THE RELATIONSHIP BETWEEN TEACHER ACADEMIC OPTIMISM AND STUDENT ACADEMIC ACHIEVEMENT: A META-ANALYSIS

Abstract: This meta-analysis of 13 studies examines the relationship between teacher academic optimism and student academic achievement. The studies have been reached from Web of Science, ERIC, Proquest Digital Dissertations, Turkish Academic Network and Information TR Directory, Google Academic and Council of Higher Education Thesis Center databases. The correlation scores of the studies included in the meta-analysis were computed by the Fisher z method and Comprehensive Meta-Analysis V3 (CMA) Program was used. As a result, the relationship between teacher academic optimism and student academic achievement has a strong effect size with a value of 0.513 according to the random effects model. Additionally, the moderator analysis was performed for verbal and non-verbal courses. There was no statistically significant difference observed and no publication bias in the meta-analysis study. Education policy makers and school administrators can put on their agenda the strengthening of teacher academic optimism for student academic achievement.

Keywords: Teacher academic optimism, student academic achievement, meta-analysis, effect size.

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INTRODUCTION

Many in-school and out-of-school factors affect student academic achievement. The concept of teacher academic optimism has recently drawn the attention of researchers in studies aimed at determining in-school factors affecting students' academic achievement (Anderson, 2012; Bevel, 2010; Kirby & DiPaola, 2011; Nelson, 2012; Wagner, 2018). Teacher academic optimism is seen as a teacher characteristic that affects the academic achievement of the student (Beard et al., 2010). Considering that the most important factor affecting student achievement is the teacher, it is natural that the academic optimism of the teacher, which is thought to affect student success, is a research subject. In this context, teachers' academic optimism was chosen as the subject of this study.

Aspects of schools and teachers had positive impacts on student achievement based on Coleman's social capital theory, Bandura's social cognitive theory and Seligman's learned optimism studies, K. Hoy and his colleagues' school climate and culture-oriented research (Beard, Hoy & Hoy, 2010). As a result of Hoy and his colleagues' research, they found that trust, academic emphasis and collective self-efficacy at school are three important factors affecting student achievement, and they also concluded that, through the interaction of these three factors, a new structure called academic optimism emerged and influenced student achievement (Hoy, Tarter & Hoy, 2006). This structure creates a culture with collective beliefs and norms, whose teachers are talented, students are eager, parents are supportive, and academic achievement is attainable (McGuigan & Hoy, 2006). Hoy et al. (2006) explain how these three factors interact and create an academic optimism culture as follows: the common sense of collective self-efficacy improves trust. When trust arises, teachers encourage each other. They place more emphasis on academic standards as they have confidence in receiving parental support. Improvement in trust positively affects student achievement because teachers feel they have the freedom and expertise to implement changes that will positively affect student achievement. Academic achievement becomes more important by teachers who experience a common sense of self-efficacy. Academic optimism creates a common belief that not only will teachers prepare the environment for student development, but also that student performance will increase. Academic optimism is a set of beliefs that students' achievement is important, that teachers can help students' achievement, that the family will cooperate in the school's work in this direction and will trust teachers (McGuigan & Hoy, 2006).

As the research on academic optimism for schools increased, it was revealed that academic optimism also existed at the teacher level (Beard, 2008; Beard et al., 2010; Hoy et al., 2008). Teachers' academic optimism has affective, cognitive and behavioral aspects. Trust in students and parents, affective aspects; self-efficacy, expectations and beliefs indicate the cognitive aspect and academic emphasis, various behaviors determined behavioral aspect (Beard et al., 2010). These three aspects influence and reinforce each other. Teachers' trust in parents and students makes the teacher feel competent, and the teacher's sense of competence reinforces trust. Similarly, if the teacher trusts the parents, they can establish high academic standards that cannot be undermined by the parents. High academic standards strengthen teachers' confidence. Finally, when the teacher believes that s/he can organize and implement actions for a positive impact on student achievement, they emphasize academic achievement and the academic emphasis strengthens the teacher competence feeling (Beard et al., 2010; Woolfolk Hoy, 2012; Woolfolk Hoy, Hoy & Kurz, 2008). In this context, teachers' academic optimism is the belief that teachers attach importance to on that academic achievement is attainable, subsequently they can cooperate with both parents and students for student success, and that they will help students' academic achievement (McGuigan & Hoy, 2006). Teacher academic optimism can also be defined as the belief that teachers will make a positive difference in student achievement in various ways (Hoy et al., 2008). Teacher academic optimism consists of the functionally interconnected elements, self-efficacy perception of the teacher, her/his trust in parents and students, and academic emphasis. These components are detailed below.

Teacher self-efficacy: According to Bandura (1994), self-efficacy is the body of individuals' beliefs, abilities and judgments about their performance against events that have an impact on their lives. Besides, it determines how hard individuals will try and how persistent they will be in their efforts when they encounter a situation that they do not want in their lives. Teacher self-efficacy shows the belief that the teacher can bring unmotivated or difficult students to the desired level in taking responsibility and learning

(Tschannen-Moran & Woolfolk Hoy, 2001). The teacher's belief in his potential to succeed can also be seen as self-efficacy.

Even if it looks simple, teacher self-efficacy can have important consequences. The most important result is that when teacher self-efficacy increases, student achievement also increases (Bandura, 1993; Goddard, Hoy & Woolfolk Hoy, 2000). The teacher sets high expectations and makes a high level of effort to get his expectations, and when he encounters difficulties, he prefers to struggle with them instead of giving up (Woolfolk Hoy et al., 2008). Perceptions of self-efficacy affect teachers' effort, willingness and goal setting. Teachers with high/positive self-efficacy beliefs take responsibility and are entrepreneurs in increasing student achievement. They bring all the necessary elements together for the realization of success. Their beliefs in themselves are an important driving force to address the problem (Tschannen-Moran & Woolfolk Hoy, 2001).

Trust of the teacher to the parents and students: According to Bandura (1994), trust is the level of belief of an individual towards the competence and goodwill of the other to behave predictably, ethically and fairly. It enables the risks and uncertainties arising from the interactions of individuals to be managed. Although teachers' sense of self-efficacy is important, it is not always sufficient for student achievement. A teacher with a sense of self-efficacy also needs to establish a trust-based relationship with parents and students. Trust-based relationships and partnerships provide positive learning environments in the classroom (Adams & Forsyth, 2013). Believing that the teacher will not harm him in a positive learning environment, the student takes more courageous steps and makes more effort to learn. Student's learning attempts provide parents with positive clues about the teacher and these tips mostly result in parents' trust in the teacher (Hoy & Tschannen-Moran, 1999). In short, the trust of the teacher in parents and student returns as trust and support to the teacher and led him to make more effort for student success.

The student's learning initiative not only makes the parent trust on the teacher but also makes the teacher has trust on the parent and the student. When the teacher verbally expresses trust, it may affect the encouragement of the parent to contribute to the academic achievement of the student. The efforts of the parents can facilitate the teachers to reach the standards and expectations set by them by mediating the teacher-parent collaboration (Goddard et al., 2001; Kurz, 2006). Studies focusing on trust and academic achievement relationships (Tschannen-Moran & Hoy, 2000; Goddard, Tschannen-Moran & Hoy, 2001; Goddard, Salloum & Berebitsky 2009; Adams & Forsyth, 2013) even when students' socio-economic conditions are under control, trust is an important predictor of academic achievement.

Teacher's academic emphasis: Teacher's tendency towards academic success is called by several conceptions such as success pressure, academic emphasis, academic pressure, or academic rigidity (Wagner & DiPaola, 2011). Beard et al. (2010) defined academic emphasis as that teachers finds out various ways to involve the student in appropriate academic tasks. Accordingly, academic emphasis constitutes the behaviors of teachers to ensure that students use their time effectively, to enable their participation in academic activities appropriate for their academic achievement, to optimize the classroom environment for learning, to explain the lesson effectively, and to follow homework by giving effective assignments (McGuigan & Hoy, 2006). Academic emphasis is also on the teacher's belief in academic goals and achievement (Goddard et al., 2001). Academic emphasis is on reflecting the teacher's sense of self-efficacy and confidence in his behavior (Woolfolk Hoy et al., 2008). Parents who see that the teacher uses the time effectively for the academic achievement gives effective homework and follows these assignments, in short, the academic emphasis, can volunteer to help the teacher and the student (McGuigan & Hoy, 2006). According to Kurz (2006), academic emphasis provides continuity not only in the arrangement of the learning environment but also in the continuation of the learning environment. The academic emphasis of the teacher, with this aspect, is the learning power that directs the student to academic achievement.

Studies show that there is a relationship between teacher academic optimism and student academic achievement (Hoy et al., 2006; McGuigan & Hoy, 2006; Nelson, 2012; Wagner & DiPaola, 2011). The results of research conducted in different countries also support the relationship between teacher academic optimism and student academic success. For example; Wu, Hoy & Tarter (2013) examined the relationship between school structure, academic optimism and student academic achievement in Taiwan. Similarly, Heidarzadeh and Abbasian (2014) and Safari and Soleimani (2019) in Iran, Strakova, Simonová & Greger (2018) in Czechia, Wu (2013) in Taiwan and Adekunle and Omolola (2019) in Nigeria found that there is a correlation between teacher academic optimism and student academic achievement in different

geographies. As the number of studies carried out different contexts has been growing, there appear a need to look at their results comprehensivelly. However, literature review indicates a research gap on a meta-analysis on the relationship between teacher academic optimism and student academic achievement.

One of the main goals of educational research is to identify the factors that positively affect and maintain student achievement. In this context, academic optimism and teacher academic optimism attracted the attention of researchers, and studies examining the relationship between teacher academic optimism and student achievement continue to be conducted. Integrating the results of studies may determine the size of the relationship between these two variables and may eliminate hesitations about the relationship between them. This study is based on evaluating the results of researches independently from each other in a holistic manner and to contribute to the stronger interpretation of the findings by combining them. This study aims to examine the relationship between teacher academic optimism and student academic achievement using the meta-analysis method. To achieve this goal, the following questions were sought:

i. What is the average effect size of the relationship between teacher academic optimism and student academic achievement?

ii. Does the average effect size of the relationship between teacher academic optimism and student academic achievement differ according to the verbal and non-verbal courses?

In this way, it is expected to reveal the bigger picture and create a discussion environment by determining the effect size of teacher academic optimism on student academic achievement.

METHOD

The meta-analysis method was used to determine the average effect size between teacher academic optimism and student academic achievement. The researcher, who uses the meta-analysis method, chooses the researches from the relevant literature by the goals and criteria he has previously determined.

Some databases were searched to get data for this study. Web of Science, ERIC and ULAKBİM TR Index for article search; Proquest Digital Dissertations and Council of Higher Education Thesis Center were scanned for thesis scanning. The paper booklets published for the papers were scanned via Google Scholar. Study data were collected between December 2019-March 2020. The first screening was carried out between December 2019 and January 2020, then the necessary controls were provided by scanning again between February 2020-March-2020. The keywords used to reach researchers in databases are: “academic optimism, teacher academic optimism, student achievement, student success and student academic achievement”. In the literature review, 102 articles, 98 master/doctorate theses and 5 reports were identified. In the literature review, studies not contain determined data for this study were excluded. The process of inclusion of the studies is presented in the flow chart in Figure 1.

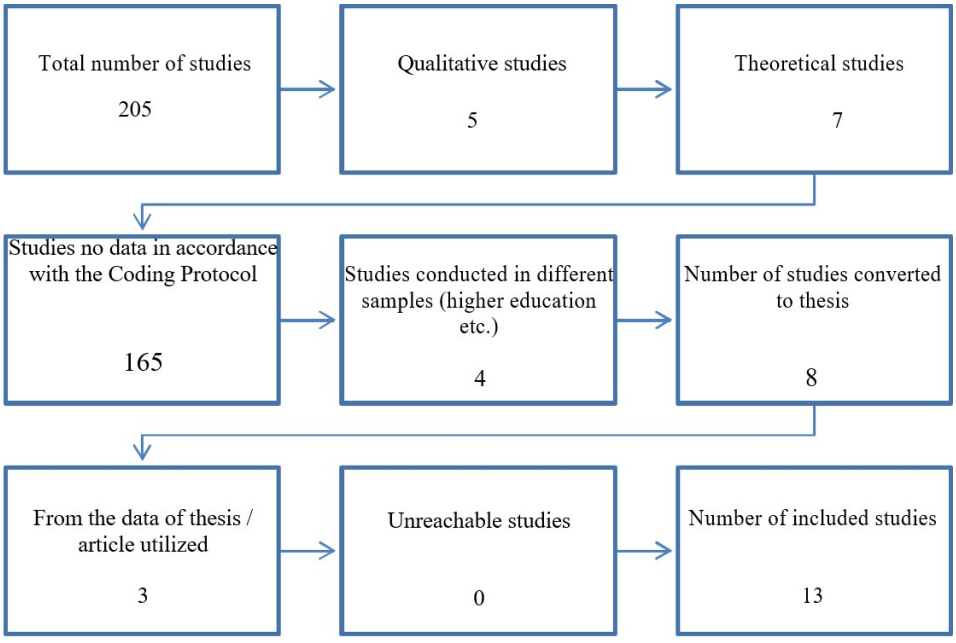


Figure 1. Prisma Flow Diagram for Meta-analaysis

In the study, researches conducted between 2009 (the year the teacher academic optimism studies started) and 2019 were included. The data of the publication type, sample size and courses of the studies included in the study are presented in Table 1.

Table 1. Descriptive Data of Studies

Variable		f
Publication type	Article	10
	Doctoral dissertation	3
	Total	13
Sample size	Article	7.727
	Doctoral dissertation	1.130
	Total	8.857
Courses	Language arts/mathematics and science	5
	Mathematics and science	1
	It is not included in the analysis of the course areas since the course is not distinguished.	7
	Total	13

As can be seen in Table 1, 10 (ten) articles and 3 (three) doctoral dissertations were included in the study. The total sample size of the studies was 8.857.

INCLUSION CRITERIA

The following criteria were used in selecting the previous studies in the study:

• The research has been done between 2009 and 2019.
• Whether the research is an article, a report, a master's or doctoral thesis.
• Studies reveal the correlation between teacher academic optimism and student achievement.
• To determine the effect size in the study, partial correlation coefficients between variables are given or qualitative studies are not included. Studies eligible for the further analysis are marked in the reference part.

CODING PROTOCOL AND RELIABILITY

A clear and detailed coding form was developed by examining the sampled studies following the inclusion criteria. The coding form consists of three parts: (a) "Study ID" was the first part and the identification number, title, author (s), type and year of publication were included. (b) "Content of the study" was the second part and covered the courses where teacher academic optimism and student academic achievement were evaluated. (c) "Study data" formed the third section. This section had the correlation values of the relationship between courses and teacher academic optimism and the sample size.

According to Card (2012), ensuring the reliability of the coding protocol also affects the reliability of meta-analysis studies. In this study, interrater reliability was used for the reliability of the coding protocol. Since sections 1 and 2 of the Coding Protocol contain objective data, there is no need for intercoder reliability. Approximately 40% (n = 6) of the studies in the coding form for reliability calculation were determined by random assignment. The identified studies were encoded into the coding form after being read by a second reader with a good knowledge of English. The second coder is one of the authors. It was observed that the agreement between coders was 92% (Card, 2012).

VALIDITY

The validity of the meta-analysis studies depends only on the ability of the data collection tools of the included studies to measure what is intended. According to Petitti (2000), the validity of the average effect size obtained as a result of the meta-analysis is directly proportional to the validity level of the studies included in the analysis. In this study, it was observed that the validity of the data collection tools used in all studies was ensured.

DATA ANALYSIS

In the sampled studies, the relationship between teacher academic optimism and student academic achievement has been researched based on reading, mathematics and science (Kirby & DiPaola, 2011; Wagner & Dipaola, 2011; Wu & Lin, 2017) or social sciences, language lessons, reading and writing courses (Adekunle & Omolola, 2019; Nelson, 2012). On the other hand, some researchers (Heidarzadeh & Abbasian, 2014; Chang, 2011; Ngidi, 2012; Safari & Soleimani, 2019) investigated the relationship

between teacher academic optimism and student academic achievement by integrating course areas into verbal and non-verbal courses or courses under academic and skill courses. Therefore, to determine whether the average effect size of the relationship between teacher academic optimism and student academic achievement differs according to the courses (2nd research question), first: *(a)* courses were combined under the fields of verbal (reading, writing, social sciences and language courses) and non-verbal courses (mathematics, science). Then *(b)* the correlation values of non-verbal and verbal courses (Andersen, 2012; Kirby & DiPaola, 2011; Wagner & DiPaola, 2011; Wu, 2013; Wu et al., 2013; Wu &d Lin, 2017) were combined via CMA program. *(c)* The obtained values were used to analyze whether the relationship between teacher academic optimism and student academic achievement differs according to the courses.
To determine the average effect size of the relationship between teacher academic optimism and student academic achievement (1st research question): *(a)* A single correlation value for the academic achievement variable was determined by integrating the correlation values of the verbal and non-verbal courses via CMA program. (b) The obtained value and the correlation values of the studies that did not separate academic achievement according to the courses were used.

META-ANALYSIS PROCESS

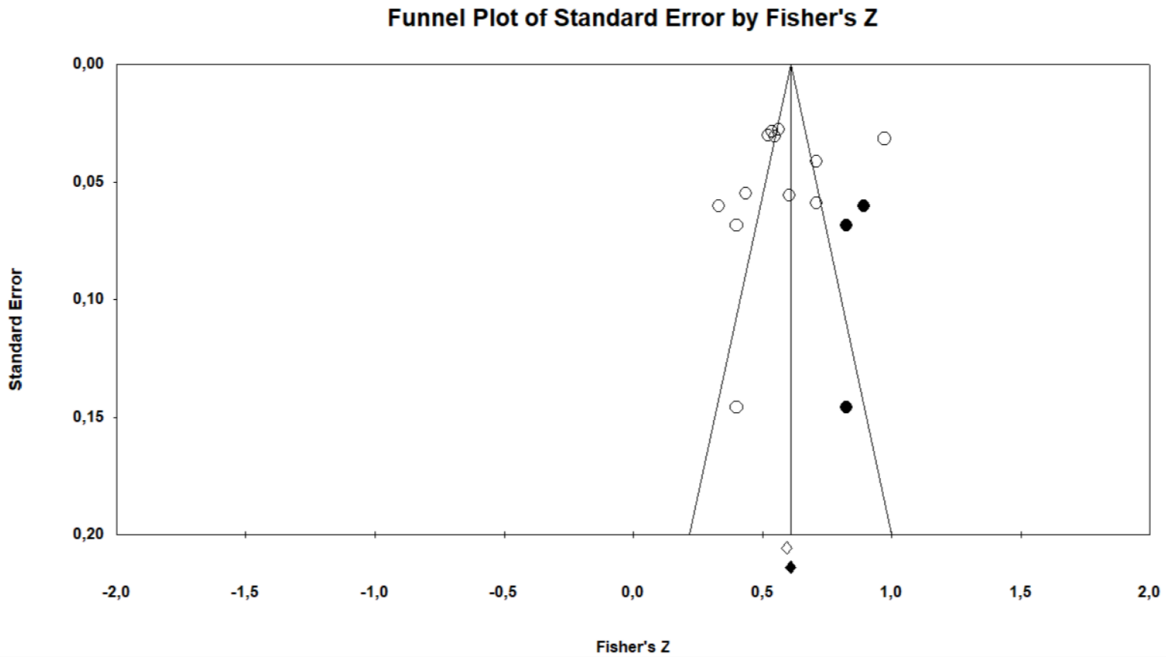
In this study, statistical analyzsis and heterogeneity tests were performed using the Comprehensive Meta-Analysis V3 (CMA) Program. Degrees of freedom Chi-Square heterogeneity test (Q statistic) and I^2 were used to evaluate true heterogeneity among the studies. While Field and Gillett (2010) recommended using the random-effects model to make inferences about the universe of research included in the meta-analysis study. Borenstein et al. (2009), Field and Gillett (2010) and Schmidt et al. (2009), many researchers do not find a single assumption of real effect size, which is the basic assumption of the fixed effects model, isn't realistic for all situations and quite limited. Due to the limitations of the fixed effects model, it is recommended to use the random-effects model. In the study, the random-effects model was used for the reasons stated.
SPSS 21.0 statistical package program was used for the descriptive data analysis and Microsoft Excel 2010 program was used for data entry of the coding form. The effect size was calculated depending on the correlation. In all calculations of the effect size, the confidence interval was determined as 95% and the level of significance as .05. To determine the effect size of each study included in the meta-analysis and the study, correlation values were converted to Fisher z values and analyzes were performed. The interpretation of the effect size findings was generated by converting them into the correlation coefficient. Benchmark values were based on Cohen et al. (2011):

$0.00 \leq$ effect size value ≤ 0.10 weak,
$0.10 \leq$ effect size value ≤ 0.30 modest,
$0.30 \leq$ effect size value ≤ 0.50 moderate,
$0.50 \leq$ effect size value ≤ 0.80 strong,
Effect size value ≥ 0.80 very strong Effect

Funnel plot, Begg and Mazumdar rank correlations, Rosenthal's fail-safe N, Egger's linear regression and Duval and Tweedie's trim and fill tests were used for publication bias.

PUBLICATION BIAS

The funnel plot was used to detect publication bias. The funnel graphic of the study is presented in Graphic 1. When Graph 1 is examined, the studies are close to asymmetrical distribution and that the studies do not concentrate on one side. Studies in the inner part of the funnel plot show studies that have higher effects on the meta-analysis result. Also, studies at the end of the funnel represent studies with big sample size, while studies at the bottom of the funnel represent studies with a low sample size. The vertical line results in the funnel plot show the effect sizes of the studies combined. Looking at the funnel plot, the studies are distributed almost symmetrically on the right and left sides of this line. Based on this result, we can argue that there is no publication bias. However, the funnel plot does not contain statistical information and does not provide precise information.



Graphic 1. Funnel Plot of publication bias

Begg and Mazumdar's rank correlation test, Rosenthal's safe N test and Egger's linear regression tests were applied for statistical information of publication bias. Results of the tests are included in Table 2.

Table 2. Confidence Tests and Results Showing Publication Bias

Confidence Tests		Data of Confidence Tests
Rosenthal's Fail- Safe N	z-value for observed studies	51.08923
	p-value for observed studies	0.00000
	Alpha	0.05000
	Tails	2.00000
	z for Alpha	1.95996
	Number of observed studies	13.00000
	Fail-Safe N (FSN)	8820.00000
Begg and Mazumdar Rank Correlation	Tau	-0.09091
	Tau for z-value	0.42706
	p-value (1 tailed)	0.33467
	p-value (2 tailed)	0.66933
Egger's Linear Regression	Standart Error	3.35742
	95% loer limit (2 tailed)	-9.57517
	95% upper limit (2 tailed)	5.20410
	t-value	0.65096
	df	11.00000
	p-value (1 tailed)	0.26422
	p-value (2 tailed)	0.52844

The p-value (p = 0.000) in the result of Rosenthal's safe N test shows that the result of the meta-analysis study is statistically significant. The number of studies needed to remove the significance of the meta-analysis study (p> 0.05) is 8820. On the other hand, when the Begg and Mazumdar rank correlations test results are taken into account, the sample of the meta-analysis study is not biased; Kendall's Tau coefficient and p-value (-0.09091; p = 33467) are not statistically significant. There is no publication bias in the meta-analysis study based on the results of the test. Besides, Egger's linear regression test results (p = 0.52844> 0.05) show that there is no publication bias with a 95% confidence interval.

Duval and Tweedie's trim and fill test is used to determine the impact of probably lost studies on the findings. Table 3 contains the results of Duval and Tweedie's trim and fill tests.

Table 3: Duval and Tweedi's trim and fill test

		Fixed Effect			Random Effect			Q-value
	Studies Trimmed	Point Estimate	Lower Limit	Upper Limit	Point Estimate	Lower Limit	Upper Limit	Q-value
Observed values		0.593	0.572	0.614	0.566	0.474	0.567	201.846
Adjusted values	3	0.608	0.588	0.628	0.612	0.525	0.699	247.621

When Duval and Tweedie's trim and fill test is evaluated, the number of missing studies is only 3 (three). As 3 (three) studies are added to the meta-analysis study, the average effect size according to the random effects model is 0.612. Also, the lower limit of the average effect size in the random-effects model is 0.525 and the upper limit is 0.699.

RESULTS

In this part, there are findings to determine the average effect size based on the relationship between teacher academic optimism and student academic achievement.

FINDINGS OF EFFECT SIZE BASED ON THE RELATIONSHIP BETWEEN TEACHER ACADEMIC OPTIMISM AND STUDENT ACADEMIC ACHIEVEMENT

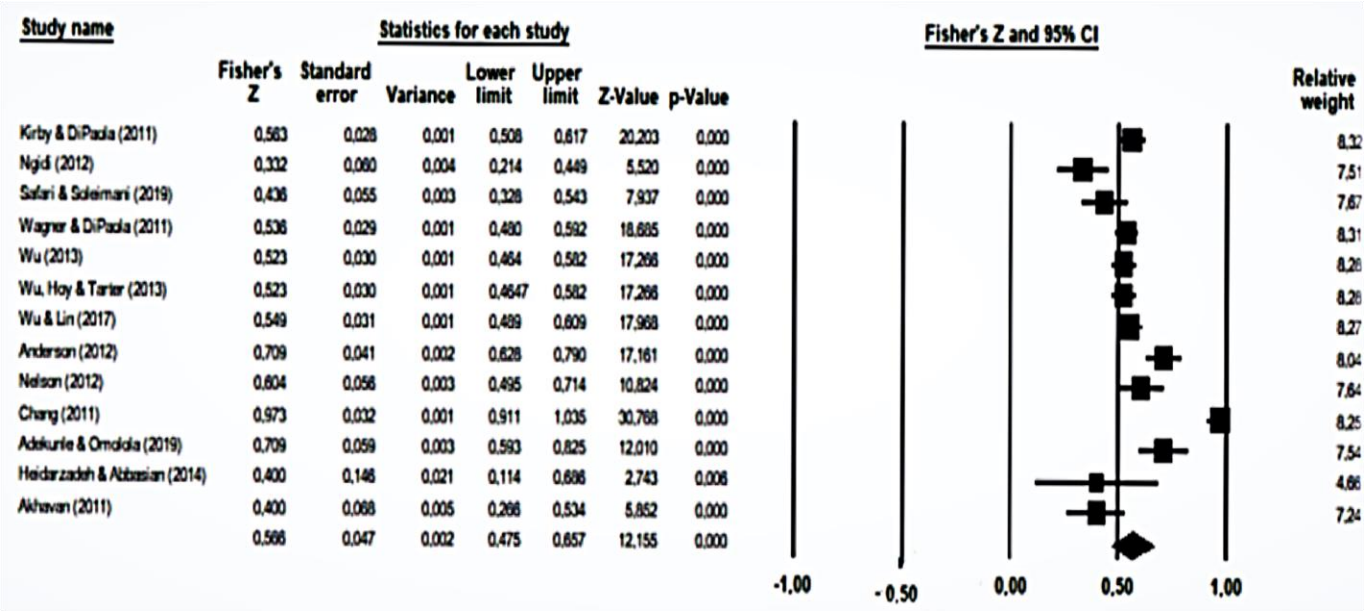
One of the important purposes of meta-analysis studies is to determine the statistical significance and confidence interval of the effect size. It is also trying to reach a general index. Another aim is to test the heterogeneity of the effect size. Q and I^2 statistics are frequently used tests for testing heterogeneity. The Q statistic is the weighted sum of squares. The I^2 statistic determines the ratio of total variance to true half. Although the I^2 statistic is based on the Q statistic, unlike the Q statistic, it provides an intuitive measure of heterogeneity that is not dependent on the effect size. In this meta-analysis study, Q and I^2 statistics were used to detect heterogeneity. Table 4 contains meta-analysis results.

Table 4. Meta-Analysis of the Relationship between Teacher Academic Optimism and Student Academic Achievement

		%95 confidence interval			Test of null		Heterogeneity test			
Model	N	Effect Size	Lower Limit	Upper Limit	Z-value	P-value	Q-value	df (Q)	P-value	I^2
Fixed	13	0.593	0.572	0.614	55.708	0.000	210.847	12	0.000	94.309
Random	13	0.566	0.475	0.657	12.155	0.000				

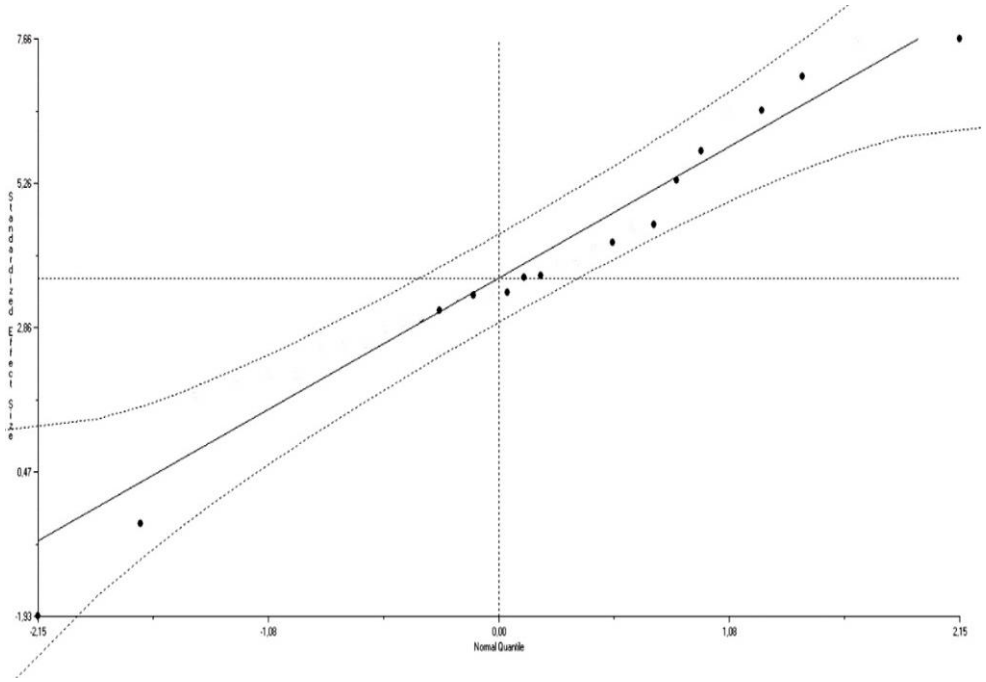
When Table 4 is examined, the heterogeneity test is significant (Q: 210,847; df (Q): 12; p: 00). With 12 degrees of freedom and a 95% significance level in the $\chi 2$ table, it is seen that the critical value (df: 12; $\chi 2$ (0.95) = 21.0260) in the chi-square distribution table is exceeded. Besides, the I^2 statistic exceeds the 75% limit value with a value of 94.309, indicating a high level of heterogeneity (Higgins et al., 2003). For this reason, it is concluded that the distribution is heterogeneous. The heterogeneous nature of the studies indicates that the effect size difference is greater than the expected sampling error-induced change (Field & Gillett, 2010). When Table 2 is evaluated, it is seen that the average effect size according to the fixed effect model is 0.593 according to the Fisher z value. According to the random effect model, the average effect size is 0.566 according to the Fisher z value. When the Fisher z value (0.566) is transformed into the correlation value, the average effect size (0.513) has a strong effect size. According to the random-effects model analysis results, the standard error was 0.013, the upper limit of the effect size was 0.657 and the lower limit was 0.475. When the average effect size value is interpreted according to Cohen et al. (2011), there is a strong and positive relationship between teacher academic optimism and student academic achievement. According to the z-test results for statistical significance, it was calculated as z = 12.155 and the analysis was statistically significant with the value of p = 0.000.

When the studies on teacher academic optimism and student academic achievement variables are analyzed according to the random-effects model, the effect size and the weights of the studies are included in the forest plot, Graphic 2.



Graphic 2. Effect Size and Weights of Studies

According to the forest plot, the research with the largest confidence interval belongs to Heidarzadeh and Abbasian (2014) and the lowest confidence interval belongs to Kirby and DiPaola (2011) and Wagner and DiPaola (2011). The studies with the highest weight on the meta-analysis result were Kirby and DiPaola (2011) with 8.32% and Wagner and DiPaola (2011) with 8.31%, while the research with the lowest weight was Heidarzadeh and Abbasian (4.66%). 2014). The weight percentages of other studies are close to each other. The highest effect size is 0.973 of Chang's (2011) research; It can be evaluated that Ngidi (2012) has the lowest effect size with 0.332. Additionally, each study has a positive effect size. The fact that all of the studies have a positive effect is an indicator of high effectiveness between teacher academic optimism and student academic success. Further, the general distribution of the effect sizes was also examined to decide whether the research data will be used in calculating the average effect size. As observed in Graphic 3, the effect sizes are within the confidence interval and the ordering along the x = y line shows that the research data can be used in calculating the average effect size (Card, 2012).



Graphic 3. General Distribution of Effect Sizes

Findings of Effect Size Based on the Relationship between Teacher Academic Optimism and Student Academic Achievement Effect Size According to Courses

Courses were divided into two groups, verbally and non-verbally, to determine whether the average effect size varies according to the courses. Analysis results are in Table 5.

Table 5. A meta-Analysis of the Fields of the Courses

Variable			Confidence interval %95			Heterogeneity test		
	Q_B	N	Effect size	Lower Limit	Upper Limit	Q-value	df (Q)	p
Courses	0.546							
Matematics and science (Non-verbal)		6	0.610	0.501	0.581	1.929	1	0.165
Language arts (Verbal)		5	0.530	0.480	1.138			

The course areas in which the studies were conducted are examined, the average effect size for non-verbal courses is 0.610 according to Fisher's z value. The average effect size for verbal courses is 0.530. When the average effect sizes of the courses are converted into correlation values, they have a strong effect level with 0.544 for non-verbal courses and a medium effect level with 0.486 for verbal courses (Cohen et al., 2011). On the other hand, the homogeneity test value between courses was $Q_B = 0.546$. At the 95% significance level, 1 degree of freedom in the χ^2 table was observed with a value of 3.841 (χ^2 (0.95) = 3.841). Since the value of 1 degree of freedom in the χ^2 table is less than (χ^2 = 3,841), the relationship between teacher academic optimism and student academic achievement does not differ significantly according to courses. Based on this finding, the assumption of homogeneity for the effect size distribution can be accepted in the fixed-effects model.

DISCUSSION AND CONCLUSION

In this study, it was found that the relationship between teacher academic optimism and student academic achievement was positive and strong. It has been determined that the effect size has a moderate effect on verbal courses and a strong effect on non-verbal courses. However, it was observed that the relationship between teacher academic optimism and student academic achievement did not differ significantly according to the courses. Teacher academic optimism has a medium effect level and above not only with one of the verbal or non-verbal courses but with both field courses. That means that teacher academic optimism affects student academic achievement at all courses. This result shows that teacher academic optimism is an issue that should be taken into consideration both in the education system generally and in schools.

Based on teachers' academic optimism, teachers invest in their self-efficacy, increase student achievement, develop a trust-based relationship with students and parents and involve students and parents in learning activities (Beard et al., 2010; Flutter, 2007; Kurz, 2006; Tschannen-Moran & Woolfolk Hoy, 2001; Woolfolk Hoy et al., 2008). Teacher self-efficacy, which is one of the sub-dimensions of teachers' academic optimism, is affected by the environment of the school (less or more developed environment, the environment that sees education as a value), organizational conditions (school culture, climate, number of students, success in central exams) and individual movements (Schunk & Meece, 2006). Klassen et al. (2010) found that student academic achievement has a positive effect on both teacher and student motivation. However, class size above 30, students with low socioeconomic level, obstructive bureaucratic school structure and anxiety in central exams negatively affect teachers' academic optimism (Üzüm, 2017). Fırat (2016) determined that experienced teachers' trust is higher than the teachers who have just started the profession. Bandura (1994) defined learning from the experiences of others as a component of self-efficacy. New teachers working with experienced teachers will be effective in developing the dimension of academic optimism. For example; Babaoğlan and Korkut (2010) concluded that classroom management skills and teacher self-efficacy have a positive and significant relationship. Efforts should be made to increase the motivation and self-efficacy perceptions of new teachers. It may be suggested that prospective teachers be

employed in schools with experienced teachers, students with a high probability of success, or academically successful students and is not crowded classes.

Hoy (2003) and Hoy and Sweetland (2001) determined that the practices of school administrators who have direct contact with the teacher are also important in the relationship between teacher academic optimism and student academic achievement and teachers' academic optimism should be supported in schools. Kurt (2009), Lev and Koslowsky (2009) and Skaalvik and Skaalvik (2007) concluded that there is a positive and significant relationship between teachers' academic optimism and collective self-efficacy. Therefore, the practices of school administrators to increase collective self-efficacy will increase academic optimism. School administrators can demonstrate the importance given to academic achievement at school by holding regular meetings where teaching at the school is questioned. These meetings can increase the collective and individual self-efficacy perceptions by providing the opportunity for teachers to be aware of each other's practices and evaluate student learning. Also, according to Goddard et al. (2004), the source of collective self-efficacy is teachers' belief in their self-efficacy and capacities. School administrators can increase collective self-efficacy by strengthening teachers' beliefs in their self-efficacy by implementing the meetings suggested above in school. According to Bümen (2009), professional development programs positively affect teachers' self-efficacy perceptions. School administrators can encourage teachers to participate in professional development programs and ensure that participation in these programs is seen as a value in school culture. Therefore, school administrators can improve teachers' self-efficacy perceptions by enabling teachers to focus on student learning and teaching and by supporting them to develop their knowledge and skills.

Studies on the leadership behaviors of school administrators have also revealed that school administrators should ensure that teachers focus on student learning, teaching and support teachers to develop their knowledge and skills. There is a positive and significant relationship between teachers' self-efficacy and educational leadership (Çalık et al., 2012), teacher self-efficacy and distributed leadership (Alenzi, 2019; Chang, 2011; Malloy, 2012; Mascall et al., 2008; Oldaç, 2016). School administrators should exhibit educational and distributive leadership behaviors. Alenzi (2019) pointed that school administrators spend a lot of time on bureaucratic work and cannot work with teachers to increase student academic achievement. School administrators may focus on educational leadership behaviors to increase teacher academic optimism and student academic achievement by transferring administrative responsibilities and bureaucratic tasks, which can also be shown among distributive leadership behaviors, to their assistants. According to Çalık et al. (2012), the school administrator's guidance on new teaching methods and techniques for teachers and encouragement to use them in the classroom can provide teachers with a sense of self-efficacy. The school administrator may guide teachers in teaching activities, set goals for them and the school with them, and bring student academic success to the school's agenda. The school principal can direct the agenda of the school and convey a clear message about the mission of the school with its significant managerial power.

Researchers have found out that the development of teachers' academic optimism in schools depends on various factors. Hoy and Sweetland (2001) and Sinden, et al. (2004) show that among these reasons, individual differences are welcomed, teachers are supported to take responsibility in teaching processes, school members develop healthy relationships with each other, and teachers' professional development are constantly supported. Hoy and Sweetland (2001) state that teachers become lonely and insensitive to student learning in schools where teachers are expected to obey rules unconditionally and are closely supervised. School administrators should ask themselves whether the procedures, rules and regulations that exist in the school help or prevent teachers from doing their work. The school administrator may ask teachers what rules and practices are the obstacles to doing the teaching. As McGuigan and Hoy (2006) stated, the rules are not fixed because they emerged as a result of previous practices and often have purposes that do not serve the present.

Teachers with high academic optimism set high academic goals for their students, attempt to develop effective teaching in the classroom to achieve the goals they set, and they believe that every student can be successful (McGuigan & Hoy, 2006). Teachers can be expected to have academic optimism in schools where school administrators support teachers, see them as experts in their fields, facilitate their work, and show that they respect their competencies, knowledge and skills.

School administrators' trust in students and parents also affects teachers' trust in parents and students because the school administrator is a model (Simonova et al., 2019). Bryk and Schneider (2002) also state that trust is an important school factor in student success. School administrators' attitude of trust towards parents is modeled by teachers (Hoy & Tschannen-Moran, 2003). Therefore, the attentive approach of the school administrator in his speeches about parents and his communication with parents can give teachers the message that trust and respect to parents is a valuable feature. The school administrator can create adequate opportunities for both working and non-working parents to meet with teachers. It can organize activities that will enable all parents and teachers to collaborate for academic success. For example, he can use homework and feedback applications to build cooperation and trust.

Studies investigating the relationship between teacher academic optimism and student academic achievement are relational studies. Relational studies do not determine the cause and effect, but only determine the level of relationship between variables (Büyüköztürk et al., 2014). Therefore, it may be wrong to interpret the finding that there is a positive and strong effect size based on the relationship between teacher academic optimism and student academic achievement as that teacher academic optimism leads to student academic success. In other words, teacher academic optimism is the independent variable and student academic achievement is the dependent variable that may not reflect the reality and even the opposite may be true. Strakova et al. (2018) and Woolfolk Hoy et al. (2008) concluded that teachers' academic optimism is also low in schools with low student academic achievement. Therefore, explanations stating that teacher academic optimism positively affects student academic achievement should be approached with caution. Researchers who want to work on the subject may be recommended to conduct experimental research to clarify this situation.

Although the concept of teacher academic optimism has been studied intensively in recent years, it is open to research whether the meaning and consequences of the concept differ across cultures. Teacher academic optimism is heavily seen in studies originating in the United States. More studies on the subject need to be done in different geographies. The time, place and application forms of the studies in the field of social sciences may differ. This situation often causes the research results to be viewed with suspicion. Besides, according to Rust, Lehmann and Farley (1990) evaluation, the biggest problem in meta-analysis studies is that printed publications generally have a strong influence. Because the statistical significance of a study increases the rate of publication, otherwise the rate of printing is almost negligible. The inclusion of 13 studies in the study can be seen as a limitation.

Although the studies included in this study are mainly from the United States of America, there are also studies from different geographies (Taiwan, Iran, Republic of South Africa, Nigeria), which can be seen as one of the strengths of the study. It is remarkable in terms of showing that the relationship between teacher academic optimism and student academic achievement is not only functional in the sociology of society but also distant geographies and cultural structures of the world. The total sample size of the studies included (8.857) can be seen as a remarkable aspect of the research and its result. The strong effect size of the relationship between teacher academic optimism and student academic achievement can be considered as a sign that teachers' academic optimism should be strengthened in schools.

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