

The Relationship Between Parental Involvement in Education and Academic Achievement: A Meta-analysis Study

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Abstract

The aim of this study is to examine the relationship between parental involvement and students' academic achievement using meta-analysis method. In the research, Proquest Digital Dissertations, Web of Science, ERIC, Council of Higher Education Thesis Center and Turkish Academic Network and Information Center were scanned, and 53 studies in accordance with the study criteria were included in the meta-analysis. Inclusion criteria includes research on the relationship between parental involvement and academic achievement, having sufficient quantitative data such as correlation value or regression coefficient, studies involving primary, secondary or high school students and their families. The correlation values of the included studies were converted into Fisher z values. The average effect size was evaluated by Comprehensive Meta Analysis V3 (CMA) Program. As a result of the study, it was seen that parental involvement affects academic achievement. In addition, it was observed that the relationship between parental involvement and academic achievement did not differ significantly according to course areas, school levels and geographical areas. In this context, suggestions have been developed for ensuring parental involvement and for future researches.

Keywords: Parental involvement, academic achievement, school, teacher.

1. Introduction

What the factors that affect the academic achievement of students are among the most curious topics of educators, parents and researchers. It may be possible to separate these factors as in-school and out-of-school. The qualifications of teachers and school administrators (Adams & Forsyth, 2013; Anderson, 2012; Helvacı & Aygoğan, 2011), learning environment and teaching methods (Straková, Simonová & Greger, 2018) can be given as examples of in-school factors. Out-of-school factors include the student's socio-economic (Epstein & Sheldon, 2019; Sénéchal & Young, 2008; Stright & Yeo, 2014) and physiological status (Underwood, 2011), self-efficacy, and parental involvement (Epstein, 1991; Jurado, 2014; Partin, 2017; Roksa & Kinsley, 2019; Schnepf, Klinger, Volante & Jerrim, 2019) in education. Since students spend a limited part of their time at school and most of their time outside of school, out-of-school factors are at least as important as in-school factors in students' achievement. Students spend their time outside of school with their social environment and family. Therefore, it is expected to be related to family, parental involvement in school and academic achievement of the student. For this reason, the relationship between parental involvement in school and students' academic achievement has been determined as the subject of this study.

When the theoretical background of parental involvement is examined, it is seen that there is no consensus on the definition of the concept (Fan & Chen, 2001). For example; For Grolnick & Slowiaczek (1994), parental involvement is a selfless transfer of resources that parents have in line with their children's needs; For LaRocque, Kleiman & Darling (2011), the investment of parents or caregivers in educational processes;

For El Nokali, Bachman & Votruba-Drzal (2010), it is the set of behaviors that parents display at school and at home in order to support the education of the child. Although different definitions have been made for family participation, the definition is based on the fact that the family is an important factor in the education of the child.

The reason for the different definitions of parental involvement is that the researchers focused on different features of parental involvement. For example; Choi, Chang, Kim & Reio (2015) and Epstein & Sheldon (2019) deal with parental involvement on two grounds. The first of these is home-based parental involvement. Here, providing the necessary support and creating the structure for repeating what has been learned at school at home. The second type is school-based parental involvement. This type of involvement includes communicating with the teacher and participating in school activities (Choi et al., 2015; Epstein & Sheldon, 2019). Hill, Witherspoon & Bartz (2018) talk about a separate type

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of involvement called academic socialization. According to Hill et al. (2018), in academic socialization, the educational expectations of the family are clear, the family talks with the child about the educational processes, establishes a relationship between current issues and course subjects, discusses learning strategies with the child, supports his education dreams and plans his future.

There are also different explanations as to why parental involvement is important for student success. One of these is Bronfenbrenner's (1979) ecological approach. According to Bronfenbrenner, there should be two-way interaction, unity of goals, sustainable trust and a balance of power between the environments or institutions in which the individual lives for his development. The two main institutions where students spend their lives are school and family. Therefore, two-way interaction between school and family, unity of goals, sustainable balance of trust and power, and the quality of parental involvement are determinants of student success. Leichter (1974) explains why parental involvement is important for student success, by drawing attention to the fact that families are also educators and families should be seen as partners in the education and development of students. According to him, when schools and teachers ask parents to be partners for students' education, they draw parents' attention to their children's life at school, their mastery of skills and learning abilities. Thus, the interaction between the school and the family increases and the positive effect of the family on the education of the child increases through this increase in interaction. Epstein, Galindo & Sheldon (2011) state that this increasing interaction creates "schools like families" and "families like schools".

Studies show that parental involvement in education in line with expectations increases student academic success and parental involvement is at least as important as school. For instance; Epstein (1991), in a longitudinal study examining the effect of parental involvement on students' mathematics and reading achievements, found that parental involvement has a positive effect on overall academic achievement. Jeynes (2007) showed that parental involvement increases academic achievement with his research. Similar findings have been obtained in other studies (Chang, Choib & Kim, 2015; Johnson & Hull, 2014; Partin, 2017; Lam & Ducreux, 2013; Zhang, 2018).

Research also provides data on how parental involvement increases students' academic achievement. For example; parental involvement increases students' homework rates (Dumont, Trautwein, Nagy & Nagengast, 2014; You, Lim, No & Dang, 2015), improves language skills (Gubbinsa & Otero, 2016; Perkins, Syvertsen, Mincemoyer, Chilenski, Olson, Berrena et al., 2016), reducing absenteeism (Benner, Boyle & Sadler, 2016; Dotterer & Wehrspann, 2016; Gonida & Cortin, 2014). Families can increase the rate of doing homework by helping children with their homework and by creating a

homework routine (You et al., 2015). In addition, families can increase their academic achievement by going to centers where learning is intensive such as libraries and museums, reading, watching scientific broadcasting and talking about them, and watching films in foreign languages (Dotterer & Wehrspann, 2016; Gubbinsa & Otero, 2016; Partin, 2017; Perkins et al., 2016; Zhang, 2018; You et al., 2015).

It is possible to define academic achievement in various ways. In this study, academic achievement was evaluated as the scores obtained by the students from the subject areas (mathematics, science, reading and foreign language), the year-end general averages or test scores. It is not a clear concept to define parental involvement as academic achievement. In some studies, parental involvement is defined as parent-teacher communication (Deslandes, Royer, Turcotte & Bertrand, 1997), parents communication with children (Keith, Reimers, Fehrmann, Pottebaum & Aubey, 1986), and voluntary time spent at school (Okpala, Okpala & Smith, 2001) otherwise in some studies, It is defined as the parental involvement in school activities such as conferences (Miedel & Reynolds, 1999), parents' meetings dispose by school (Shaver & Walls, 1998) or helping the child with school-related activities such as homework (Shumow & Miller, 2001). In the light of the definitions given above, in this study, parental involvement is evaluated as the contribution of the family or caregivers to the education of the child.

When the literature is examined, it is seen that there are various meta-analysis studies examining the relationship between parental involvement and academic achievement. The first study was conducted by Fan and Chen (2001). Fan and Chen (2001) concluded that parental involvement is related to academic achievement. Mattingly, Prislin, McKenzie, Rodriguez, and Kayzar (2002) is another synthesis study. Contrary to Fan and Chen (2001), Mattingly et al. (2002) concluded that programs that support parental involvement are not related to academic achievement.

Jeynes, who has intensive studies on parental involvement, conducted four (4) meta-analysis studies (2003, 2005, 2007, 2012) on the subject. In each study, the researcher found that two variables are related. In addition, Erion (2006), Patall, Cooper, and Robinson (2008), Sénéchal and Young (2008), Hill and Tyson (2009) supported the relationship between parental involvement and achievement with the research results. One of the last studies on the subject belongs to Castro, Expósito-Casas, López-Martín, Lizasoain, Navarro-Asencio and Gaviria (2015). Castro et al. (2015) synthesized the results of research conducted in kindergartens, primary schools and secondary schools published in 2000-2013. The findings of the synthesis study showed that parental involvement has a moderate and positive effect on academic achievement.

Studies whose results are cited show that the relationship between parental involvement and academic achievement is

a subject of research at different school levels, involvement types and programs. The topic poses conceptual challenges for researchers because parental involvement has different definitions and types of involvement in the literature. This difficulty makes it difficult for a single or a few studies to address all aspects of parental involvement. For this reason, meta-analysis studies on parental involvement show limited coverage. For example; it is far from being comprehensive in that the concept is not addressed in general, it does not cover all course areas (mathematics, science, reading, language skills) believed to represent academic achievement, does not examine school levels at the same time, or does not include research published in a wide time period. For this reason, studies have limitations in revealing the general effect of parental involvement in academic achievement. In this respect, it can be said that more inclusive studies are needed to reveal the relationship between parental involvement and student achievement. As Fan & Chen (2001) stated, most parental involvement studies were carried out for homework, communication, family type, participation in school activities or parental expectations, and reading activities with children. In addition, as Chen & Gregory (2010) pointed out, the nature of parental involvement should be considered as a holistic concept that combines behavioral and psychological perspectives. Integrating the results of independent research can give an idea of the average effect size of the relationship between parental involvement and the academic achievement of the student, and can also answer questions about the relationship between concepts.

In the light of the theoretical background that was tried to be explained above, the purpose of this study is to examine the average effect size of the relationship between parental involvement and academic achievement in the light of the studies carried out between 2004-2020 according to school levels (primary, secondary and high school), course areas and geographical regions. With the time interval of the research, more homogeneous theoretical conceptual diversity of parental involvement was aimed. In addition, a meta-analysis study was conducted on the subject every year between 2001 and 2003 and the results of the research conducted up to that day were integrated. However, post-2004 studies focused either on research conducted in certain regions (e.g. Jeynes, 2012) or only on the results of research conducted at a school level (e.g. Castro, et al., 2015; Jeynes, 2005, 2007; Hill & Tyson, 2009) or It has integrated the results of research conducted for a type of involvement and subject area (Erion, 2006; Patall, Cooper & Robinson, 2008; Sénéchal & Young, 2008). For this reason, there was a need to integrate the results of the research conducted between 2004-2020. This meta-analysis study is based on the relationship between parental involvement and academic achievement, evaluating parental involvement with a more holistic approach. Sub-problems were developed within this framework are as follows:

1. What is the average effect size of the relationship between parental involvement and academic achievement?
2. Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to the subject areas (mathematics, science, reading skills, foreign language skills)?
3. Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to school levels (primary school, secondary school, high school)?
4. Does the average effect size of the relationship between parental involvement and academic achievement significantly differ by geographic regions (Asia, Europe, Africa and America continents)?

Method

Research Model

In this study, it was aimed to determine the average effect size of the relationship between parental involvement and academic achievement, and the meta-analysis method was used. The aim of using the meta-analysis method is to integrate independent research results investigating the same subject at different time intervals and to reach a general conclusion about the subject (Cohen, Manion & Morrison, 2011).

Data Collection

The data of study were collected by the researcher between March 2020 - July 2020. It is also taken into account that the researches included in the study were published between 2004 and July 2020, because the studies conducted until 2004 were either related to family participation types (Jeynes, 2012), a certain school level (Hill & Tayson, 2009) or a certain subject area (Sénéchal & Young, 2008). The full text of all studies included in the meta-analysis study has been reached. In the included studies, 30.5% of the data collection tools were developed by the researchers, 8.5% were adapted, 28% were ready-made scales and 33% were information in the educational statistics centers of the countries. Campbell (1994), Fan (2001), Fantuzzu, Tighe & Childs (2000), Epstein, Connors & Salinas (1993), Finn (1998), Lorenz & Wild (2007), Kohl, Lengua & McMahon (2000) and Grolnick, Ryan & Deci (1991) were among read-made used and adapted data collection tools. In all measurement tools used in studies, high score means higher parental involvement.

Validity

The effect size obtained in meta-analysis studies is valid for the validity of the included studies (Petitti, 2000). It was determined that the validity of data collection tools was ensured in all studies included in this study.

“Keywords” Used in Search

While the researches to be included in the study are being scanned in the relevant databases, “family involvement, family support, parent participation, parental participation, household, educational outcomes, academic achievement, parent support, parental involvement, family participation” are used. Keywords are used in various combinations in different searches.

Searched Databases

The researches to be included in the meta-analysis study were reached by scanning databases such as Proquest Digital Dissertations, Web of Science, ERIC, Council of Higher Education Thesis Center and Turkish Academic Network and Information Center. After the first search, more than 11,300 studies were filtered, including articles, doctoral/master’s

theses and books. 513 studies were found to be significantly associated with the topic of this meta-analysis study. Detailed examination of the researches was made according to the determined research criteria. 53 research including 48 articles, 1 master’s thesis and 4 doctoral dissertations were included in the meta-analysis.

Inclusion Criteria

The criteria used in the selection of studies included in the study are:

1. Including sufficient quantitative data (including the Pearson correlation coefficient or regression coefficient for the relationship between family participation and academic achievement),
2. To be published between 2004 and July 2020 (the last date the research data were collected),

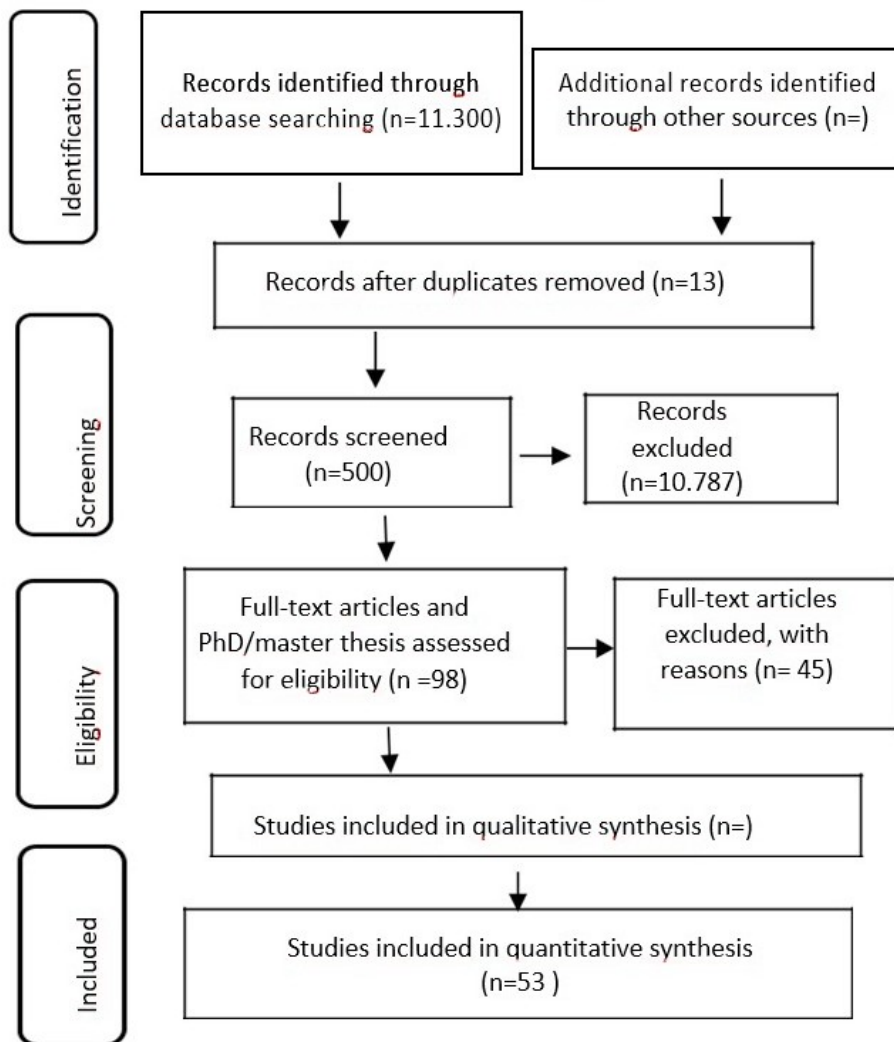


Fig. 1: Prisma Flow Diagram for Meta-analysis

3. Researching the relationship between parental involvement and academic achievement,
4. Surveys include primary, secondary or high school students or their families. 53 research including 48 articles, 1 master's degree and 4 doctoral dissertations in accordance with the inclusion criteria were included in the meta-analysis. The flow diagram regarding the process of including primary researches in the study is given in Figure 1. The total sample size of the articles was 202.937 and the total sample size of their theses was 23.018. It was seen that the total sample size of the studies included in the meta-analysis study reached a large sample of 225.955. In the studies included in the meta-analysis study, the $r: \beta + 0.05\lambda$ procedure suggested by Peterson & Brown (2005) was used in the imputation stage of beta coefficients. When β is positive, $\lambda 1$ is evaluated as λ while β is negative. The aim of the method is to include more studies in the meta-analysis study.

Coding Method

Detailed and clear coding forms were prepared for 53 studies included in the meta-analysis. Three parts were created in the coding form: (a) The first part of the form is "Study ID". In this section, the sequence number, name, author (s), publication year and type information of the research are included. (b) The second part of the form was "Study content". The "study content" section covered the course areas in which the relationship between parental involvement and academic achievement was evaluated, the type of school and where the research was conducted. (c) The third part of the form is "Study data". The "study data" section also included the correlation coefficients and sample size information.

Coding Protocol Reliability

In the reliability calculation of the study, 30% ($n = 17$) of the studies included in the coding form for inter-rater reliability were determined using random assignment method. The determined studies were coded into the coding form by a second evaluator with a good level of English knowledge. "Agreement rate", which is the measure of inter-coder reliability, which belongs to Orwin & Vevea (2009), was used. Orwin & Vevea (2009) applied the formula of agreement rate ($AR = \text{number of observations agreed upon} / \text{total number of observations}$) and it was determined that there was .90 reliability.

Preparing Data for The Analysis

For the first research question of the meta-analysis study (What is the average effect size of the relationship between parental involvement and academic achievement?): (a) the correlation values of the course areas were combined with the CMA

program. (b) In studies where regression values were given, correlation values were reached by using Peterson and Brown's (2005) method. (c) The first research question was tested by converting these values and the correlation values of the studies that do not separate academic achievement according to the course areas into Fisher z value.

For the second research question of the study (Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to the course areas?), the correlation values of the relationship between parental involvement and the four basic course areas (mathematics, science, reading skills and language skills) were used to test the second research question.

For the third research question of the study (Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to school levels?): school levels were evaluated in three groups as primary school, secondary school and high school. For the last research question (does the effect size of the relationship between parental involvement and academic achievement significantly differ according to geographical regions?): the countries where the research was conducted were grouped as Asia, Europe, Africa and America according to their continents.

Meta-analysis Process

The average effect size value of the meta-analysis study is calculated with the data obtained from the researches whose quality is examined and included in the study. Which model will be used in meta-analysis (fixed effects or random effects model) may vary depending on the result of the heterogeneity test applied to the data obtained. In this meta-analysis study, Comprehensive Meta-Analysis V3 Program (CMA) was used for heterogeneity test and statistical analysis. I^2 and Chi-Square degree of freedom heterogeneity test (Q statistic) was used to test the true heterogeneity between studies included in the meta-analysis study. The heterogeneity test tests the null hypothesis, which assumes that all studies show the same effect (Higgins, Thompson, Deeks & Altman, 2003). At this stage, which model will be used in the meta-analysis study becomes important and clear. In meta-analysis studies, it is important to represent each research (whether it has a large or small sample) within the meta-analysis summary effect (Ellis, 2010). Researchers such as Borenstein, Hedges, Higgins & Rothstein (2009), Field & Gillett (2010), and Schmidt, Oh & Hayes (2009) find the conditions under which the fixed effects model is suitable are limited, and the most basic assumption of the model, a single real effect size assumption, is far from reality. They recommend the use of random effects model (Borenstein et al., 2009; Field & Gillett, 2010; Schmidt et al., 2009). In this meta-analysis study, random effects model was used for the reasons stated. Microsoft Excel 2010 program was used for data entry into coding form and SPSS 21.0 program

was used for descriptive statistics. In the analysis of the meta-analysis study, the significance level was determined as .05 and the confidence interval in the calculations used for the effect size was determined as 95%. For effect size calculations, correlation values were converted to Fisher z values and analyzes were performed. In order to interpret the effect size, the values were converted into the correlation coefficient. For the interpretation of the average effect size, Cohen et al. (2011) used the following benchmarks:

- 0.00 ≤ effect size value ≤ 0.10 very weak
- 0.10 ≤ effect size value ≤ 0.30 weak effect
- 0.30 ≤ effect size value ≤ 0.50 moderate effect
- 0.50 ≤ effect size value ≤ 0.80 strong level effect
- Effect size ≥ 0.80 very strong effect

In addition, funnel plot, Begg and Mazumdar Rank Correlations Test, Rosenthal’s Safe N Test, Egger’s Linear Regression Test were used for publication bias.

Publication Bias

Before conducting the tests for publication bias, taking into account the opinion of Card (2012), the researches included in the meta-analysis study were grouped as articles and thesis to perform moderator analysis. The findings obtained as a result of the analysis are included in Table 1.

Table 1: Effect Sizes of Studies Regarding Publication Type and Heterogeneity Test Results

| Moderator | n | QB | %95 confidence interval | | | Heterogeneity | |
|-------------|----|-------|-------------------------|-------|-------|---------------|------|
| | | | E.S. | Lower | Upper | df | P |
| Publication | | | | | | | |
| Artical | 48 | 1,312 | 0.377 | 0.35 | 0.39 | 1 | 0.25 |
| Theses | 5 | | 0.408 | 0.40 | 0.40 | | |

When Table 1 is evaluated, it is observed that $Q_B = 1.312$. The Q_B statistic value ($Q_B = 1.312$, $p = 0.252$) was observed to be significant because it exceeded the critical value in the χ^2 table at 1 degree of freedom ($df: 1; \chi^2(0.95) = 3.841$) and 95% significance level, and it has been evaluated that there was no publication bias. Although it was observed that there was no publication bias, funnel plot, Rosenthal’s Safe N, Begg and Mazumdar (Begg and Mazumdar’s rank correlation test) Rank Correlations and Egger’s Linear Regression tests were also applied. The funnel chart is shown in Figure 2.

When the funnel plot is examined, it can be said that the studies are in an image close to a symmetrical distribution to the right and left of the vertical line showing the average effect size. The studies collected in the upper part of the funnel plot show large sampled studies, while the studies in the lower part show studies with small samples. The fact that the total sample size of the studies constituting the meta-analysis study is 225.955 may

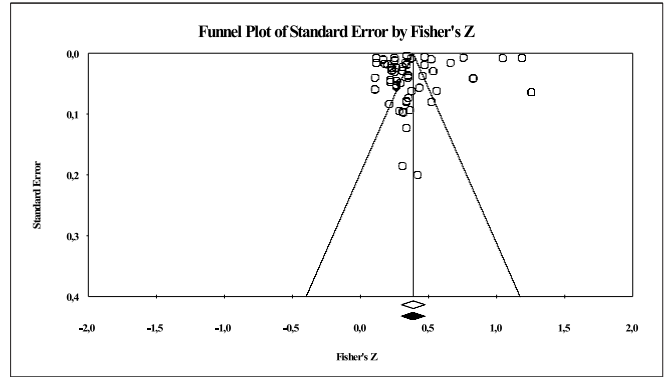


Fig. 2: Funnel plot

explain why the studies are collected at the end of the funnel. Although the funnel plot is used to determine publication bias, Lau, Ioannidis, Terrin, Schmid & Olkin (2006) point out that the graph should be interpreted with caution and does not contain statistical information. For this reason, Rosenthal’s Safe N, Begg and Mazumdar (Begg and Mazumdar’s rank correlation test) Rank Correlations and Egger’s Linear Regression Test findings, which contain statistical information about publication bias, are included in Table 2.

Table 2: Confidence Tests and Results Showing the Publication Bias of the Sampled Studies

| Confidence Tests | Data of Confidence Tests | |
|------------------------------------|----------------------------------|-------------|
| | Z- value for observed studies | 145.96700 |
| | the p-value for observed studies | 0.00000 |
| | Alpha | 0.05000 |
| Rosenthal's Fail-Safe N | Tails | 2.00000 |
| | Z for Alpha | 1.95996 |
| | Number of observed studies | 53.00000 |
| | Fail- Safe N (FSN) | 13908.00000 |
| | Tau | 0.28302 |
| | Tau for Z-value | 2.99157 |
| Begg and Mazumdar Rank Correlation | p-value (1 tailed) | 0.00139 |
| | p-valur(2 tailed) | 0.00278 |
| | Standard Error | 3.84111 |
| | 95% lower limit (2 tailed) | -10.47287 |
| | 95% upper limit (2 tailed) | 4.94982 |
| Egger's Regression Intercept | t-value | 0.71894 |
| | df | 51.00000 |
| | p-value (1 tailed) | 0.23773 |
| | p-value (2 tailed) | 0.47546 |

The value of $p = 0.000$ in Rosenthal's Safe N Test, one of the publication bias tests in Table 2, can be interpreted as the statistical significance of the result of the meta-analysis study. It is seen that 13908 studies are needed for the meta-analysis study to lose its significance ($p > 0.05$). In other words, the required number of studies is 13908 in order for the average effect size of 0.387 to be statistically insignificant. This value can be interpreted as the average effect size reached is resistant to publication bias. Although there is no definite judgment about how much Rosenthal Safe N value should be, Mullen, Muellereile & Bryant (2001) state that if the value reached in the result of $N / (5k + 10)$ exceeds 1, the meta-analysis study result (s) may be resistant for future research. When the necessary calculation is made $[13908 / (53 * 5 + 10) = 50.574]$ it is seen that the result is greater than 1. With the result achieved, it can be said that there is very low publication bias in the meta-analysis study. Since Kendall's Tau coefficient (0.28302) and p values (0.00139) are not statistically significant, result of Begg and Mazumdar Rank Correlations can be interpreted that the studies included are not biased. In addition, the result of Egger's Linear Regression Test ($p = 0.47546 > 0.05$) with 95% confidence interval can be considered as a sign that there is no publication bias in the meta-analysis study.

Findings

In this section, the analysis and findings of the average effect size of the relationship between parental involvement and student academic achievement and of other research questions are included.

Findings Regarding Effect Size Based on the Relationship Between Parental Involvement and Academic Achievement

It was stated in the previous sections that the random effects model will be used because the research on the relationship between parental involvement and academic achievement is included in the field of social sciences and the studies included in the study are carried out using different patterns, in different cultures and school levels (Başol, 2016). However, in order to determine which model (fixed effects model or random effects model) will be used depending on the average effect size distribution, heterogeneity test was applied to the data obtained within the scope of the study.

As a result of the heterogeneity test, it was seen that the Q value was statistically significant (Q: 19776.278; df (Q): 50; $p: 0.00$). In the χ^2 table, it is seen that it exceeds the value (df: 50; $\chi^2 (0.95) = 67.505$) with 50 degrees of freedom and 95% significance level. In addition, the fact that the p value ($p = 0.000$) is less than 0.05 indicates that the effect size distribution is heterogeneous. The I^2 statistic value, another statistic used in heterogenic tests, was also examined because it is stated that the Q statistic is not strong enough to accurately test the heterogeneity of the studies included in the meta-analysis studies (Huedo Medina, Sánchez Meca, Marín Martínez, & Botella, 2006). Unlike the Q statistic, the I^2 statistic is not sensitive to the effect size value and the number of studies included in the meta-analysis. It is clear that the I^2 statistic with the value of 99.737 exceeds the 75% value which can be accepted as the limit value. According to the classification of I^2 , 75% ($I^2 = 75$) values indicates that the heterogeneity is at a high level (Higgins & Thompson, 2002). The value obtained determined that the inter-study variability or heterogeneity was at the level of 99.737%. According to the I^2 classification, I^2 value 99.737% ($I^2 = 99.737$) can be interpreted as a sign of high level of heterogeneity. In summary, the heterogeneity test result (Q = 19776.278, $p < 0.05$, $I^2 = 99.737$) indicated that the effect size distribution is heterogeneous and the random effects model should be used in the interpretation of the average effect size.

When Table 3 is examined, it is seen that the average effect size obtained in the fixed effects model is 0.460 and in random effects model is 0.387. Fisher z values were used for effect sizes. When the Fisher z value (0.387) is converted into the correlation value (0.369), it can be said that according to Cohen et al. (2011) the average effect size of the relationship between parental involvement and student academic achievement is moderate and positive. When the statistical significance of the analysis was evaluated according to the result of the z-test, it was calculated as $z = 8.904$ and it was evaluated that the analysis was statistically significant with the value of $p = 0.000$.

The average effect size and the weights of the studies obtained as a result of the analysis made according to the random effects model evaluating the relationship between parental involvement and academic success are shown in the forest plot in Figure 3. When the forest plot is examined, it is seen that the research with the widest confidence interval is Gonida & Cortina (2014) and the research with the lowest

Table 3: Meta-Analysis of the Relationship Between Parental Involvement and Academic Achievement

| Heterogeneity Test | | 95% confidence interval | | | Test of null | | | | | |
|--------------------|----|-------------------------|-------------|-------------|--------------|---------|-----------|-------|---------|--------|
| Model | N | E.S | Lower Limit | Upper Limit | Z-value | P-value | Q value | df(Q) | P-value | I2 |
| Fixed | 53 | 0.460 | 0.455 | 0.464 | 218.411 | 0.000 | 19776.278 | 50 | 0.000 | 99.737 |
| Random | 53 | 0.387 | 0.302 | 0.473 | 8.904 | | | | | |

confidence interval is Gubbins & Otero (2016). It can be said that the highest weight percentage among the studies is 1.95%, and more than one study (such as Aikens & Barbarian, 2008; Benner et al., 2016; Gravis & B. Wright, 2011; Roska & Kinsley, 2018) has this weight. The lowest weight percentage is 38% and belongs to Núñez, Suárez, Rosário, Vallejo, Valle & Epstein (2015). When the effect sizes of the studies included in the meta-analysis study are examined, the biggest effect size with 1.256 was Ogwari, Simiyu & Kindiki (2014) and the lowest effect size with 0.110 was Gonida and Cortina (2014)

and Perkins et al. (2016). If the statistical results of the effect size are evaluated in general, it can be seen that all 53 studies have a positive effect.

The appropriateness of combining the effect sizes of the studies included in the meta-analysis study was also examined with the normal distribution chart. The normal distribution of the effect sizes of the studies is given in Graphic 1 below. In Graph 1, it is observed that the effect sizes of the studies are on both sides of the normal distribution line and within confidence intervals. According to the evaluation of

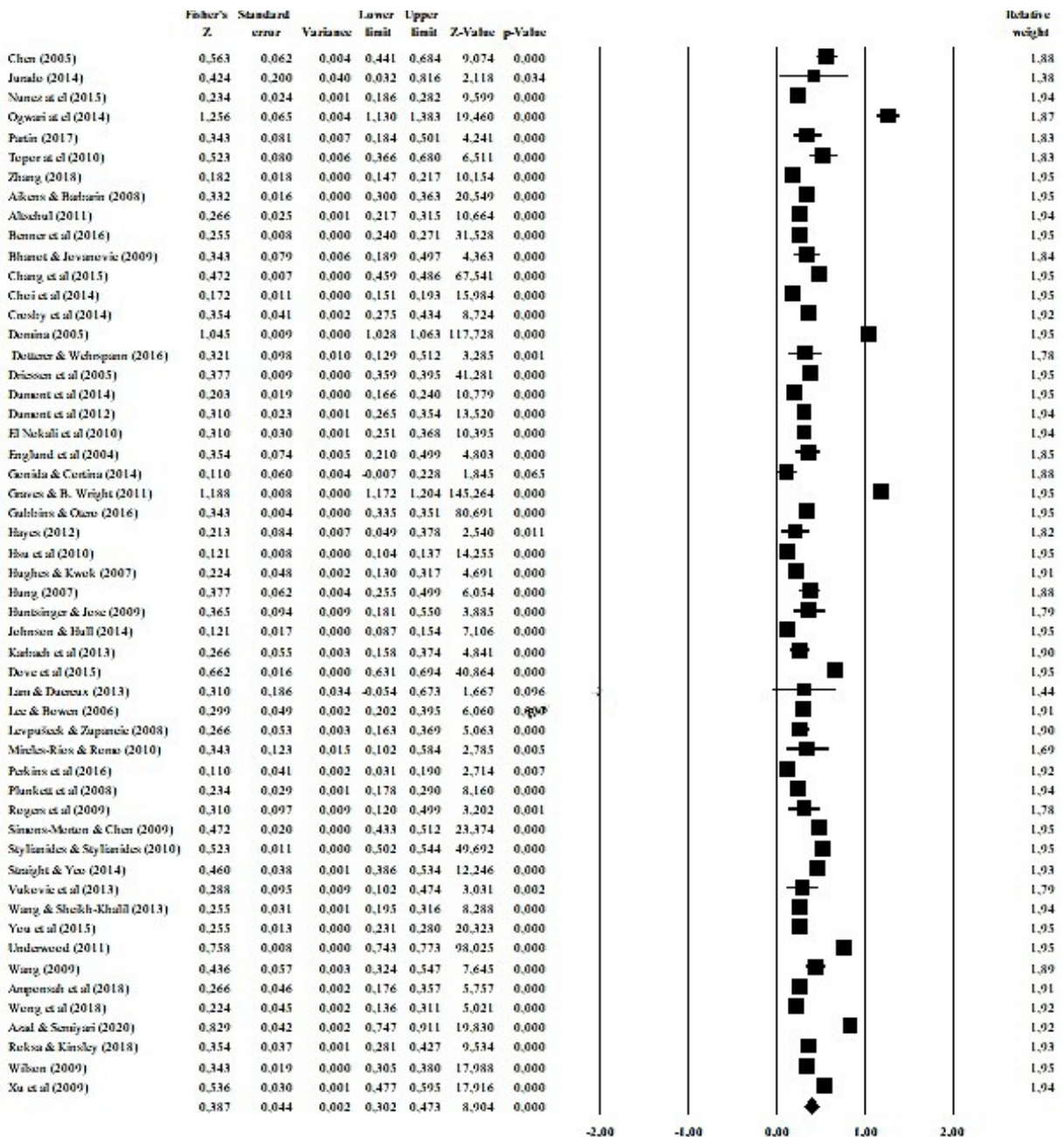
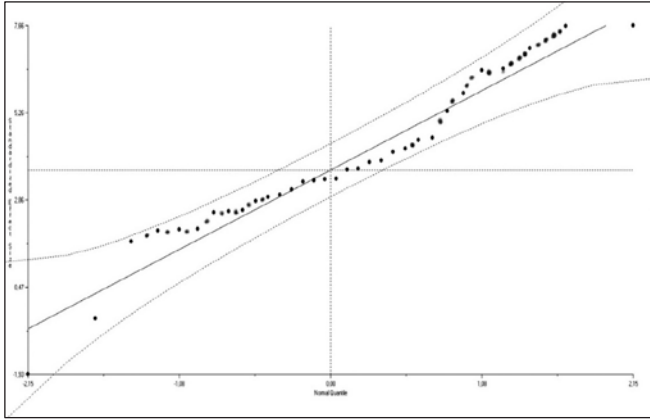


Figure 3. Effect Size and Weights of the Studies



Graphic 1: Normal Distribution of Effect Sizes of Studies

Rosenberg, Adams & Gurevitch (2000), if the distribution is normal, it is statistically possible to calculate the effect sizes of the studies.

Findings Regarding Whether The Average Effect Size of the Relationship Between Parental Involvement and Academic Achievement Differentiates According to Subject Areas (Mathematics, Science, Reading Skills, Foreign Language Skills)

The statistical analysis findings for the sub-problem “ Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to the subject areas (mathematics, science, reading skills, foreign language skills)” are given in Table 4.

Examining the subject areas in which the research was conducted, it is seen that the average effect size according to Fisher z values of the relationship between parental involvement and academic achievement is 0.303 for mathematics, 0.188 for science, 0.402 for reading skills and 0.421 for foreign language skills. Transforming Fisher z values into correlation values, the average effect sizes of the subjects, according to Cohen et al. (2011), mathematics lesson has a weak effect with 0.294, science lesson has a weak effect with a value of 0.186, reading skills has a moderate effect with a value of 0.382, and foreign language skills with a value of 0.398. When the effect sizes of the subject areas are evaluated, it is seen that parental involvement has the greatest effect on foreign language

skills and least on the science subjects. However, it can be accepted that parental involvement has a remarkable effect on all learning areas. Subject areas heterogeneity test value was determined as $Q_B = 0.275$. In the χ^2 table, 3 degrees of freedom at 95% significance level was observed with a value of 7.81473 ($\chi^2_{(0,95)} = 7.81473$). The Q_B value was determined at 0.275 and $p = 0.000$. On the other hand, the Q_B value ($Q_B = 0.275$; $p = 0.000$) is not significant because it is below the value ($\chi^2_{(0,95)} = 7.81473$) in the χ^2 table with 3 degrees of freedom and 95% significance level. Within the framework of the values obtained, the heterogeneity hypothesis of the subject areas was accepted in the fixed effects model. The average effect sizes obtained according to the subject areas do not differ statistically significantly.

Findings Regarding Whether the Average Effect Size of the Relationship Between Parental Involvement and Academic Achievement Differentiates According to School Level (Primary School, Middle School and High School)

The statistical analysis findings for the sub-problem “ Does the average effect size of the relationship between parental involvement and academic achievement significantly differ according to school levels (primary school, secondary school, high school)?” are included in Table 5.

In order to determine whether the relationship between parental involvement and academic achievement differentiates according to the school level, school levels are grouped as primary school, middle school and high school. The effect sizes were observed as 0.437 for primary school, 0.368 for middle school and 0.339 for high school according to Fisher z value. When Fisher z values are converted to correlation values, the average effect size for school levels is 0.411 for primary school, 0.352 for middle school and 0.326 for high school (Cohen et al., 2011). Heterogeneity test was conducted to determine whether there is a significant difference between average effect sizes. As a result of the heterogeneity test, $Q_B = 0.373$; $p = 0.723$ was found. The Q_B value ($Q_B = 0.373$; $p = 0.723$) is not significant since it is below the critical value ($\chi^2_{(0,95)} = 5.99146$) in the χ^2 table at 2 degrees of freedom and 95% significance level. These findings indicate that the average effect size distribution should be accepted in the fixed effects model. According to

Table4: Effect Size Differences by Subject Areas

| Variable | QB | N | E.S. | 95% confidence interval | | Z-value | P-value | df(Q) | P-value |
|------------------|-------|----|-------|-------------------------|-------|---------|---------|-------|---------|
| | | | | Lower | Upper | | | | |
| Subject | 0,275 | | | | | | | | |
| Matematics | | 20 | 0.303 | 0.248 | 0.358 | 10.746 | 0.000 | 3 | 0.000 |
| Science | | 4 | 0.188 | 0.126 | 0.250 | 5.954 | 0.000 | | |
| Reading | | 15 | 0.402 | 0.198 | 0.607 | 3.850 | 0.000 | | |
| Foreign language | | 14 | 0.421 | 0.304 | 0.538 | 7.076 | 0.000 | | |

Table5: Effect Size Differences by School Level

| Variable | Q _B | N | E.S. | %95 confidence interval | | Z-value | P-value | df(Q) | P-value |
|--------------|----------------|----|-------|-------------------------|-------|---------|---------|-------|---------|
| | | | | Lower | Upper | | | | |
| School level | 0,373 | | | | | | | | |
| Primary | | 20 | 0.411 | 0.256 | 0.618 | 4.730 | 0.000 | 2 | 0.723 |
| Middle | | 20 | 0.352 | 0.297 | 0.439 | 10.117 | 0.000 | | |
| High | | 11 | 0.326 | 0.164 | 0.514 | 3.793 | 0.000 | | |

Table6: Effect Size Differences by Geographical Regions

| Variable | Q _N | N | E.S. | %95 confidence interval | | Z-value | P-value | df(Q) | P-value |
|----------|----------------|----|-------|-------------------------|-------|---------|---------|-------|---------|
| | | | | Lower | Upper | | | | |
| Region | 0,328 | | | | | | | | |
| Asia | | 7 | 0.400 | 0.259 | 0.541 | 5.532 | 0.000 | 3 | 0.148 |
| Europe | | 6 | 0.262 | 0.178 | 0.346 | 6.115 | 0.000 | | |
| Africa | | 2 | 0.760 | 0.210 | 1.30 | 1.536 | 0.025 | | |
| America | | 38 | 0.386 | 0.281 | 0.491 | 7.187 | 0.000 | | |

the school level, there is no statistically significant difference between the average effect sizes of the studies included in the meta-analysis study.

Findings Regarding Whether the Average Effect Size of the Relationship Between Parental Involvement and Academic Achievement Differentiates According to Geographical Regions (Asia, Europe, Africa and America)

The statistical analysis findings for the sub-problem “Does the average effect size of the relationship between parental involvement and academic achievement significantly differ by geographic regions (Asia, Europe, Africa and America continents)?” are included in Table 6.

In order to determine whether the relationship between parental involvement and academic achievement differs according to geographical regions, geographical regions are grouped according to the continents (Asia, Europe, Africa and America) where the researches are carried out. When the findings are evaluated, according to the Fisher z value the effect size value for the Asian continent is 0.400, 0.266 for the European continent, 0.760 for the African continent and 0.386 for the American continent. When the effect size values are transformed into correlation values, the Asian continent has a medium level of 0.380, the European continent has a weak level of 0.256, the African continent has a strong level of 0.641, and the American continent has a moderate effect size of 0.386. In addition, the effect size between variables at all geographical regions is positive. While the average effect size of the geographical regions is 0.328 according to the Fisher z value, when this value is converted to the correlation value, the average effect size is 0.316 and it has been observed to be medium and positive. The heterogeneity test result

was evaluated to determine whether the difference between the effect sizes was significant. Among the groups formed according to geographical regions, the Q_B value (Q_B = 0.328; p = 0.148) is not significant since it is below the critical value ($\chi^2_{(0.95)} = 7.81473$) in the χ^2 table at 3 degrees of freedom and 95% significance level. Because of these findings, the average effect size distribution should be accepted in the fixed effects model. There is no statistically significant difference between groups of geographical regions.

Conclusion And Discussion

In this meta-analysis study, which aims to determine the average effect size of the relationship between parental involvement and academic achievement at the level of primary, secondary and high schools, it was observed that the average effect size of the relationship between parental involvement and academic achievement was positive and at the medium effect size level. It was obtained that the relationship between parental involvement and academic achievement did not differ significantly in terms of subject areas (mathematics, science, reading and language skills). The effect size was found to be weak for mathematics and science lessons, and moderate for reading skills and foreign language. When the average effect size of the relationship between parental involvement and academic achievement was examined by school level, it was determined that the average effect size did not differ statistically. Another finding of the study was that the average effect size for all school levels (primary school, middle school and high school) was moderate. In addition, it was observed that the average effect size of the relationship between parental involvement and academic achievement did not significantly differ according to geographical regions (Asia, Europe, Africa

and America continents). It has been determined that the average effect size is moderate for the Asian and American continents, strong for the African continent and weak for the European continent. When the results obtained from the study are evaluated, it can be said that there is a moderate relationship between parental involvement and academic achievement regardless of continent, school or course.

The effect size finding of the relationship between parental involvement and academic achievement of the study coincides with the study findings of Fan & Chen (2001), Jeynes (2003, 2005, 2007, 2012), Erion (2006), Senechal & Young (2008), Hill & Tyson (2009) and Castro et al. (2015). On the other hand, Mattingly et al. (2002) and Patall et al. (2008) are not compatible with the study findings. The similarity or difference of the study findings can be explained by the complex structure of parental involvement (Roska & Kinsley, 2018). Within this complexity, it is difficult to comment except that there is a moderate relationship between parental involvement and academic achievement. It is not clear whether a different statement is the involvement of parent in school activities or helping the child with homework at home is the source of this relationship. The reason for this is parental involvement defined assorted in the studies included in the meta-analysis such as the hours the parents spend voluntarily at the school of the child; involvement of parents in school activities, teacher-parent communication; involvement in school activities such as homework, at home; expectations related to the education level of the child and talking to the child about school problems. It is the fact that parental involvement was investigated in one or more dimensions intertwinedly, so other criteria could not be determined in terms of subject, except that the articles investigated the relationship between parental involvement and academic achievement. In this respect in determining the studies to be included in the analysis, the results obtained without any other criteria in terms of subject, do not show which dimension of parental involvement is moderately related to academic achievement. At the same time, it is clear that studies examining the relationship between parental involvement and academic achievement do not reflect the causal relationship, and the data sets of the studies reflect only the findings of the observed parts. This situation may explain the different correlation values not only in meta-analysis studies but also in other studies.

Finding the average effect size of the relationship between parental involvement and academic achievement may require answering the question of how parental involvement affects academic achievement. Parental involvement sends the message to the child that he and his performance are important (Wang & Sheikh-Khalil, 2014) and that encouragement and support will be provided (Wong, Ho, Wong, Tung, Chow, Rao et al., 2018). Support and encouragement are likely to bring high academic achievement. At the same time,

parental involvement, which provides suitable materials and environment for learning, has a positive relationship with academic success (Zhang, 2018). However, the parental involvement literature lacks empirical study data, and it is unclear whether the types of parental involvement develop prior to the child's academic achievement or as a result of academic achievement. Therefore, conducting experimental studies on parental involvement can provide data to the field.

In this study, it was observed that each of the mathematics, science, reading and foreign language skills courses had a positive relationship with parental involvement and generally had a moderate effect size. The studies of Aikens & Barbarian (2008), Graves & B. Wright (2011) and Stylianides & Stylianides (2011) support the finding of this meta-analysis study. In addition, Crosby, Rasinski, Patak & Yıldırım's (2015) research found that families' reading activities at home with their children has a positive relationship with children's reading skills. The findings of You et al. (2015) showed that increased parental involvement means increased mathematics achievement. Particularly, parents talking about math and math homework, having and using math materials at home are among the important factors affecting math achievement (You et al., 2015). Johnson & Hull (2014), Bhanot & Jovanovic (2009) and Zhang (2018) supported the relationship between parental involvement and science achievement with their research. Parents watching science/science-based programs with their children, reading books about scientific discoveries, reading science-fiction content or watching movies can be shown as activities that increase science success (Bhanot & Jovanovic, 2009; Johnson & Hull, 2014; Zhang, 2018). As a result, parental involvement positively affects the academic achievement of the child for all courses.

Among the findings of the meta-analysis study is that the relationship between parental involvement and academic achievement does not differ according to school levels. The relationship between parental involvement and academic achievement has a moderate average effect size according to school levels. This finding of the study showed that parental involvement is important for academic achievement at all school levels (primary school, middle school and high school). Chang et al., (2015), Englund, Luckner, Whaley & Egeland (2004), Hayes (2012), Hughes & Kwok (2007), and Straight & Yeo (2014) studies show that the relationship between parental involvement and academic achievement is positively related and meaningful. Contrary to popular belief, parental involvement does not decrease as the school level of the child increases (Azad & Semiyari, 2020). For example; while parental involvement in primary school is reading and doing homework with the child, carving and singing (Stylianides & Stylianides, 2010; Xu, Benson, Mudrey-Camino & Steiner, 2010; You et al., 2015), this type of participation is not useful as child gets older. As the school

level of the child rises, parental involvement turns into high academic expectations, supportive behaviors such as praising effort and performance, and positively affects academic achievement. It is observed that the academic achievement of children who have high level of communication with the parents is also high. The studies of Amponsah, Milledzi, Ampofo & Gyambrah (2018) and Zhang (2018) show that with the increase of the child's school level, the parents's interest in academic performance increases and parents prefer academic encouragement. Azad & Semiyari (2020) and Epstein (2005) stated in their research that the strong interaction and relationship between parent-child and parent-teacher, parenting skills affect the success of children at every school level. It may be suggested that future research on parental involvement should focus on which factors of involvement have positive results for academic success and students. In addition, one of the areas that can be focused on is when parental involvement should be.

One of the findings of this meta-analysis study was that the relationship between, parental involvement and academic achievement did not differ statistically significantly at the geographical level. The average effect size of the geographical regions varied between weak level and strong level. It has been determined that the African continent has a strong average effect size, but two studies in accordance with the research criteria determined in the African continent have been reached, so it can be said that more research is needed on this continent. On the other hand, it can be said that the sample of primary studies included in the meta-analysis study constitutes a cultural mosaic (such as America, Thailand, Hong Kong, Germany, Iran, Ghana, the Netherlands, Singapore, and Chile). The positive relationship between parental involvement and academic achievement in different geographies and cultures is an important data in terms of directing the attention of schools to this field.

Based on the finding that there is a moderate relationship between parental involvement and academic achievement, which is the main finding of the study, it can be said that the efforts of schools to improve parental involvement will contribute to the academic achievement of students and the effectiveness of the school, albeit at a moderate level. Efforts should be made in terms of parental involvement in schools because when families are left to their own preferences regarding participation, it is seen that the involvement is higher in families with a high socio-economic level and lower in the opposite case (Epstein, 2005; Choi et al., 2015). In this context, although teacher practices at all school levels, politics and philosophy of the school significantly affect parental involvement (Epstein et al., 2011; Jenkins, 2017; Partin, 2017), studies indicate that the main actor influencing parental involvement is teachers (Lewis, Kim & Bey, 2011; Murray, McFarland-Piazza & Harrison, 2015). However, studies show

that many teachers have problems in communicating or in relationships with parents. (Deslandes, Barma & Morin, 2015; Ünal, Yıldırım & Çelik, 2010). de Bruine, Willemse, D'Haem, Griswold, Vloeberghs & Van Eynde (2014) and Miller, Lines, Sullivan & Hermanutz (2013) attribute these problems teachers experience to the inadequacy of the education they receive regarding parental involvement. Based on this, it can be said that teacher training programs should be developed on how to ensure parental involvement. Apart from this, teachers can be encouraged to guide parents on how to help their children at home and how they can be involved in school, to organize teacher-parent meetings, to make home visits, to cooperate to support child learning.

Since parents are often dealing with teachers, the principal is the key to ensuring parental involvement, although he is the most important person in ensuring parental involvement. Because it is the person who determines the policies regarding school-parent relations, seeks an environment and opportunity, solves problems when necessary, and becomes a mediator. According to Sanders, Sheldon & Epstein (2005), school administrators' ability and capacity to cooperate is an important indicator of parental involvement in schools. These capacities of school administrators can act as a facilitator for parental involvement. Professional networks can be established to develop these skills of school administrators or administrators working in the same region can share experiences by establishing expanded groups. Thus, solution-based sharing can take place. According to Barr & Saltmarsh (2014), school administrators can effectively direct one-to-one communication with parents by developing an atmosphere of trust and compassion, and they can welcome and support parental involvement. As Epstein et al. (2011) stated, many schools leave parents alone in how to involve in education. In order to eliminate this loneliness, school administrators can conduct regular meetings with teachers to determine what kind of parental involvement is needed for student academic achievement. School administrators can try to get to know the parents one by one and invite them to attend the education of their children. In this way, they can also have the opportunity to be role models for teachers. They can mediate the development of school-parent partnership by displaying supportive and reflective behaviors for teachers to communicate with parents. In addition, working parents cannot visit the school on days when the schools have parent meetings (Altschul, 2011; Gonida & Cortina, 2014). School administrators can ensure the involvement of parents in the school by using the video conference method, electronic or printed information notes and messages for families in this situation. Parental involvement not only contributes to academic achievement but also it brings along school compliance (Chen, 2005), attendance and regular homework habits (Dove, Neuharth-Pritchett, W. Wright & Wallinga,

2015), positive classroom behaviors (Hayes, 2012). When parental involvement is considered together with these results, it can be said that school administrators should take initiatives to improve parental involvement.

It is seen that students and teachers gain various gains in case of parental involvement. Students gain in their academic learning, and teachers receive more support from both their parents and their administrators in understanding families and ensuring their involvement when they take initiatives in this regard. Regarding parental involvement, it can be said that in general, both families and schools should make an effort to understand each other.

Limitations

Most research on parental involvement is relational and cannot explain causation. This meta-analysis study also has limitations in combining the results of relational research and is far from explaining causality. In addition, the fact that the definitions of parental involvement used in researches are not the same makes it difficult to make an operational definition of parental involvement. However, the study, like all other meta-analysis studies, focused on the existing literature. The study focused on general parental involvement, not on a particular parental involvement pattern or type. Thus, in whatever way it is tried to be supported by research findings that parental involvement is an important actor for student achievement. In addition, instead of reducing academic achievement to one or more courses, it was based on general academic achievement and the results of studies (53 studies) conducted in different geographies over a wide period of time were integrated. Every year children attend school they attend home, and this should not be overlooked. As a result, the effects of the school are seen on the parents, and the effects of the parents on the school. Considering that the academic achievement of the student is among the main goals of the school, achievements in education is worth developing every semester for policy makers, school administrators, teachers and researchers.

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