Examining the Relationship Between Teacher Leadership and Academic Achievement

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Abstract

The aim of this research is to examine the relationship between teacher leadership and academic achievement of students through meta-analysis. For this purpose, an analysis of the effect sizes of 47 independent samples obtained from a total of 54 primary studies was carried out according to the inclusion criteria. Findings revealed that there is a positive yet weak association between teacher leadership and academic achievement. The distribution of effect sizes does not differ statistically with respect to the leadership type, academic field, education level, analysis unit, participant, location, and publication type. However, the size of effects significantly differs by the education levels. Accordingly, the effect size value in terms of the relationship between teacher leadership and students' academic achievement is weak for the elementary school, with Fz = .12, while it is moderate for the university, high school, and middle school with values of Fz = .26, Fz = .38, and Fz = .30 respectively.

Keywords: *Academic achievement, meta-analysis, teacher leadership.*

Öğretmen Liderliği ve Akademik Başarı Arasındaki İlişkinin İncelenmesi

Öz

Bu araştırmanın amacı öğretmen liderliği ile öğrencilerin akademik başarıları arasındaki ilişkiyi meta analiz yöntemiyle incelemektir. Bu amaç doğrultusunda dahil etme kriterlerine uygun toplam 47 temel araştırmadan elde edilen 54 bağımsız örnekleme ait etki büyüklüklerinin analizi yapılmıştır. Çalışmada genel olarak, öğretmen liderliği ve akademik başarı arasında pozitif yönlü fakat zayıf düzeyde bir ilişki olduğu sonucuna varılmıştır. Etki büyüklüklerinin dağılımı liderlik türü, akademik alan, eğitim kademesi, analiz birimi, katılımcı, bölge ve yayın türüne göre istatistiksel olarak farklılaşmamaktadır. Fakat etki büyüklükleri farklı eğitim

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kademlerine göre istatistiksel olarak anlamlı biçimde farklılaşmaktadır. Buna göre, öğretmen liderliği ile öğrencilerin akademik başarısı arasındaki ilişkinin etki büyüklüğü cinsinden değeri ilkokul kademesi için Fz=.12 biçiminde zayıf düzeyde iken üniversite, lise ve ortaokul kademelerinde ise sırasıyla Fz=.26, Fz=.38 ve Fz=.30 olmak üzere orta düzeydedir.

Anahtar Kelimeler: *Akademik başarı, meta-analiz, öğretmen liderliği.*

Introduction

Teachers are one of the pivotal factors in students' academic lives, playing a paramount role in shaping their educational trajectories. This is because teachers occupy a position that can influence not only the academic achievements of their students but also the formation of their overall behaviors, whether in positive or negative ways. At this juncture, teacher leadership emerges as a concept that directly influences the educational process, exerting a significant impact. A teacher leader embodies characteristics described by various terms such as change agent, expert, coach, lead teacher, mentor, and department chair, among others (Mangin and Stoelinga, 2008; Neumerski, 2012). The diversity of these attributes signifies the comprehensive nature of the mission entrusted to the teacher leader. Given the complexity of school environments, influencing other stakeholders is not an easy task, thus underscoring the expectation for teacher leaders to possess these exceptional qualities. On the other hand, transformational leadership, distributed leadership and instructional leadership practices, which are related to teacher leadership, can also be effective on the academic success of the student. Because these types of leadership, due to their characteristics, encourage the teacher to take responsibility as an impressive leader.

Teacher Leadership

The concept of teacher leadership can be broadly defined as the ability of a teacher to dismantle organizational barriers and leverage resources through the establishment of a network of relationships, thereby fostering students' educational development and achievement (York-Barr and Duke, 2004). From another perspective, teacher leadership can also be defined as the capacity of a teacher to willingly assume responsibilities in both formal and informal educational activities and processes within the classroom and school, while influencing their surroundings, supporting the professional development of colleagues, and fostering the establishment of trust (Can, 2014). These definitions illustrate that teacher leaders possess a distinct professional understanding and approach, deviating from conventional norms.

Leader teachers, have a deep passion for their profession and display a proactive attitude towards assuming responsibilities. Katzenmeyer and Moller (2001), describe teacher leaders as individuals who exhibit leadership qualities both inside and outside of the classroom. They contribute to and influence the community comprising of teachers and learners, thereby enhancing educational practices. Wynne (2002)

emphasizes that teacher leaders exhibit instructional expertise, openly share their experiences with colleagues, actively pursue professional development, prioritize the best interests of students, undertake research projects, foster collaboration with colleagues, parents, and relevant communities, provide guidance in implementing change models, demonstrate social and political awareness, mentor novice teachers, contribute to teacher education programs at universities, and actively participate in decision-making processes within the school while embracing risks.

In the definitions of teacher leadership, emphasis is generally placed on four key characteristics. These include the establishment of shared norms among teachers, providing opportunities for teachers to assume leadership roles, teachers functioning as instructional leaders, and a collective leadership approach based on a culture of sharing responsibilities rather than individualized leadership (Harris, 2005). Teacher leadership has a positive impact on student learning (Katzenmeyer and Moller, 2001). Building upon this premise, it can be inferred that teacher leaders, through their effective teaching skills, enhance their students' learning experiences, thereby contribute to the improvement of their academic achievements. Teacher leaders possess the capacity to positively influence their students. Their leadership in instructional delivery and teaching styles also effects students' learning and achievements in a favorable manner.

Distributed Leadership

Distributed leadership advocates for providing everyone in the organization with an opportunity to contribute to management by utilizing their existing talents and emphasizes the importance of sharing expertise with the entire team rather than having it concentrated in a few individuals. This approach enables employees to exercise leadership based on their areas of expertise. Distributed leadership, which eliminates the boundaries created by the hierarchical structure in the traditional leadership approach, enables the emergence of numerous diverse and interconnected perspectives and talents within the organization. By bringing together these diverse qualities, distributed leadership, which surpasses the sum of individual contributions, has the potential to transform into the harmonious and artistic sound produced by a dynamic orchestra (Woods, Bennett, Harvey and Wise, 2004). The characteristic of distributed leadership, which minimizes the constraints imposed by traditional hierarchy and boundaries, also enhances teachers' leadership qualities. Granting teachers, the opportunity to engage in leadership roles leads to their increased proactivity and productivity in this regard. Consequently, they are afforded the chance to engage in practical experiences that enable them to attain teacher leadership attributes.

Transformational Leadership

Transformational leadership is a process that enhances followers' awareness, emphasizing the cultivation of justice, harmony, and peace ideals, while prioritizing

morale and motivation, and preventing the transformation of competition into hatred and envy (Burns, 2004). Transformational leadership focuses on how a leader identifies and addresses the essential needs of their followers.

In this regard, four fundamental dimensions have been identified. The first dimension is idealized influence or charisma, which represents the leader's ability to profoundly influence their followers. The second dimension is inspirational motivation, which reflects the extent to which a leader displays an inspiring approach towards their followers. The third dimension is intellectual stimulation, which encourages followers to question existing conditions and take risks to find unique solutions. The fourth dimension is individualized consideration, that is the leader's level of awareness and responsiveness to each follower's personal needs (Judge and Piccolo, 2004). Based on these facts, it can be expected that school leaders who exhibit a transformational leadership style would act in a manner that empowers their teachers with leadership qualities. The prominent feature of this leadership style is its ability to transform the followers. The capacity to take behaviors from a specific pattern and transform them into something entirely new leads to fundamental changes in teachers' learning and instructional activities. Teachers can engage in learning and instructional activities within a transformative leadership style, influencing and transforming their students. Therefore, it would be appropriate to consider teacher leadership in association with transformational leadership.

Instructional Leadership

Instructional leadership in its essence, refers to the power and behaviors employed by school principals, teachers, and supervisors to influence individuals and situations related to the school (Şişman, 2004). The most distinctive characteristic that sets instructional leadership apart from other leadership styles is its focus on the learning and teaching processes within the school. Because the schools are fundamentally organizations centered on learning and teaching, the significance of all activities is secondary to these two fundamental objectives (Hoy and Hoy, 2006). Instructional leadership places the teacher in a critical position as it is inherently centered on the learning and teaching processes within the school. The teacher assumes a leading role in the school's learning and teaching endeavors. Instructional leaders do not engage in the learning and teaching activities to the same extent as teachers, yet they provide leadership in effectively managing these activities. The instructional leadership style influences teachers' possession of leadership qualities and their process of acquiring such attributes, as it empowers teachers to shape the learning and teaching activities. Effective instructional leaders are expected to instill leadership qualities in teachers, as the success of instructional leaders is contingent upon possessing qualities of teacher leadership. Leader teachers contribute to the effectiveness of the teaching and learning process, and thus, they contribute to the attainment of the fundamental goals of instructional leadership, through their display of effective teaching behaviors.

Research on teacher leadership is related to distributed leadership, transformational leadership, and instructional leadership. Distributed leadership, by definition, assigns leadership roles to teachers. Transformational leadership transforms teachers' educational perceptions, while instructional leadership focuses on students' academic achievements and, consequently, the effective delivery of instruction by teachers. Thus, teacher leadership intersects with these concepts, as highlighted in studies by Altunay (2017) and York-Barr and Duke (2004). Although there are relatively few studies examining the direct relationship between teacher leadership and students' academic achievement in the literature, it is possible to come across numerous studies indirectly investigating the association between teacher leadership and students' academic performance. Tan, Dimmock and Walker (2021) conducted a meta-analysis study examining the relationships between instructional leadership and learning outcomes. In their meta-analysis study Shen, Wu, Reeves, Zheng, Ryan and Anderson (2020) investigated the relationship between teacher leadership and students' academic achievement. Schott, van Roekel, and Tummers (2020) made a systematic review on teacher leadership. Araşkal and Kılınç (2019) investigated the relation between teacher leadership and student achievement. Nguyen, Harris, and Ng (2019) conducted a systematic review examining studies on teacher leadership in the international literature between 2003 and 2017. Balwant (2016) conducted a meta-analysis examining the relationships between transformative teacher leadership and student achievement at the higher education level. York-Barr and Duke (2004), Wenner and Campbell (2017) have emphasized the need for more rigorous, comprehensive, and advanced experimental studies that delve into the effects of teacher leadership on student outcomes. Similarly, Nguyen, et al., (2019) have reiterated the necessity of experimental research in this area, reaffirming the importance of such studies. In this aspect, our purpose is to investigate the relationship between teacher leadership and student academic achievement, encompassing grade levels from K-4, K-8, K-12, and higher education. Moreover, the relationship between teacher leadership and student outcomes has gained increasing importance in terms of educational system effectiveness. There is a growing tendency for the number of studies examining the relationship between teacher leadership and student outcomes. Therefore, there is a need for comprehensive reviews that specifically focus on the relationship between teacher leadership and student achievement. Furthermore, it is crucial to thoroughly investigate the relationship between teacher leadership, a significant student outcome, and academic achievement. Accordingly, the following hypotheses were tested:

H1. The relationship between teacher leadership and academic achievement is positively oriented.

H2. The characteristics of primary studies (publication type, unit of analysis, sample location, participant type, educational level, leadership type, academic field) serve as moderators in the relationship between teacher leadership and academic achievement.

Method

In this section, explanations regarding the research model, data collection, coding, and analysis process are explained.

Research Model

In this study, the meta-analysis method was employed to determine the relationship between teacher leadership and academic achievement. Meta-analysis as a research model, is a statistical method used to combine the results of numerous studies conducted on a specific topic to arrive at a general conclusion (Littell, Corcoran and Pillai, 2008).

Data Collection

The data for this study consisted of primary studies investigated the relationship of teacher leadership and student academic achievement. Electronic databases were utilized to access the primary research studies. The electronic databases used for this study included Scopus, Web of Science, ERIC, Academic Search Ultimate, Open Dissertations, and ProQuest Publicly Available Content. The search terms utilized in the databases included "teacher leadership," "teacher leader," "classroom leadership," "instructor leadership," "professor as a leader," "distributed leadership," "shared leadership," "collective leadership," combined with "achievement," "success," "academic," "school," "student," "educational," "learning," and "performance" or "outcome." In addition, the Google Scholar database and the reference lists of primary studies were utilized to access different research sources. Non-repetitive studies were retrieved from the Google Scholar database. Subsequently, the reference lists of the studies were examined, and potential studies that were not repetitive with the primary studies were accessed. In line with the purpose of this study, various inclusion criteria were determined, and studies meeting these criteria were included in the analysis. The flow diagram outlining the data collection and inclusion process is presented in Appendix 1.

Inclusion criteria

The inclusion criteria to select and analyze the primary studies determined as follows: i) Primary studies should be published between 2000 and 2023. ii) Studies should involve teacher/instructor leadership, exclude school administrative leadership. iii) Studies should contain appropriate statistical data to calculate effect sizes, such as Pearson's r, R, R^2, F, and t values. The dataset of this study consists of 49 primary studies, comprising 51% articles, 47% theses, and 2% conference papers. The characteristics of the primary studies are presented in Appendix 2.

Data coding

The coding of the primary studies was performed under the following labels. Leadership type: It was coded based on the leadership model that was the focus of

the research. For example, if the research focused on transformational teacher leadership, it was coded as "transformational". Similarly, if it focused on distributed leadership, it was coded as “distributed”. Teacher leadership was coded as “teacher leader”. If the number of effect sizes related to a specific leadership type was less than or equal to three (k≤3), it was coded as "other". Academic field: If the research covers multiple academic fields, it was coded as "mixed". If it specifically focuses on a single academic field, it was coded as “math” and “language” etc. If the number of effect sizes related to a specific academic field was less than or equal to three (k≤3), it was coded as "other". Achievement scale: The scales used to measure the achievement were coded as “GPA” for general point average, “self-report” for self-reporting, “standard” for standard exams and “test scores” for multiple choice tests. Education level: Coding was based on the educational levels in which the research was conducted. These levels were coded as “elementary”, “middle”, “high”, “university” and “mixed”. Analysis unit: If the study conducted statistical analyses based on scores from individual participants such as teachers or students, the unit of analysis was coded as “individual”. If the research conducted statistical analyses based on aggregated data, for example, scores aggregated at the school level, the unit of analysis was coded as “school”. Participant: The participant type was coded as reported in the research reports such as “teacher, student and, principal”. If the research involved participants from multiple statuses, it was coded as "mixed". Location: The country where the research was conducted was taken as a reference. The number of studies from the U.S. is significantly higher compared to other countries. This aspect was considered during coding. Accordingly, the countries were coded as "US" and "other". Quality assessment: The quality of the primary studies was assessed using the Quality Assessment and Validity Tool for Correlational Studies developed by Cicolini, Comparcini and Simonetti (2013). This tool is specifically designed to measure the quality of correlational research. The scores obtained from the tool by the primary studies were coded as follows: “0-4 = Low; 5-9 = Medium; 10-14 = High”. Publication type: The publication type of the primary studies coded as “article”, “dissertation” and “proceeding”.

Data Analysis

Statistical model

A dataset was created from studies that met the inclusion criteria of this research. The samples and characteristics of the primary studies included in this dataset vary. When the samples and characteristics of the primary studies are diverse, it is recommended to use a random effects statistical model in meta-analyses (Borenstein et al., 2021; Paul and Barari, 2022). In this study, considering the diversity of the dataset, the statistical analysis was conducted by using the random effect meta-analysis model.

Effect size selection

In this research, each primary study included in the meta-analysis is considered as an analysis unit. In other words, each primary study comprising the dataset of this research (if it covers a sample) is represented by an effect size. If the primary studies have reported dependent correlations, an average effect size can be calculated for that study to represent a single effect size (Park and Beretvas, 2019). If a study was conducted on a single sample and reported interdependent correlations, the average effect size was calculated for that study. If there was more than one sample group in a study, independent effect sizes were produced for each sample. For each study, Fisher's z (Fz) effect size was calculated. Since the Pearson r values reported in the primary studies take values between 1 and -1, the calculated variance values tend to narrow the confidence intervals. To address this issue of shrinkage, the use of the Fz index is recommended (Borenstein and Hedges, 2019). Therefore, the Fz index was preferred as the effect size index in this research.

Publication bias

Publication bias concerning the distribution of effect sizes, was assessed using the Egger's regression test (ER), Duval and Tweedie's Trim and Fill analysis (DTTF), and funnel plot examination techniques (Samawi, 2021). Different tests for publication bias were compared and interpreted in relation to each other.

Heterogeneity and moderator analysis

The total amount of heterogeneity in the dataset was examined using Q statistics, while the level of heterogeneity was assessed using I^2 and tau^2 statistics (Borenstein et al., 2017). Furthermore, average effect sizes were calculated and interpreted based on moderator variables. Moreover, to assess whether the average effect size differed across moderator variables, between-group Q values were calculated and interpreted. If a continuous variable such as the year of the study served as a moderator, meta-regression was performed.

Findings

The dataset of this study consists of k=55 independent samples derived from n=49 primary studies. The effect sizes of the primary studies range from Fz=-.69 to Fz=.1.05. It was determined that there are two extreme effect sizes within the primary studies (Fz=-.69 and Fz=.1.05). Outliers were excluded from the statistical analyses. Thus, the present study analyzed a total of n=47 independent samples from k=53 primary studies. Accordingly, the effect sizes ranged from Fz=-.08 to Fz=.86. The average effect size between teacher leadership and academic achievement is moderate in magnitude (Fz=.25, 95% CI [.19, .31], $p < .01$). Furthermore, the total amount of heterogeneity in effect sizes was calculated as $Q (53) = 830.78$, $p < .01$. It was determined that the effect sizes exhibited a high level of heterogeneity ($I^2 = 93.74$). It

can be stated that the amount of heterogeneity is significantly influenced by the between-study variance ($Tau^2 = .05$).

The results of Egger's Regression test did not reveal any evidence of publication bias (t = 1.35, df = 51, p = .18). Similarly, the results of the DTTF test indicated a negligible level of publication bias. It was found that the distribution of effect sizes based on their standard errors exhibits symmetry, however, an additional study needs to be added to the right of the mean effect size. Based on this, the corrected effect size was calculated as Fz = 0.254, with a 95% confidence interval of [0.19, 0.32].

The Q statistic was computed as 834.49, indicating the total heterogeneity of the effect sizes. The distribution of effect sizes based on their standard errors was examined by using a funnel plot, and it was observed that the distribution was symmetric. The funnel plot is presented in Figure 1. In line with the above results, it was concluded that the data set of the study does not exhibit publication bias. The results of the heterogeneity and moderator analysis for the data set are presented in Table 1.

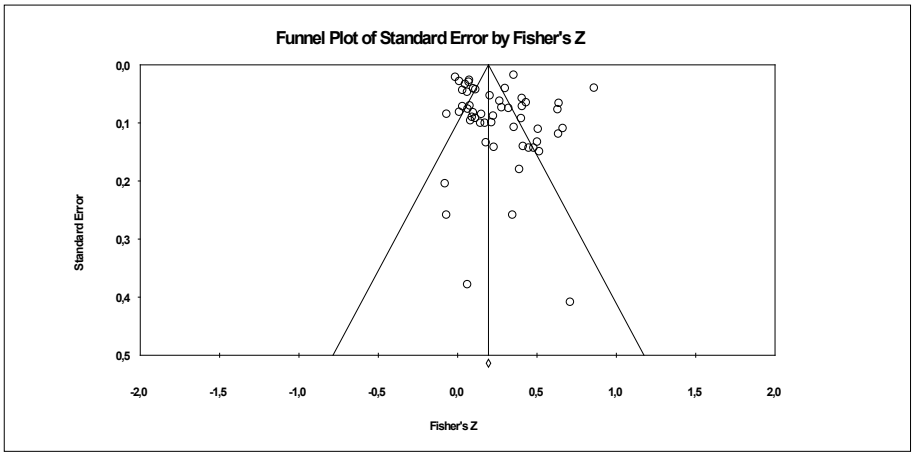

Figure1. Funnel plot

The distribution of effect sizes varies statistically according to the type of achievement measure (Q(b) = 15.98, p < .05) and the quality level of the study (Q(b) = 9.86, p < .05). The self-report type scales used in the studies yielded effect sizes at a moderate level (k = 5, Fz = .45, 95% CI [.29, .61]). Similarly, the test score type scales used in the studies also generated effect sizes at a moderate level (k = 6, Fz = .39, 95% CI [.24, .55]). In contrast, standard achievement tests yielded lower effect sizes (k = 5, Fz = .14, 95% CI [.06, .23]). Furthermore, studies with higher quality levels produced lower effect sizes compared to studies at a moderate level (k = 25, Fz = .16, 95% CI [.08, .24]; k = 28, Fz = .34, 95% CI [.26, .42]). The distribution of effect sizes does not statistically differ according to leadership type, academic field,

educational level, unit of analysis, participant type, location, and publication type. However, there are noteworthy observations based on the magnitude of effect sizes. The effect size of studies conducted at the elementary school level is weak (Fz=.12), while it is moderate for the university (Fz=.26), for the high school level (Fz=.38) and middle school level (Fz=.30), and for the mixed level (Fz=.22). Furthermore, there is a significantly lower between-study variance observed at the elementary level (I^2=34.65, Tau^2<.01). Additionally, the meta-regression analysis examining the effect sizes across years did not yield statistically significant results (Slope=.007, Standard Error=.0065, p=.26).

Table 1
Moderator and Heterogeneity Analyses

	Effect size		%95 CI		Heterogeneity		
Moderator	k	Fz	LL	UL	I^2	tau^2	Q(b)
Leadership type							.94
Teacher leader	22	.29	.18	.39	91.67	.04	
Transformational	14	.25	.12	.37	93.00	.03	
Distributed	14	.22	.09	.34	95.84	.11	
Other	3	.19	-.06	.45	74.91	.01	
Academic field							.57
Mixed	38	.24	.16	.32	93.75	.04	
Language	8	.24	.07	.41	88.06	.05	
Math	4	.31	.09	.54	95.94	.09	
Other	3	.31	.03	.58	86.67	.07	
Achievement scale							15.98*
GPA	18	.25	.16	.35	89.06	.03	
Self-report	5	.45	.29	.61	97.31	.05	
Standard	24	.14	.06	.23	70.50	.01	
Test scores	6	.39	.24	.55	93.74	.07	
Education Level							5.82
Elementary	12	.12	-.02	.26	34.65	<.01	
Middle	16	.30	.18	.43	96.95	.12	
High	8	.38	.20	.55	87.96	.05	
Mixed (K1-K12)	8	.22	.05	.39	74.35	.01	
University	9	.26	.10	.42	94.73	.03	
Analysis unit							.38
Individual	39	.26	.19	.34	95.19	.05	
School	14	.19	.06	.33	61.65	.02	
Participant							.90
Teacher	18	.23	.11	.34	63.27	.01	

Student	17	.24	.13	.35	96.10	.04	
Principal	3	.20	-.06	.47	74.85	.02	
Mixed	15	.30	.18	.42	95.48	.11	
Location							1.84
US	33	.21	.13	.29	82.16	.03	
Other	20	.30	.20	.39	96.65	.05	
Quality							9.86*
High	25	.16	.08	.24	92.71	.02	
Medium	28	.34	.26	.42	91.01	.08	
Publication type							5.25
Article	25	.28	.20	.37	96.00	.05	
Dissertation	27	.19	.10	.28	76.98	.02	
Proceeding	1	.66	.21	1.11	.00	<.01	

Note: * p <.05, Q(b): Q between, %95 CI: %95 Confidence Interval

Continued from Table 1.

Conclusion, Discussion and Recommendation

In this study, the aim was to examine the relationship between teacher leadership and academic achievement. To achieve this objective, an analysis of effect sizes was conducted based on 54 independent samples obtained from 47 primary studies. Overall, it was concluded that there is a weak-level relationship between teacher leadership and academic achievement. From this perspective, it can be inferred that teacher leadership does not have a significant impact on academic achievement. However, it should be noted that the interpretation of the meta-analysis results needs to be approached with caution. The quality of the studies included in the analysis directly affects the findings and results of the meta-analysis (Olejnik and Algina, 2000). The obtained results have been shaped based on the data from the selected studies.

The findings of this study are consistent with the research results of Balwant (2016) and Shen et al. (2020). However, the results of this study partially align with the research findings of Tan et al. (2021). The obtained result has shown a weak level of relationship (ES = .12) between teacher leadership and academic outcomes, similar to what has been found in this study. However, there is a notable difference (ΔES = .13) between the effect size observed in this study and the effect size observed in the study by Tan et al. (2021). This discrepancy may have arisen due to the different levels of analysis between the two studies. In this study, the unit of analysis is at the research level, whereas in the mentioned study, the unit of analysis comprises independent effect sizes derived from primary studies.

According to the research findings, the relationship between teacher leadership and academic achievement is weak at the elementary school level. The weak level of impact of teacher leadership on academic achievement among elementary school students can be explained by the lack of age and maturity necessary for these students to discern leadership behaviors. Due to being in their childhood stage, students at this level may exhibit different behaviors in discerning and valuing teacher leadership behaviors. However, their tendency to perceive their teachers as ideal individuals in all aspects can also enhance their efforts to emulate them in various domains. Thus, students in this age group may not only emulate their teachers' leadership behaviors but also strive to emulate them in every aspect and action. Focusing solely on specific leadership behaviors may prove to be inadequate. In line with this, Tan et al. (2021) calculated the effect size between teacher leadership and academic achievement among students in grades 1 to 6 (G1-G6) to be small (ES=.10).

In this study, a moderate positive relationship was identified between teacher leadership and academic achievement in middle and high school levels. Accordingly, teacher leadership can be considered a significant factor in the academic success of students at the middle and high school levels. Indeed, in these school stages where students undergo a process of self-discovery, emotional support, and identity formation, they are influenced by the leadership of their teachers. Leader teacher behaviors not only serve as examples but also shape students' behaviors. Sokol, Gozdek and Figurska (2015) concluded in their research that leader teachers' behaviors have a significant impact on shaping students' creativity. They also emphasized the important contributions of leader teachers in providing emotional support to students, highlighting that students not only need academic success but also emotional maturity and satisfaction. Therefore, the relatively high effect size found between the academic achievement of secondary school students and teacher leadership behaviors is meaningful. It can be inferred that leader teachers create a positive impact on academic achievement through emotional support.

Another finding of this study suggests that the relationship between teacher leadership and academic achievement is positive and of moderate magnitude among higher education students. The moderate effect size observed in this relationship at the higher education level may be attributed to the significance and meaning that university students attribute to leadership behaviors. Unlike students at the secondary education level, university students may have a greater desire to understand the world and life in a universal framework and develop a unique set of values. This inclination could lead them to attach greater importance to leadership behaviors, as these behaviors can embody special and valuable ideas that have the potential to influence others. Such ideas can serve as guiding principles for young individuals who seek to shape their lives. Therefore, it is natural to observe meaningful relationships between instructional behaviors that are influential on higher education students and various learning outcomes, including academic achievement. In line with this, Balwant (2016) conducted a meta-analysis examining the relationship between transformational

teacher leadership and higher education instruction and found significant positive associations between transformational teacher leadership and student motivation, satisfaction, trust in the instructor, academic achievement, effective learning, and cognitive learning.

Higher effect sizes have been calculated for the academic achievement variable based on students' self-reports and research-specific tests compared to standardized tests. This discrepancy may be attributed to the fact that standardized tests are designed to differentiate students' performance from one another and tend to be more challenging. On the other hand, self-report measures and research-specific tests are intended to assess students' attainment of target learning outcomes rather than distinguishing among students. Due to their greater flexibility as measurement tools compared to standardized tests, they may have produced larger effect sizes. As noted by Çakan (2003), achievement tests are developed to meet specific standards and involve the collaboration of experts, teachers, and technicians to ensure the necessary competencies. It is expected that achievement tests designed to meet these standards would yield lower effect sizes compared to reports prepared in a subjective manner, which could be more prone to bias.

The study revealed that studies with lower quality levels tended to produce moderate effect sizes. The validity and reliability of the measures employed in the studies are crucial methodological factors for determining the true effect size. Furthermore, the study found that studies with lower quality levels yielded moderate effect sizes more frequently. The quality of research is closely associated with the methodological rigor of the study. To ascertain the true effect size, the methodological quality of the studies should be carefully examined and monitored by researchers, editors, reviewers, and jurors. Indeed, Lipsey and Wilson (2001) stated that the quality of primary studies included in a meta-analysis has an impact on validity. Accordingly, it is important to thoroughly evaluate and assess the studies that can be included in the scope of analysis before their publication and allow their dissemination thereafter. This is because the results of meta-analyses and similar compilations are directly dependent on the quality of the primary studies. High-quality publications are necessary for obtaining reliable results and guiding assessments.

This meta-analysis has several limitations. Firstly, the inclusion of studies with diverse sample characteristics and variations in the administered achievement tests has led to substantial heterogeneity in the calculated effect sizes. Consequently, obtaining and interpreting a general conclusion, like the overall effect sizes derived from similar studies, is more challenging in this study. Secondly, there is a relatively limited number of experimental studies focusing on the relationship between teacher leadership and student achievement. The existing studies have approached the issue from different perspectives. Meta-analysis, by definition, is a compilation method that combines data from similar studies. However, the number of similar experimental studies on this topic, especially across different school levels, has not yet reached a

sufficient quantity. Thirdly, the insufficient number of experimental studies conducted specifically for each school level has made it challenging to independently evaluate teacher leadership and academic achievement within these levels. Despite these limitations, the results obtained from the present study confirm the need for further experimental research in this area. The insufficient number of experimental studies hinders the accurate evaluation of meta-analyses and similar systematic reviews. In light of the findings of this study, the following recommendations may be considered beneficial: Researchers can conduct more experimental studies examining the relationship between teacher leadership and students' academic achievement. These studies can be carried out independently at primary, secondary and higher education levels. They may take more careful quality control measures in experimental studies to ensure appropriate data are provided for subsequent research efforts. In terms of educational policies, adopting strategies that encourage teacher leadership may increase the effectiveness of teachers.

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Genişletilmiş Özet

Öğretmenler öğrencilerin akademik hayatlarındaki en önemli unsurlardan biridir. Çünkü öğretmen öğrencilerinin sadece akademik başarısının değil bütün davranışlarının olumlu veya olumsuz biçimde şekillenmesine etki edebilecek bir konumdadır. Bu noktada öğretmen liderliği, eğitim sürecini doğrudan etkileyen bir kavram olarak öne çıkmaktadır. Lider öğretmen okul ortamında değişime öncülük eden, uzman, koç, baş öğretmen, mentor, bölüm başkanı gibi nitelemelerle tarif edilen özellikleri taşır (Mangin & Stoelinga, 2008; Neumerski, 2012). Bu niteliklerin çeşitliliği, lider öğretmene yüklenen misyonun kapsamlılığına işaret eder. Karmaşık okul ortamlarında diğer paydaşları etkilemek kolay olmadığı için lider öğretmenlerin bu üstün özelliklere sahip olması beklenir.

Bu çalışmanın amacı, öğretmen liderliği ve akademik başarı arasındaki ilişkiyi incelemektir. Bu amaç doğrultusunda aşağıdaki hipotezler test edilmiştir:

H1. Öğretmen liderliğiyle akademik başarı arasındaki ilişki pozitif yönlüdür.

H2. Temel araştırmaların özellikleri (araştırmanın yayın yılı, analiz birimi, örneklem lokasyonu, katılımcı tipi, öğretim kademesi, liderlik türü, akademik alan) öğretmen liderliği akademik başarı arasındaki ilişkide moderatördür.

Bu araştırmada öğretmen liderliği ve akademik başarı arasındaki ilişkiyi belirlemek amacıyla meta analiz yöntemi kullanılmıştır. Meta analiz, belirli bir konuda yapılmış çok sayıda araştırmanın sonuçlarını birleştirerek genel bir sonuca ulaşmayı sağlamak amacıyla kullanılan istatistiksel bir yöntemdir (Littell, Corcoran ve Pillai, 2008). Veri toplama: Bu çalışmanın verileri öğretmen liderliği ile öğrenci akademik başarısı arasındaki ilişkiyi araştıran birincil çalışmalardan oluşmaktadır. Birincil araştırma çalışmalarına erişim için elektronik veri tabanlarından yararlanılmıştır. Bu elektronik veri tabanları Scopus, Web of Science, Eric, Academic Search Ultimate, Open Dissertations, ProQuest Publicly Available Content'tir. Veri tabanlarında arama yapmak için "teacher leadership or teacher leader or classroom leadership or instructor leadership or professor as a leader or distributed leadership or shared leadership or collective leadership and achievement or success or academic/school student/educational/learning with performance or outcome" anahtar kelimeleri kullanılmıştır. *Dahil edilme ölçütleri:* i) Temel araştırmalar 2000-2023 yılları arasında yayınlanmış olmalıdır. ii) Temel araştırmalarda lider olan öğretmen/öğretici olmalıdır. Okul yönetici lider ise hariç bırakılmıştır. iii) Temel araştırmalar etki büyüklüğü hesaplamak için yeterli istatistiksel veri içermelidir (Pearson r, R, R^2, F ve t değerleri gibi). Bu araştırmanın dahil edilme ölçütlerini karşılayan çalışmalardan bir veri seti oluşturulmuştur. Bu veri setini oluşturan temel araştırmaların örneklemleri ve özellikleri birbirlerinden farklıdır. Temel araştırmaların örneklem ve özellikleri birbirlerinden farklı ise meta analizde rastgele etkiler (random effects) modelinin kullanılması önerilmektedir (Borenstein, et al., 2021; Paul & Barari, 2022). Bu araştırmada veri setinin örneklem çeşitliği dikkate alınarak rastgele etkiler modeline göre istatistiksel süreç yürütülmüştür. Bu araştırmaya dahil edilen 49 temel araştırmadan 55 bağımsız etki büyüklüğü hesaplanmıştır. Hesaplanan etki büyüklüğü değerleri Fz=-.69 ile Fz=.1.05 arasında değişmektedir. Bunlardan 2 tanesi uç değer olduğu (Fz=-.69 ve Fz=.1.05) için analiz dışında tutulmuştur. Böylelikle, toplam 47 temel araştırmadan 53 bağımsız etki büyüklüğü analiz edilmiştir. Buna göre etki büyüklüğü değerleri Fz=-.08 ile Fz=.86 arasında yayılmaktadır. Öğretmen liderliği ve akademik başarı arasındaki ortalama etki büyüklüğü orta düzeydedir (Fz=.25, %95 CI [.19, .31], p <.01). Yine etki büyüklüklerinin toplam heterojenlik miktarı Q (53) = 830.78, p <.01 olarak hesaplanmıştır. Etki büyüklüklerinin yüksek düzeyde heterojen olduğuna karar verilmiştir (I^2=93.74). Heterojenlik miktarına araştırmalar arası varyansın katkısının önemli düzeyde olduğu söylenebilir (Tau^2=.05).

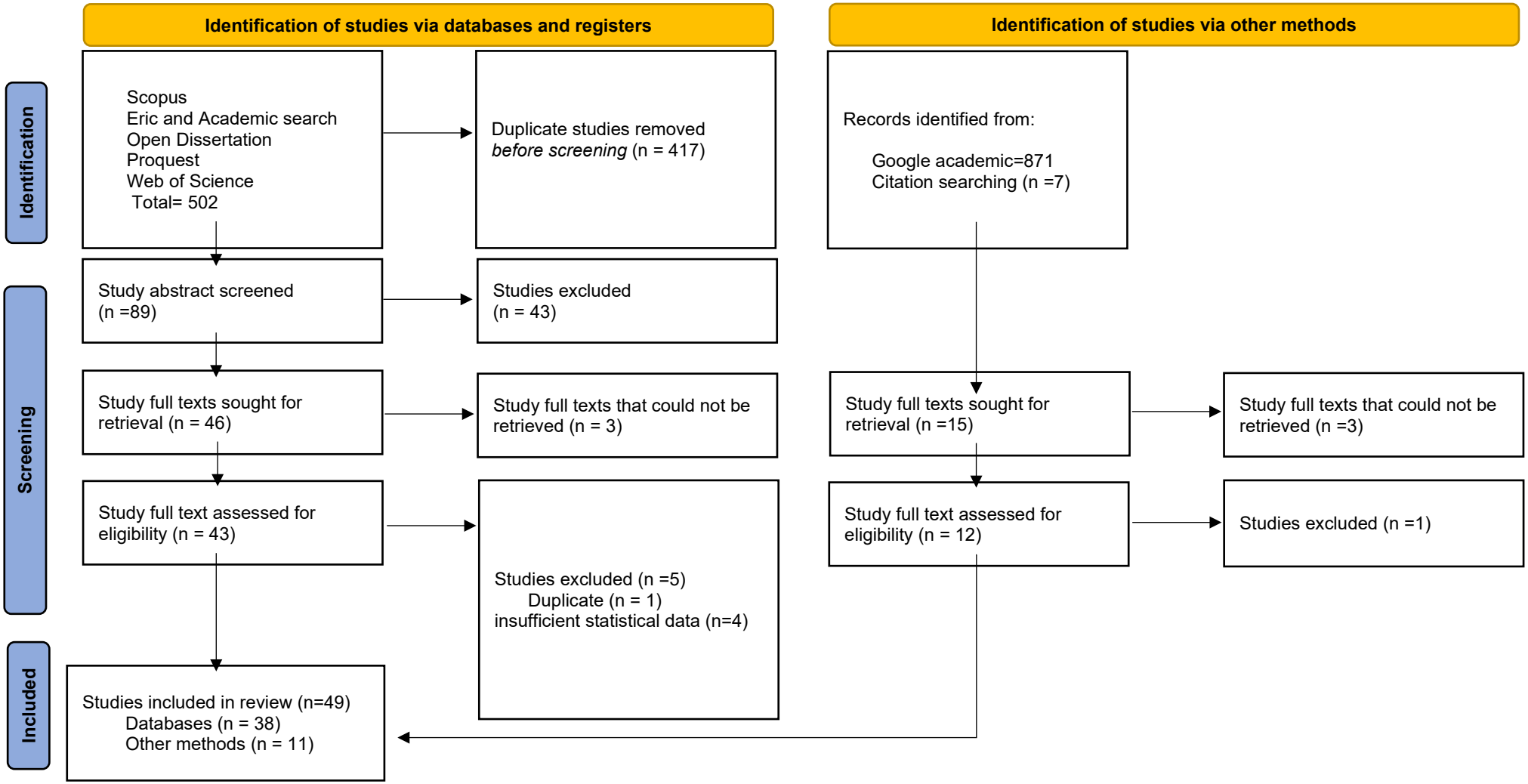
Araştırmanın sonuçları Balwant, (2016) ve Shen, vd. (2020) araştırma sonuçlarıyla örtüşmektedir. Öte yandan Tan, vd. (2021) araştırma sonuçlarıyla bu

araştırmanın sonuçları kısmen örtüşmektedir. Ulaşılan sonuç, bu çalışmada olduğu gibi öğretmen liderliğinin akademik çıktılarla ilişkisinin zayıf düzeyde (ES=.12) olduğunu göstermiştir. Fakat Tan, vd. (2021)'de gözlenen etki büyüklüğü ile bu araştırmada gözlenen etki büyüklüğü arasında dikkate değer bir fark vardır (ΔES=.13). Bu durum iki araştırmanın analiz düzeylerinin farklı olmasından kaynaklanmış olabilir. Bu araştırmada analiz birimi araştırma düzeyinde iken söz konusu çalışmanın analiz birimi, temel araştırmaların içinde yer alan birbirinden bağımsız etki büyüklükleridir.

Araştırma sonuçlarına göre öğretmen liderliği ile akademik başarı arasındaki ilişki ilkokul kademesi için zayıf düzeydedir. Öğretmen liderliğinin akademik başarı üzerindeki etkisinin ilkokul öğrencileri için zayıf düzeyde çıkması bu kademedeki öğrencilerin liderlik davranışlarını ayırt edecek yaş ve olgunlukta olmamasıyla izah edilebilir. Bu kademedeki öğrenciler çocukluk çağında olmalarından dolayı, lider öğretmen davranışlarını ayırt etme ve önemseme konusunda farklı davranabilirler. Fakat öğretmenlerini her konuda ideal insan olarak görmeleri onlara her konuda benzeme çabalarını da artırabilir. Böylelikle sadece liderlik davranışlarıyla değil her ve hareketleriyle öğretmenlerini örnek alabilirler. Liderlik gibi belirli davranışlara odaklanmak bakımından zayıf kalabilirler. Bu doğrultuda Tan, vd. (2021), birinci sınıftan altıncı sınıfa kadar olan aralıkta yer alan sınıflardaki öğrencilerin akademik başarılarıyla ile öğretmen liderliği arasındaki etki büyüklüğünü küçük (ES=.10) düzeyde hesaplamışlardır.

Bu çalışmada, ortaokul ve lise düzeyindeki okullarda öğretmen liderliği ile akademik başarı arasında orta düzeyde olumlu bir ilişki belirlenmiştir. Bu doğrultuda öğretmen liderliğinin ortaokul ve lise düzeyindeki öğrencilerin akademik başarısı üzerinde önemli bir faktör olduğu düşünülebilir. Nitekim, öğrencilerin kendilerini tanıma, duygusal destek bulma ve bir kimlik edinme süreci yaşadığı bu okul kademelerinde öğretmenlerin liderliklerinden etkilenmeleri söz konusudur. Lider öğretmen davranışları, öğrencilere örnek olması bakımından onların davranışlarını da şekillendirir. Sokol, Gozdek ve Figurska (2015), yaptıkları araştırmada öğrencilerin yaratıcılığına şekil vermede lider öğretmenlerin davranışlarının etkili olduğu sonucuna ulaşmışlardır. Ayrıca lider öğretmenlerin öğrencilere duygusal destek olma noktasında önemli katkılarının olduğunu, öğrencilerin akademik başarıları kadar onların duygusal olgunluk ve doyuma da ihtiyacı olduğunu ifade etmişlerdir. Bu bakımdan ortaöğretim öğrencilerinin akademik başarısıyla öğretmenlerin liderlik davranışları arasındaki ilişkinin etki büyüklüğünün görece yüksek çıkması anlamlıdır. Lider öğretmenlerin duygusal destek aracılığıyla akademik başarı üzerinde olumlu etki oluşturduğu düşünülebilir.

Appendix 1: Flow diagram of searching, screening and including process of the primary studies



Flow diagram of screening and including process, adapted from McKenzie, et al. (2021).

Appendix 2.

The characteristics of the studies included in the meta-analysis

Study	r	n	Rep.	Partic.	Local	Edu.L.	Leadership	Scope	Scale	Unit	Qualty
Huamán, et al. (2021)	0,270	189	A	T	Peru	H	Transformational	mixed	GPA	I	Mq
Kılınç, et al. (2022)	0,148	142	A	M	Turkey	M	Distributed	Lang.	Std	S	Hq
Gultekin & Dougherty (2021)	0,200	362	A	T	US	M	Servant	mixed	Std	I	Hq
Küçükalioglu & Tuluk (2021)	0,047	915	A	S	Turkey	M	Teacher	math	T-Sc	I	Hq
Tsuyuguchi, et al. (2020)	0,070	1157	A	P	Japan	M	Distributed	mixed	Std	I	Hq
Leithwood & Mascal (2008)	0,340	90	A	P	Canada	M	Distributed	mixed	Std	S	Hq
Givens (2013)	0,080	27	D	S	US	M	Distributed	mixed	Std	S	Hq
Estes (2009)	0,210	105	D	P	US	H	Teacher	mixed	GPA	I	Mq
Nesmith (2011)	0,090	127	D	T	US	E	Teacher	mixed	GPA	I	Mq
Boudreaux (2011)	0,030	199	D	T	US	E	Distributed	mixed	Std	I	Mq
Davis (2009)	0,370	34	D	T	US	E	Distributed	mixed	Std	S	Hq
Wilson (2016)	-0,070	143	D	S	US	M	Transformational	Lang.	Std	I	Mq
Crosby, K. D. (2019)	0,420	52	D	T	US	H	Transformational	other	T-Sc	I	Mq
Turker (2021)	0,467	85	D	T	US	H	Transformational	mixed	GPA	I	Mq
Carmichael (2006)	-0,600	10	D	M	US	E	Distributed	mixed	Std	S	Mq
Lopez (2015)	0,076	206	D	T	US	M	Authentic	mixed	Std	I	Hq
Yusof, et al., (2018)	0,142	103	A	T	Malaysia	E	Teacher	mixed	GPA	I	Mq
	-0,071	18	D	T	US	E	Teacher	mixed	Std	S	Hq
Terrell (2010)	0,110	122	D	M	US	E	Distributed	mixed	Std	I	Mq
Sugg (2013)	-0,015	2292	D	S	US	M	Teacher	Lang.	Std	I	Hq
Sebastian el al., (2017)	0,380	121	A	M	US	H	Teacher	mixed	Std	S	Hq
Cohron (2009)	0,112	561	D	T	US	E	Teacher	mixed	GPA	I	Hq
Harris (2016)	0,220	133	D	T	US	E	Transformational	Lang.	Std	I	Mq
Burr (2003)	0,258	262	D	T	US	E	Distributed	mixed	Std	I	Mq
Woo (2021)	0,063	177	D	M	US	M	Distributed	mixed	Std	S	Hq
Woo (2021)	0,010	155	D	M	S.Korea	M	Distributed	mixed	Std	S	Hq
Bell (2012)	0,332	18	D	T	US	M	Teacher	mixed	Std	S	Mq
	0,061	10	D	T	US	M	Teacher	mixed	Std	S	Mq
	0,610	9	D	T	US	H	Teacher	mixed	Std	S	Mq
Sebastian,et al., (2016)	0,030	534	A	M	US	E	Teacher	mixed	Std	S	Hq
Seashore, et al,. (2010)	0,170	103	A	M	US	M	Distributed	math	Std	S	Hq
Calderone, et al., (2018)	0,558	173	A	S	US	M	Teacher	mixed	T-Sc	I	Mq

Shah & Khan (2020)	0,406	242	A	T	Pakistan	M	Teacher	mixed	T-Sc	I	Mq
Igiri et al., (2019)	0,385	200	A	M	Nigeria	M	Teacher	math	T-Sc	I	Mq
Wooleyhand (2012)	0,097	152	D	T	US	E	Distributed	mixed	Std	I	Mq
Siregar, et al., (2022)	0,463	60	A	S	Indonesia	M	Teacher	other	T-Sc	I	Mq
Rivers (2010)	0,782	187	D	T	US	E	Distributed	mixed	Std	I	Hq
Bukhari (2013)	0,098	605	A	M	Pakistan	H	Transformational	mixed	GPA	I	Hq
Eliav (2012)	0,445	52	D	M	US	M	Distributed	mixed	Std	S	Hq
Gilchrist (2017)	0,561	74	D	M	US	M	Teacher	Lang.	GPA	I	Mq
	0,473	48	D	M	US	M	Teacher	Lang.	GPA	I	Mq
	0,390	54	D	M	US	M	Teacher	Lang.	GPA	I	Mq
	0,224	53	D	M	US	M	Teacher	Lang.	GPA	I	Mq
Sulistiyarini & Sukardi (2016)	0,563	234	A	S	Indonesian	H	Teacher	math	GPA	I	Mq
Engin (2020)	0,073	1476	A	S	Turkey	E	Teacher	mixed	GPA	I	Hq
Trigueros, et al., (2020)	0,339	3354	A	S	Spain	U	Transformational	mixed	S-Re.	I	Hq
DeDeyn (2021)	0,176	59	A	S	US	U	Transformational	mixed	GPA	I	Mq
Bogler, et al., (2013)	0,010	1270	A	S	Israil	U	Transformational	mixed	GPA	I	Hq
Gill, et al., (2011)	0,384	307	A	S	India	U	Transformational	mixed	S-Re.	I	Hq
Prasad (2011)	0,58	87	P	S	India	U	Transformational	mixed	GPA	I	Mq
Harrison, (2011)	0,080	112	A	S	US	U	Transformational	mixed	GPA	I	Mq
Balwant (2022)	0,290	620	A	S	Trinidad	U	Authentic	mixed	S-Re.	I	Hq
Bubale,et al,. (2021)	0,696	640	A	M	Uganda	M	Distributed	mixed	S-Re.	I	Mq
Balwant, et al., (2019)	0,310	183	A	S	England	U	Transformational	mixed	S-Re.	I	Hq
Peters (2014).	0,060	462	D	S	US	U	Transformational	other	GPA	I	Hq

r= Pearson correlation, n= Sample size, Rep.= Report type, A= Article, D=Dissertation, P=Proceedings, Partic.= Participant type, T= Teacher, S= Student, P= Princibal, M=Mixed, Edu. L.= Education level, E= Elementry, M= Middle H=High U= University, Std=Standard, T-Sc=Test Score S-Re= Self Report GPA=Grade point average I= İndividual S= School, Hq= High qualty, Mq: Medium qualty, Lang.= Language