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A Meta-Analysis of the Effect of Parental Involvement on Students' Academic Achievement

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Abstract: This study aims to examine the effect of parental involvement on students' academic achievement at pre-school, elementary and secondary levels by using the meta-analysis method with respect to home-based and school-based parental involvement strategies. Data consisted of 55 independent research studies in English published between 2010 and 2019, and accessed through ERIC, Academic Search Complete, Science Direct, Wiley Online Library, and PsycNet databases. Findings revealed that the effect of parental involvement on academic achievement was positive but small. Parental expectations had the biggest effect on academic achievement and parental control had a negative and small effect. The mean effect of parental involvement on students' academic achievement does not differ significantly according to moderator variables of education level, measurement type or measurement area but differs by developmental level of the country. The results are discussed using available related meta-analysis studies in the literature.

Keywords: parental involvement, academic achievement, developing countries, education level, meta-analysis.

Introduction

There is a strong belief in society that parental involvement has a strong positive effect on students' academic performance. Student learning not only takes place in schools but also the contexts of families and communities play a great role (Ma, Shen, Krenn, Hu & Yuan, 2016). Therefore, parental involvement is seen as quite significant in students' learning and academic achievement. The relationship between parental involvement and academic achievement has long been an area of research across the world (Boonk, Gijselaers, Ritzen & Brand-Gruwel, 2018; Epstein, 1991; Roy and Giraldo-García, 2018).

Empirical research studies and meta-analysis studies have put forth a strong relationship between parental involvement and academic achievement, mostly indicating a positive role. Despite the research support and common view among people regarding the positive effect of parental involvement on academic achievement, there is confusion on the definition of parental involvement, as well as its activities, types and outcomes (Shute, Hansen, Underwood & Razzouk, 2011). Although most people consider parental involvement a remedy for school education, there are some inconsistencies in the findings regarding the effect of parental involvement on academic achievement (Fan & Chen, 2001). The literature contains studies that indicated a positive relationship (Dotterer & Wehrspann, 2016; Durand, 2011; Gordon & Cui, 2012; Gubbins & Otero, 2016; Manolitsis, Georgiou &

Tziraki, 2013; Phillipson & Phillipson, 2012); a negative relationship (Dumont et al, 2012; Gonida & Cortina, 2014; Xu et al, 2010; Stright & Yeo, 2013) or lack of a relationship (Altschul, 2011; Hayes, 2012; Johnson & Hull, 2014; Phillipson & Phillipson, 2012).

There is not a consensus on the definition of parental involvement and there are also different types and dimensions of parental involvement. The difference in defining parental involvement may have contributed to the inconsistent results in the literature. Due to inconsistencies in the findings regarding the relationship between academic achievement and parental involvement, a need for meta-analysis studies has risen (Fan & Chen, 2001). Though there are some meta-analysis studies in the literature (Fan & Chen, 2001; Jeynes, 2005; Hill & Tyson, 2009; Ma, Shen, Krenn, Hu & Yuan, 2016), there is a need for more such studies, including more recent studies.

The literature on parental involvement is complex and contradictory (Shute et al, 2011). This is in part because parental involvement includes multiple behaviours (Roy & Giraldo-García, 2018). Grolnick and Slowiaczek (1994, p. 238) define parental involvement as "the dedication of the resources by the parent to the child". LaRocque, Kleiman and Darling (2011) describe it as investment in the education of children. It is also defined as parents' engagement in activities which foster learning and performance of their children (Fantuzzo et al, 2000 as cited in Ma et al, 2016). In the same vein, the current study considers parental involvement as parents' efforts to contribute to their children's academic and social/emotional development. Rather than the definition of the concept, what matters is what behaviours are considered as parental involvement.

Parental involvement is defined in relation to a number of different parental behaviours including parental aspirations for their children's academic performance, parents' communication with children, parents' participation in activities in school, parents' communication with teachers, parental rules and so on (Fan & Chen, 2001). Epstein (2010) lists types of involvement as parenting, communicating, volunteering, learning at home, decision-making, and collaborating with the community. Shute et al (2011) list home-related parental involvement types as parenting style, discussing school activities, checking homework, aspirations and expectations, reading at home, supervision and home rules, while school-related aspects include contacting school personnel, attending parent teacher organisations and volunteering at school.

On the other hand, academic achievement can be defined as "learned proficiency in basic skills and content knowledge" (McCoy, Twymen, Ketterlin-Geller & Tindal, 2005, p. 8). Actually, academic achievement in a course or lesson is not only related with those experiences in that course or lesson. It is cumulative of the present and prior school, family and community experiences (Rivkin, Hanushek & Kain, 2005). However, as it is impossible to measure such a cumulative effect, it is the measurement of a single lesson or general assessment such as general point averages (GPA) which are used. Therefore, while some studies use a measure of a single achievement test, some use the grade of a lesson and some use GPA. No matter which unit is measured, academic achievement is eventually one of the main aims of the educational experiences. In the current study, academic achievement measures were grouped as standard and non-standard tests.

The relationship between parental involvement and academic achievement varies according to the parental involvement type the study focuses on. While some parental involvement types have shown positive association with academic achievement, some other types have proven negative or null

association (Boonk et al, 2018). In their review of the studies on the relationship between parental involvement and academic achievement, Boonk et al (2018, p. 25) concluded that parental involvement is related to academic achievement, yet this relationship is not as strong as traditionally believed. To put forth the effect of parental involvement on academic achievement, more meta-analysis studies focusing on different types of parental involvement are needed. This study focuses on this effect with respect to home-based and school-based parental involvement types including control, learning assistance, communication, support, activity, academic socialisation and expectation.

While home-based involvement is related to the activities carried out at home to enhance children's learning, such as helping with homework, school-based involvement has to do with activities performed by the parents at schools, such as attending school events or parent-teacher conferences (Boonk et al, 2018). As these activities are quite different from each other, they are differentiated in the analysis in the current study. Parental expectations, also called parental aspirations, are parents' expectations regarding their children's performance at school. This has been researched in the literature and it generally shows a positive association with academic achievement (Shute et al, 2011). Parental support includes encouraging children through actions such as providing them with an appropriate environment, praising them or manifesting that they care for them (Boonk et al, 2018). Learning assistance refers to parents' helping their children with their academic responsibilities such as time spent on homework completion, assisting with the difficult academic contents or tutoring. Communication refers to the exchange of ideas between parents and children with respect to issues on school, plans or activities. Control has a negative association with academic achievement. Parental control includes controlling the child too much or exerting pressure on them. Activity includes parent-child activities at home, such as reading with the children, storytelling, parent weekly home activities, which mostly address children at pre-school or early elementary education levels. Academic socialisation has to do with the messages transmitted to students by their parents about academic issues and the role of school in their future, such as the significance of making an effort in school or shame for not fulfilling expected duties (Cross, Marchand, Medina, Villafuerte & Rivas-Drake, 2019; Hill & Tyson, 2009).

In addition to the effect of parental involvement types on students' academic achievement, moderator variables of location, participant type, publication date, education level, academic area, and measure of academic achievement are also examined in the current study. It has been put forth in the literature that parental involvement variables interact with location (Boonk et al, 2018). Regarding participant types, some studies include only students while some others include parents as well. The source of information is expected to influence the results. Publication date is included to see whether the level of effect varies with regard to the years. Education level is also a significant moderator. The literature suggests that the size of the effect of parental involvement differs with respect to education levels (Jeynes, 2007; Kim & Hill, 2015). Parental participation at lower levels, such as pre-school or elementary levels, can be expected to be much more than at higher levels such as secondary level. Besides, the dimensions of the parental involvement may also change by the level. The academic area may also affect the results as some studies measure general academic achievement, while some studies measure academic achievement in single areas such as mathematics or language. Measure of academic achievement refers to whether measurement is general point average or a standard measurement scale, which may also mediate the results.

This study aimed to examine the effect of parental involvement on students' academic achievement. To this end, the following research questions were investigated.

1. Does parental involvement have an effect on academic achievement of school children?
2. Does the effect of parental involvement on academic achievement differ by moderating variables?

Methods

The meta-analysis method was employed in the study. Meta-analysis is defined as combining the statistical findings of independent research studies and carrying out a statistical analysis of the obtained results (Borenstein, Hedges, Higgins & Rothstein, 2009; Dinçer, 2018; Lipsey & Wilson, 2001).

Data Collection

The data of the current study were accessed through ERIC, Academic Search Complete, Science Direct, Wiley Online Library and PsycNet databases. The data consist of articles published in English. Keywords of parental/family involvement, family engagement/participation, performance/achievement/success/outcomes were used in the searching process. The related keywords in the article titles were searched. The data embody the span of 2010 to 2019. The last date of search is 10 November 2019. Searches in the databases resulted in 236, 134, 136, 68 and 22 results, respectively. The titles and abstracts of the resulting articles were examined and 82 of them were selected as they met the selection criteria of this study. Of this data pool, the studies that did not include needed statistical data (k = 20), that included intervention (k = 3), that had immigrant participants (k = 2) and that had students with need for special education (k = 2) were eliminated. All in all, the data set of the study includes 55 independent research studies. The data flow diagram is presented in Figure 1.

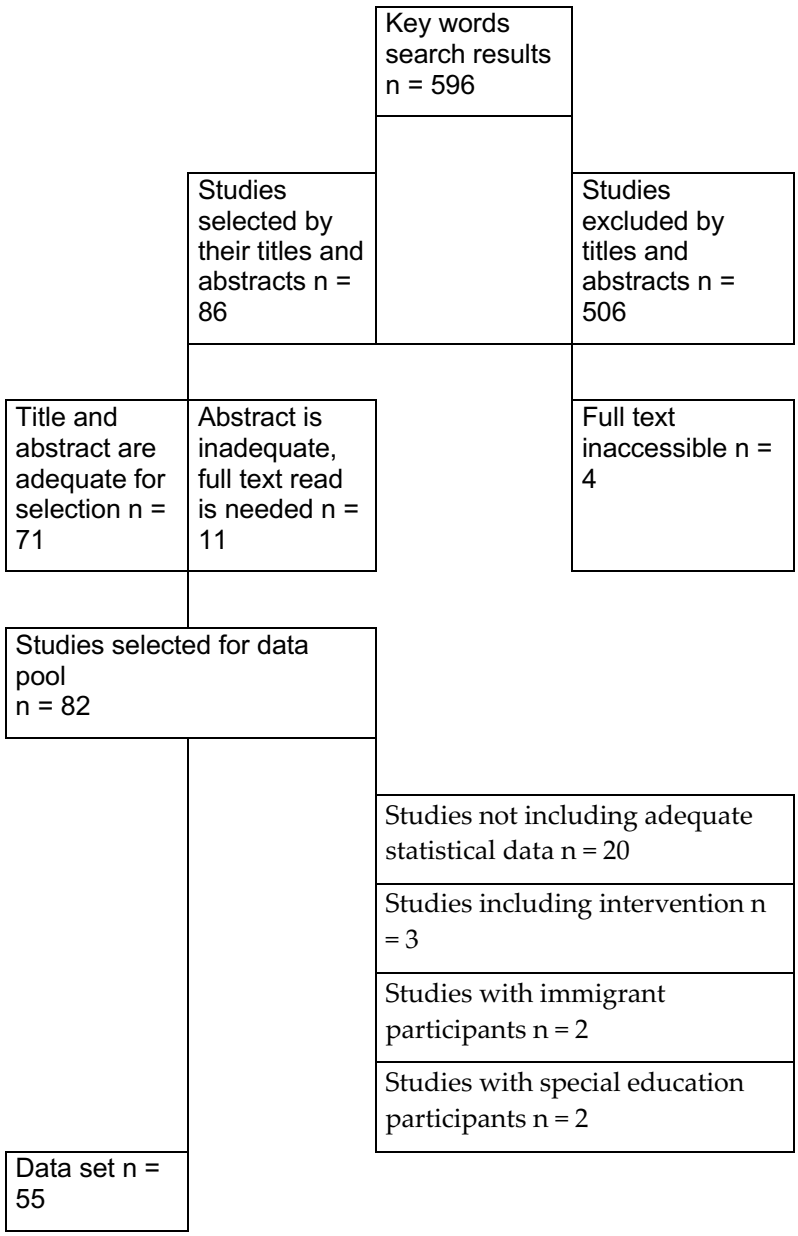

Figure 1: The data flow diagram

Inclusion Criteria of the Study

1. The research results should be based on parental involvement and measurement of academic achievement. Studies focusing on academic achievement and socio-economic status are excluded.
2. The study should include the necessary statistical data to calculate effect size (r or R^2 and N). Studies involving simple linear regression analysis and correlation analysis are included but

studies involving multiple regression, hierarchical regression and logistic regression are excluded.

3. The study should have been published between 2010-2019.
4. The language of the study should be English.
5. The participants of the study should have attended at an education level from early childhood education to secondary education.

Coding

A coding form in Excel format was created to include codes that would represent the general characteristics of the independent studies. The form consists of categories of identification tag, measured parental involvement type, measured academic achievement area, measure of academic achievement, education level, country of the sample, participants' legal status and publication date.

Parental involvement type: If parental involvement was measured generally through a scale, it was coded as parental involvement index. If parental involvement types were reported independently, the parental involvement types were coded separately such as parental support or parental control.

Academic achievement area: If the learning output of mathematics, science, language and others was co-evaluated in the study, it was coded as general academic achievement. If the outputs of mathematics, language or other areas were reported independently, they were coded separately such as mathematics or language. If the results included outputs regarding reading or writing, they were coded as language.

Measure of academic achievement: Academic achievement measurement types were coded. If the study used standard tests, they were coded as standard test. If general point average or lesson average are used, then they were coded as non-standard tests.

Participant type: The participant groups including both students and parents were coded as student-parent, only student participants were coded as student and teacher participants were coded as teacher.

Publication date: The year in which the article was published was taken as reference.

Location: The area of the sample was considered. The countries of the studies were coded as either developed or developing countries, which was carried out in reference with the Human Development Report prepared by the United Nations Development Programme (2019).

Education level: Education level was coded with reference to the International Standard Classification of Education (UNESCO, 2011).

Ten studies selected from the data set were coded by the two researchers and the codes were compared. Then the studies in the data set were coded in the coding form by the first and second researchers independently. Agreement between the two coders was calculated through the Miles and Huberman (1994) reliability coefficient. Agreement between the coders was calculated as 93%. The codes with low agreement were finalised after negotiation between the coders. The general characteristics of the studies in the data set are presented in Table 1.

Table 1: Characteristics of the data set

Year	f	%	Measure	f	%
2010-2014	18	32,73	Standard test	13	23,64
2015-2019	37	67,27	GPA	42	76,36
Total	55	100,00	Total	55	100,00
Level			**Location**		
Pre-school	4	7,27	Developed	38	69,10
Elementary	33	60,00	Developing	17	30,90
Secondary	12	21,82	Total	55	100,00
Mixed	6	10,91			
Total	55	100,00			
Academic Output			**Participant Type**		
Language	18	32,73	Student	26	47,27
Mathematics	11	23,00	Mixed	29	47,27
Mixed	26	47,27			
Total	55	100,00	Total	55	100,00

Data Analysis and Results

In meta-analysis studies, there are three options in selecting the unit of analysis. The first is the study as analysis unit; the second is each effect size that the studies produce; the third is replacement of the first two options as analysis units based on the constructs or categories of the study (Lipsey & Wilson, 2001; Şirin, 2005). In most of the studies in the data set (k = 43), the relationship between parental involvement and academic achievement is reported in correlation coefficient format. Therefore, the effect sizes were preferred as units of analysis in the current study.

Due to variation of the characteristics of the basic studies in meta-analysis data sets (Borenstein et al, 2009: 83-86; Karadağ, Bektaş, Çoğaltay & Yalçın, 2015), statistical analyses were performed under a random effects model. The effect sizes were calculated by using the Comprehensive Meta-Analysis Software 2.2 package. Pearson correlation coefficient (r = ES) was calculated as the effect size of each independent study. In the interpretation of the effect sizes, value ranges offered by Cohen (1992) and Rosenthal (1996) were used (Oh-Young, Gordon, Xing & Filler, 2018). Table 2 provides ES = r interpretation value ranges.

Table 2: Interpretation of effect size

Effect size measure	Small	Medium	Large	Very large
r	0,1	0,3	0,5	0,7

Source: (Oh-Young et al 2018)

In the supervision of publication bias in the current study, funnel plot distribution regarding the effect sizes was examined first. To test the publication bias statistically, Egger's regression intercept method was used.

In this study, moderator analysis was carried out to check the difference in the mean effect sizes. According to the codes in this study, measured parental involvement type, academic achievement area, education level, location and publication year were used as moderators.

Heterogeneity in meta-analytical statistical processes results from sampling error and characteristics of the independent studies (Borenstein et al, 2009). To decide whether the data set is heterogenous or not, $İ^2$ statistical technique was used (Üstün & Eryılmaz, 2014). The value ranges of 25%-50% were interpreted as low, 50%-75% as medium and 75%-100% as high, as suggested by Higgins, Thompson, Deeks and Altman (2003). With respect to moderator analysis of the data set, whether effect size distribution according to categorical moderators differed statistically or not was checked through Q between groups test (Üstün & Eryılmaz, 2014). Meta-regression technique was used for continuous moderators (Borenstein et al, 2009).

Characteristics of the Studies in the Dataset

The dataset of the current study consists of 55 research studies. Data sets are represented with 62 different samples. The number of the total participants is 106,221. The number of the smallest sample is 74 while the number for the biggest sample is 26,543. The total effect size produced by the data set is k = 256. The effect sizes in the dataset range between ES = -,39 and ES = ,57. The Funnel Plot regarding the effect sizes in the dataset is provided in Figure 2.

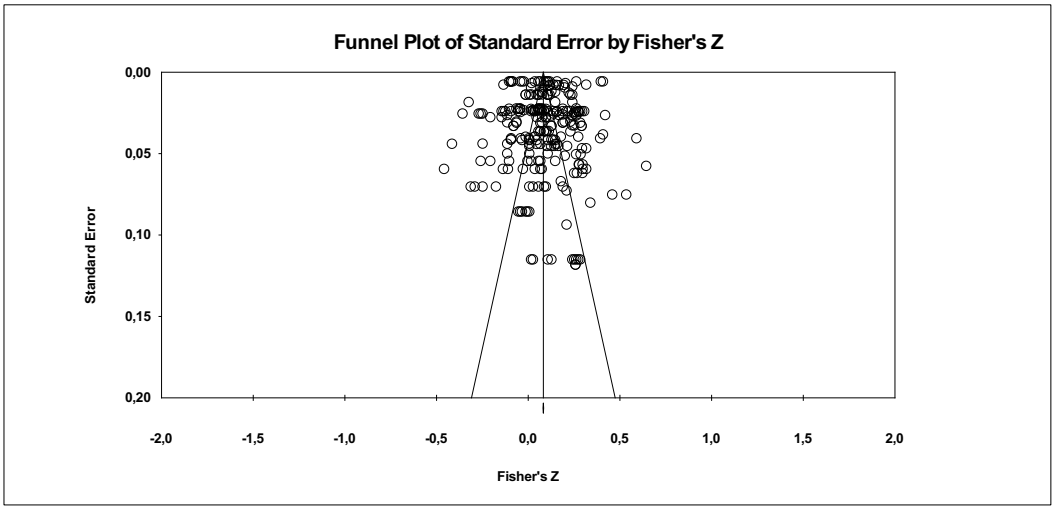

Figure 2: the Funnel Plot regarding the effect sizes produced by the dataset

To check whether the mean effect size produced by the dataset is affected by the publication bias or not, publication bias analyses were carried out. The funnel plot regarding the distribution of the effect sizes was examined first. To test the publication bias statistically, Egger's regression intercept method was used. The funnel plot is presented in Figure 2 and it was observed that the effect sizes evidenced an approximate symmetric distribution. In the Egger's regression intercept test was performed and the intercept was calculated as 0,35 (t = 0,42; p = .33), and publication bias was not found.

Results

It was identified that the mean effect size of parental involvement on students' academic achievement was calculated as ES = r = .09 (LL = .07, UP = .11; k = 256). Considering the lower and upper bounds of the mean effect size, it is suggested that the effect of parental involvement on academic achievement was positive and small. The total variance of the dataset is Q = 20982,57. The effect sizes distribution is at high level and heterogeneous (I^2 = 98,78). The moderator analysis regarding the dataset is presented in Table 3.

Table 3: Moderator analysis of the dataset

Group	k	ES	LL	UL	Q(t)	Q(b.g.)	df	p
Outcomes								
Total involvement index	34	0,24	0,2	0,28	453,01*			
School based index	41	0,09	0,05	0,12	2776,14*			
Home based index	19	0,07	0,02	0,12	644,67*			
Support (total)	28	0,1	0,06	0,14	366,78*			
Control	41	-0,1	-0,14	-0,1	2037,16*			
Learning assistance	31	0,09	0,06	0,13	704,93*			
Communication	22	0,09	0,04	0,13	366,12*			
Activity	17	0,09	0,04	0,14	303,36*			
Expectation	12	0,29	0,24	0,35	1717,04*			
Academic socialization	11	0,12	0,06	0,18	216,17*	252,83	9	0,01
Academic area								
General	77	0,11	0,07	0,14	3671,05*			
Language	98	0,08	0,05	0,1	8088,90*			
Mathematics	65	0,08	0,04	0,12	3693,15*			
Science	10	0,12	0,03	0,2	4868,81*			
Social Sciences	6	0,11	-0,01	0,22	187,80*	2,41	4	0,66
Education level								
Pre-school	23	0,08	0,02	0,14	429,57*			
Elementary	141	0,08	0,06	0,1	4559,68*			
Secondary	56	0,11	0,07	0,14	14680,33*			
Mixed	36	0,09	0,05	0,14	967,03*	1,43	3	0,7
Location								
Developed	174	0,07	0,05	0,09	6,25			
Developing	82	0,13	0,09	0,16	7,74	8,22	1	0,01
Participant type								
Mixed	148	0,07	0,05	0,1	16017,20*			
Student	108	0,11	0,08	0,14	4956,98*	4,48	1	0,03
Measure type								
Standard	70	0,07	0,04	0,11	14794,038*			
Non-standard	186	0,09	0,07	0,12	5996,66*	1,14	1	0,29

* p < 0,05

Parental involvement types

The mean effect size differs significantly according to families' parental involvement types (Q(9,256) = 252,83; p = 0,01). Families' control behaviours which are based on home-based involvement have a negative and weak effect on students' academic achievement (ES = r = -0,10; LL = -0,14; UP = -0,07). Namely, students who live in a family that controls their children at a high level have a low level of academic achievement.

Other home-based behaviours including learning assistance, communication, support, activity, ensuring academic socialisation have a positive and weak effect on students' academic achievement. In addition, families' expectation has a higher level of effect on students' academic achievement than the behaviours listed above (ES = r = 0,29; LL = 0,24; UP = 0,35). Furthermore, school-based parental involvement has a positive and weak effect on students' academic achievement (ES = r = 0,09; LL = 0,05; UP = 0,12).

Location

It is identified in the study that the effect of parental involvement differs significantly in terms of countries' development levels. The effect of parental involvement in developing countries (ES = r = 0,13 LL = 0,09 UP = 0,16) produces a bigger effect size compared to developed countries (ES = r = 0,07 LL = 0,05 UP = 0,09).

Participant type

The mean effect of parental involvement on students' academic achievement differs significantly according to the participant type (Q (1,256) = 4,48; p = 0,03). The studies in which the participants were students produced higher levels of effect sizes than the studies in which the participants were mixed.

Publication date

Meta-regression method was used to test if the effect sizes differed according to the years of publication, and it was found that the effect sizes differed significantly by years of publication (Q = 8,7; df = 1; p = .03). The regression chart regarding the distribution of the effect sizes by years is provided in Appendix 1. The effect size of parental involvement on academic achievement decreases as the years increase.

Education level

The mean effect of parental involvement on students' academic achievement does not differ significantly according to moderator variable of education level.

Academic area, measure of academic achievement

The mean effect of parental involvement on students' academic achievement does not differ significantly according to moderator variables of academic area and measure of academic achievement.

Discussion and Conclusion

This study aimed to examine the effect of parental involvement on students' academic achievement through examining this effect with respect to home-based and school-based parental involvement types including control, learning assistance, communication, support, activity, academic socialisation and expectation as well as testing the effects of other moderator variables of geographical region, participant type, publication date, education level, academic area and measures of academic achievement. The results are discussed with available related meta-analysis studies in the literature.

Consisting of 55 research studies, the dataset represents 62 different samples the total of which is 106,221. The total effect size produced by the data set is k = 256. The effect sizes in the dataset range between ES = -.39 and ES = .57. The publication bias was checked, and the values did not represent

bias. It was identified that the mean effect size of parental involvement on students' academic achievement was calculated as ES = r = .09 (LL = .07 UP = .11; k = 256). Considering the lower and upper bounds of the mean effect size, the overall effect of parental involvement on academic achievement was positive and at a low/weak level. Fan and Chen (2001) identified an overall effect size of r = .25, which they regarded as medium. Jeynes (2005) also reports a higher effect level of parental involvement on urban secondary school students' academic achievement. Ma et al (2015) suggest a strong positive relationship between parental involvement and learning outcomes at pre-school and early elementary education levels. Senechal and Young (2008) also concluded that parental involvement was a positive predictor of acquisition of literacy. Jeynes (2017) reveals that parental involvement has a significant effect of .52 on Latino students' outcomes. Kim and Hill (2015) report a closer effect size to our study from pre-school to 12th grade (.14 for father and .15 for mothers). Hill and Tyson (2009) found an effect size of .18 for middle school students.

The findings in the current study and the findings of the other related meta-analysis studies (Fan & Chen, 2001; Hill & Tyson, 2009; Jeynes, 2005; Jeynes, 2017; Kim & Hill, 2015; Ma et al, 2015; Senechal & Young, 2008) and also a meta-synthesis study on this relationship (Wilder, 2014) consistently indicate the positive relationship between parental involvement and academic achievement. This result supports the significance attached to parental involvement in the literature with respect to children's academic achievement. As suggested by Henderson and Berla (1994), parents' involvement increases students' achievement, and that is why parents should try to provide an environment at home encouraging learning, communicate reasonable but high expectations regarding their children's future and get involved in students' education at home, school and community. In addition, parental involvement should be promoted by educational policies and practices (Ma et al, 2015). However, the results of this meta-analysis study, which includes studies from several geographical regions at pre-school, elementary and secondary levels, reveal a smaller effect size when compared to other meta-analysis studies. Another finding in this study suggests that the effect sizes tend to decrease in the more recent publications. This is a finding worth dwelling on. The effect of parental involvement on students' academic achievement may be diminishing due to some factors such as changing family structures, enhancement in technologies, new educational settings and expectations. More recent analyses are needed to discuss this finding.

Regarding the effect of parental involvement types, it is revealed in the current study that school-based parental involvement has a positive and weak effect on students' academic achievement. School-based involvement has a greater effect on academic achievement than home-based involvement in this study. This is in line with the findings reported by Kim and Hill (2015). Similarly, Ma et al (2015) suggest that studies emphasising school-based involvement produced a significantly stronger relationship than studies that did not. Of the home-based parental involvement behaviours, only parental control has a negative and weak effect on students' academic achievement. All other analysed behaviours including learning assistance, communication, support, activity, expectation and academic socialisation have a positive and weak effect on students' academic achievement. Fan and Chen (2001) argue that the parental involvement dimension has a moderating effect on students' academic achievement. They report that the weakest parental involvement dimension was parents' supervision of children at home (but still positive) while parents' expectations had the highest effect on students' academic achievement. Jeynes (2005), Jeynes (2007) and Castro et al, (2015) also report

that parental expectation has the largest effect size. Similarly, in the current study, parents' expectations have the highest effect on students' academic achievement (almost medium). In a meta-synthesis study, it was revealed that when defined as parental expectations, the effect size of parental involvement is strongest. As children tend to have attitudes and beliefs towards their education similar to their parents (Wilder, 2014), parental expectations have great effect on their academic achievement. In their edited book, Karadağ and his colleagues carried out several meta-analysis studies regarding the effects of variables on student achievement. They unearthed the single variable that had high impact on student achievement which was socio-economic status (Karadağ, 2017). It can be expected that, parents with higher socio-economic status may communicate higher expectations to their children, which in turn may affect student achievement. On the other hand, parents' control behaviours have a negative effect in the current study. As suggested by Fan and Chen (2001) and Wilder (2014), high levels of parents' supervision behaviours (control in the present study) may be due to students' academic failure in the first place. Parents of students who have academic problems at school may be enacting more intense control behaviour. That is why a negative relationship between this dimension and academic achievement is plausible.

Academic socialisation has the highest effect on academic achievement following parental expectations in the current study. Similarly, in the meta-analysis by Kim and Hill (2015), it was found that it had the strongest relationship with academic achievement. Communication has a small effect on academic achievement in this study. Jeynes (2005) reports that it had a higher effect size but it was still below .30. It was found to be insignificant in another meta-analysis (Jeynes, 2007). In another study, communication had also a higher effect (Jeynes, 2017). Learning assistance has a small effect on academic achievement. Patall, Cooper and Robinson's (2008) meta-analysis study focused on the relationship between academic achievement and parental involvement at home through assisting children with homework, which is learning assistance in the current study. They found a small correlation between the two variables. These results may stem from the fact, as also suggested by Patall et al (2008) and McNeal & Ralph (2012), that poorly achieving students may require more parental involvement. Otherwise, the effect size can be expected to be higher. In the meta-synthesis study by Wilder (2014), it was found that a positive relationship between homework assistance and student academic achievement was not present. There are also negative correlations. Wilder (2014) attributes this to factors such as the facts that most parents are not trained to teach their children and they do not know teaching methods.

It is identified in this study that the effect of parental involvement on students' academic achievement differs significantly according to the location of the studies. Parental involvement has more effect on academic achievement in developing countries as opposed to developed countries. To discuss this result, more studies are needed with respect to comparison of developed and developing countries regarding the effect of parental involvement on academic achievement.

The mean effect of parental involvement on students' academic achievement does not differ significantly according to moderator variable of education level. This finding is noteworthy because parental involvement at pre-school level may be higher than at elementary and secondary education levels. Besides, parental involvement may be a stronger predictor of academic achievement at lower levels than higher levels because children in lower levels are more affected by parental values, parents of young children care more about their lives, students at higher levels are more aware of their own

strengths and weaknesses, parents are more adept in subjects at earlier grades and adolescents become independent of their parents (Gutman & Midgley, 2000; Eisenberg & Wolchik, 1992; Stenvenson & Baker, 1987 as cited in Jeynes, 2005; Patall, Cooper & Robinson, 2008). Despite these notions and a body of research (Jeynes, 2005; Jeynes, 2007; Kim & Hill, 2015; Patall, Cooper & Robinson, 2008), this study puts forth that academic achievement does not differ by education levels. This finding is also supported by the meta-synthesis study on the relationship between academic achievement and parental involvement (Wilder, 2014). This may stem from two reasons. The first is that at pre-school level and the beginning of the elementary level, measurement of academic achievement is harder than at upper levels of education. The second is that, the families enacting parental involvement behaviours at pre-school level, and even at the onset of elementary level, mostly focus on their children's security, familiarisation to school and socio-emotional development rather than their academic achievement.

The mean effect of parental involvement on students' academic achievement does not differ significantly according to moderator variables of academic area and measure of academic achievement. Erion (2006) also had similar results. Fan and Chen (2001) identified that students' academic achievement differs by area of academic achievement. In the same study, measure of academic achievement had no effect on students' academic achievement; however, they report that general academic achievement measure such as GPA had relatively higher correlation while specific measures had relatively weaker correlation. Jeynes (2005) suggested that effect sizes for grades and other measures were significant but it was not significant for standardised tests. Ma et al (2015) identified that measurement type was not a predictor of the relationship between academic achievement and learning outcomes. Erion (2006) had a similar result. In a meta-analysis on Latino students' outcomes, it was revealed that effects were bigger for non-standardised academic measures than standardised academic measures (Jeynes, 2017).

The findings in the present study contribute to the literature on the relationship between academic achievement and parental involvement in that it indicated the weakest overall effect of parental involvement on students' academic achievement among the meta-analysis studies. The study has limitations, as well. The studies included in this meta-analysis are correlational. Therefore, it may involve method bias. As this study focused on synthesising the findings of quantitative research studies, synthesis studies of qualitative research studies focusing on parental involvement and academic achievement can be carried out. Besides, the studies in this meta-analysis study are in English. Therefore, it can be suggested that it involves language bias. Future studies may include research studies published in other languages. In addition, this study involves only published research studies. Future studies may include unpublished research studies (master's or doctoral theses) and conference proceedings. On the other hand, this study focuses solely on parental involvement and students' academic achievement. Future studies may examine parental involvement and students' social skills and affective characteristics.

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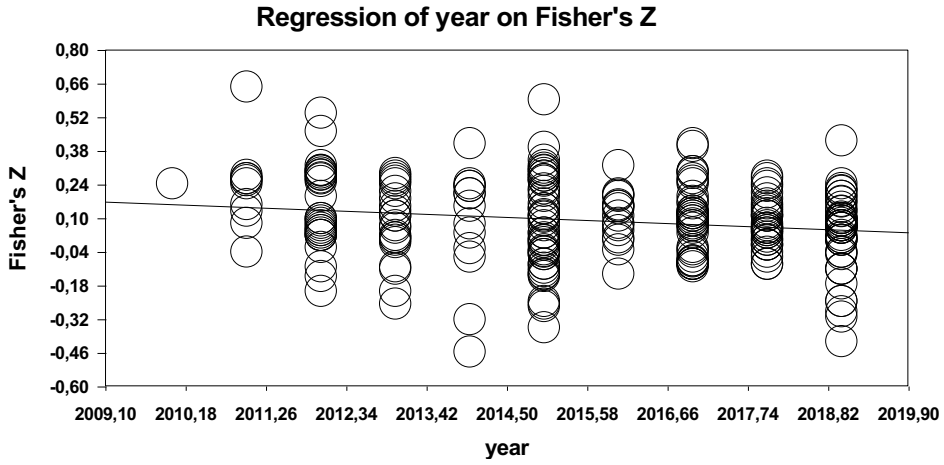
Appendix 1: The regression chart regarding the distribution of the effect sizes by years



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