While students who read Türkiye Çocuk magazine relate the content of this magazine most to Technology and Design lesson; they relate it to Turkish lesson least. Students who read scientific magazines under "Others" category which are unnamed in Student Information Form relate these magazines to science and technology most; they relate it to Music lesson least.

Table 10: The relation between the science and technology attitude points and the scientific literacy points of 7th graders

	Scientific Literacy Level	
	Pearson Correlation Coefficient (r)	0,212
Science And Technology Attitude	Significance (p)	0,00

According to the table above there is a positive relationship, though it is low, between level of science and technology attitude and scientific literacy of 7th graders. The relationship of like this means that if the level of science and technology attitude increase the scientific literacy level increases too.

4. Conclusion and Discussion

According to results collected through Science and Technology Lesson Attitude Scale and Scientific Literacy Scale applied to 7th grade students, there is a significant difference in favour of girl students between boy and girl students' scores of science and technology lesson attitudes and of scientific literacy. Tal, Geier, and Krajcik, (2000) state in their study that girl students' attitudes towards science and technology lesson are much higher than that of boy students. George (2000), in his study which he applied to middle and high school students regarding measuring of change at students' attitudes towards science within time states that boy students' attitudes towards science was initially high but they declined more rapidly than that of girl students. There are also many studies stating that attitudes do not vary with gender (Kulce, 2005; Cakir, Senler and Taskin, 2007; Alkan, 2006, Genc, 2001; Altinok, 2004). In literature, there are studies stating that the level of scientific literacy varies in a significant level in favour of girl students (Keskin, 2008; Baz, 2003; Tunc Sahin and Say, 2010; Soysal, 2011).

In the study, it has been seen that students' attitudes towards science and technology lesson and the level of scientific literacy have not shown a significant difference according to the level of mother's education. Akgun, Aydin and Sunkur (2007) has also found in their study that primary school teacher candidates' scores of attitudes towards science and technology lesson have not varied according to the level of education of their mothers. Papanastasiou (2002) has stated that education history of families has a very slight affect on students' attitude towards science. When the result of study has been elaborated more closely, it is seen that scores of attitude and of scientific literacy get higher, even if this increasing is very limited, when the level of mother's education gets higher. This result has a parallelism with the result of Cakir, Senler and Taskin's (2007) study. Cakir, Senler ve Taskin (2007), has stated in their study that students' attitudes towards science lesson are not statistically affected in a significant way by their mothers' level of education but while their mothers' level of education has increased, their attitude scores also get higher and this might be because of that educated parents help their children in questions and homework's regarding the Science lesson and they encourage them to science. Keskin (2008) states in his study that the level of scientific literacy has varied according to their mothers' level of education. According to study findings, scores of both attitude and scientific literacy of a child of mother who holds post-graduate or PhD are lower than scores of a children whose mother's education level is other (non-primary school graduate). Baz (2003) has established in his study that, children's skill to understand what they read increases while their mothers' level of education get higher apart from children of university graduate mothers. Soysal (2011) has also said that scores of scientific literacy of students have varied according to their mothers' level of education and that students whose mother is high school graduate have the highest scientific literacy scores. The decreasing of scores of students whose mothers hold a post-graduate degree found in Cakir and others' study (2007) also stands out in this study. Cakir and others (2007) has stated that since most of post-graduate holder mothers is an academician and they could not involve with children enough and this might be the reason that leads to this situation. The same interpretation could be made for this study too. Kulce (2005) in his study concluded that primary school second grade students' attitudes towards science lesson have varied according to their mothers' level of education.

It has been seen that students' attitude towards science and technology lesson and scores of scientific literacy have shown a significant difference according to their fathers' level of education. There are studies showing that the attitude towards science lessons increases as fathers' level of education gets higher (Akgun, Aydin and Sunkur, 2007; Durmaz and Ozyildirim, 2005). Germann (1994) has shown

that the difference at students' success at scientific process skills is affected by level of education of father. Keskin (2008) and Soysal (2011) state that students' level of scientific literacy increases while their fathers' level of education gets higher. Baz (2003) also has found that the average of students has shown significant differences at being investigative and creative skill according to level of education of father. It has been seen in research that students' scores of attitude and scientific literacy have increased while their fathers' level of education get higher but points of students' whose father hold post-graduate/PhD are lower than other students for both points of attitude and scientific literacy. This decreasing shows parallelism with findings found on part regarding mothers' level of education. Serin, Kesercioğlu, Saracaloğlu ve Serin (2003) have found that the science attitudes of the participants those mothers and fathers were graduated from a high school and university were higher than the participants' attitudes those mothers and fathers were graduated from a primary or a secondary school, though this difference was not significant.

The scores of attitudes of students who took part in the research are found to be related with their families' level of following a scientific magazine. It has been seen that the score of students' attitude towards science and technology lesson who has someone subscribed to a scientific magazine in his/her family is the highest and that the score of students' attitude towards science and technology lesson who hasn't got someone subscribed to a scientific magazine in his/her family is the lowest. At the result of statistical analysis, there has been found a significant difference in favour of those who subscribe to a scientific magazine between students' attitude towards science and technology who subscribe to a scientific magazine and students who never read a scientific magazine. The scores of students' attitude toward science and technology lessons who have someone in his/her family reading scientific magazine once or twice a year, has been significantly higher than that of a student which a scientific magazine has never been read at his/her family. This situation could be interpreted in a way to suggest that the reading of a scientific magazine in the family at least for once has affected the attitude at child towards science positively. However, children learn by imitating other individuals' behaviours such as family, teacher, relatives etc. This situation is defined as "social learning"; an individual observes other individuals' behaviours and exhibits his/her own behaviour by acting in a similar manner (Cartledge, G and others. 1992; cited in Cubukcu and Gultekin, 2006). There has not been found a significant difference between groups when scientific literacy scores are investigated in comparison with the level of following a scientific magazine in students' families who took part in study. But students who have someone in his/her family reading a scientific magazine once for a few months have higher scientific literacy scores according to other groups. This situaion could be interpreted in a way to suggest that the having someone in his/her family who reads a scientific magazine could be affective, even if not a significant level, in scientific literacy but the level of scientific literacy could be affected by other factors too. It is not an expected situation in which scientific literacy has improved without student himself/herself reading a magazine. Miller (2002) has stated that informal resources have affects on people's level of scientific literacy. Informal resources such as essays on the domain of science as seen in newspapers, magazines, scientific websites, museums, scientific books make a big contribution to the level of people's scientific literacy (Scarce, 2008).

It has been seen that there are significant differences between scores of scientific literacy levels and also attitudes of 7th grade students who follow and do not follow scientific magazines. Research has shown that scores of attitude and scientific literacy of students who follow scientific magazines are higher. Keskin (2008) in her study, has established that students' level of scientific literacy has significantly varied according to the level of reading a scientific magazine. Suren (2008) in his study, has stated that the levels of scientific literacy of primary school first grade students are quite high. Tunç Sahin and Say (2010), in their study, have stated that the level of scientific literacy of students towards interpretation and examination has varied according to the level of reading a scientific magazine. It has been revealed that, among scientific magazines stated on the Student Information Form, the numbers of students who follow Türkiye Çocuk (Turkey Kid) magazines are lowest and the number of students who follow National Geographic Kids are the highest. It has been seen that students' attitude of science and technology lessons

who follow Bilim Çocuk and National Geographic Kids magazines and scientific literacy of students who follow Bilim Çocuk magazine are statistically higher in a meaningful manner. This situation could be interpreted in a way to suggest that Bilim Çocuk and National Geographic Kids magazines have more positive affect on level of scientific literacy and attitude towards science and technology according to other magazines. This situation might be deriving from that these magazines have content which is convenient to level of students who are interested in science and technology and they will increase the feeling of wonder of students from score of point of science. Thus, there are visual elements such as photos of animal, plants, nature; various interesting scientific news, magazine columns relating science to life, colourful pages such as funny scientific puzzles in these magazines (Zulal, 2011; Bilim Çocuk, 2013; National Geographic Kids, 2013).

It has been seen that all scientific magazines are most related with science and technology apart from Türkiye Çocuk magazine. In particular, the rate of relating Bilim Çocuk and National Geographic Kids magazines to science and technology is quite high. That students relate these magazines most to science and technology lesson supports the result of that scores of scientific literacy and attitude of students who follow these magazines are higher than those who follow other magazines. This situation could be interpreted in a way to suggest that students follow scientific magazines which they found connected with science and technology lesson might have an important role in increasing the level of scientific literacy and in developing a positive attitude towards science. Gocmencelebi and Ozkan (2011) has stated in their study regarding the primary school students' level of connecting what they learned at science lesson with daily life, who use technology and follow scientific publishing, that visual knowledge provided by television and computer and knowledge obtained from sources such as newspapers and magazines coincide with what they are taught at school.

According to result of the research, it has been seen that there is a positive relationship, though this relation is low, between level of scientific literacy and level of science and technology lesson attitude of 7th grade. According to this, while students' level of attitude towards science and technology lesson increases, the level of scientific literacy increases too. According to Collettee (1989; cited in: Ortakuz, 2006) in order for students to have scientific literacy, teachers need to develop positive attitude towards science on his/her students. Shwartz and others (2006) has expressed that gained attitude and values towards science would form the development of scientific literacy of a person. The relation is low so it can be concluded that science and technology attitude and scientific literacy develops also under the influence of different factors. As a conclusion according to the results of this study following scientific magazines can be a factor to develop science and technology attitude and scientific literacy of the students.

In conclusion, it has been thought that it would be useful to support students to follow scientific magazines. It has also been suggested that an experimental research should be carried regarding the level of following of scientific magazines.

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