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## To What Extend Does Self-Regulated Learning Correlate Achievement in English Lesson? A Meta-Analysis Study\*

Şengül YAVUZ<sup>1</sup> Burhan ÜZÜM<sup>2</sup> Ata PESEN<sup>3</sup>

### Abstract

This paper aimed to combine the results obtained in primary studies examining the relationship between self-regulated learning and achievement in English lesson through meta-analysis. No specific starting date was determined for the literature review, and primary studies conducted until 2024 were included. Based on the inclusion and exclusion criteria, 73 effect sizes obtained from 58 primary studies were calculated. The heterogeneity test ( $Q_{sd=72}=1640.618$ ;  $P=95.611$ ) indicated the random effects model. The analysis demonstrated an overall moderate relationship between self-regulated learning and achievement in English lessons ( $r =0.327$ , 95% CI [0.263-0.388],  $p<0.000$ ). Moderator analysis was conducted to reveal the possible sources of the heterogeneity. Thus, publication year, place of publication, publication type, education level and language skill area were determined as possible moderators. The findings showed that the studies conducted in 2024 had the highest correlation. The lowest correlation was found in doctoral theses. The lowest correlation between self-regulated learning and achievement in English lessons was in university, and the highest level was in secondary school regarding the education level moderator. The highest correlations were found in reading and speaking skills.

**Keywords:** Self-regulated learning, correlation, foreign language, English, achievement, learner-centered instruction

## Öz-düzenlemeli Öğrenme ile İngilizce Dersi Başarısı Arasındaki İlişki Hangi Düzeydedir? Bir Meta-Analiz Çalışması

### Öz

Bu çalışma, öz-düzenlemeli öğrenme ile İngilizce dersindeki başarı arasındaki ilişkiyi inceleyen birincil çalışmalarda elde edilen bulguları meta-analiz yoluyla incelemeyi amaçlamaktadır. Literatür taraması için belirli bir başlangıç tarihi belirlenmemiş olup 2024 yılına kadar olan çalışmalar dahil edilmiştir. Dahil edilme ve hariç tutulma kriterlerine göre 58 birincil çalışmadan elde edilen 73 etki büyüklüğü hesaplanmıştır. Heterojenlik testi ( $Q_{sd=72}=1640.618$ ;  $P=95.611$ ) rastgele etkiler modelini göstermektedir. Analizler, öz-düzenlemeli öğrenme ile İngilizce dersindeki başarı arasında orta düzeyde ( $r =0.327$ , 95% GA [0.263-0.388],  $p<0.000$ ) bir ilişki olduğunu göstermektedir. Heterojenliğin olası nedenlerini ortaya çıkarmak için moderator analizi yapılmıştır. Bu doğrultuda, yayım yılı, yayım yeri, yayım türü, öğretim kademesi ve dil beceri alanı olası moderatörler olarak belirlenmiştir. Bulgular 2024 yılında yapılan çalışmaların en yüksek korelasyona sahip olduğunu göstermektedir. Yayım türünde en düşük korelasyon doktora tezlerinde tespit edilmiştir. Öğretim kademesine göre öz-düzenlemeli öğrenme ile İngilizce dersindeki başarı arasındaki en düşük korelasyonun üniversitede, en yüksek korelasyon ise ortaokul kademesinde olduğu ortaya çıkmıştır. Dil beceri alanı bakımından en yüksek korelasyonlar okuma ve konuşma becerilerinde görülmüştür.

**Anahtar Kelimeler:** Öz-düzenlemeli öğrenme, korelasyon, yabancı dil, İngilizce, başarı, öğrenci merkezli öğretim

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<sup>1</sup> Öğretmen, Milli Eğitim Bakanlığı, [eylul.elam@hotmail.com](mailto:eylul.elam@hotmail.com), <https://orcid.org/0009-0001-7996-881X>

<sup>2</sup> Dr. Öğr. Üyesi, Siirt Üniversitesi, [uzum\\_b@siirt.edu.tr](mailto:uzum_b@siirt.edu.tr), <https://orcid.org/0000-0003-3385-5841>

<sup>3</sup> Doç. Dr. Siirt Üniversitesi, [atapesen@siirt.edu.tr](mailto:atapesen@siirt.edu.tr), <https://orcid.org/0000-0003-1676-7444>

## Introduction

Learning English holds tremendous significance throughout the 21st century, especially for people whose native language is not English. English proficiency acquisition for non-native speakers transcends mere language mastery because it functions as an essential portal to numerous international educational opportunities, career paths and personal development (Cook, 2016). However, mastering a foreign or second language presents a significant challenge. Similarly, Dan et al. (2024) show that English language acquisition emerges as a complex and challenging endeavour shaped by numerous interacting personal, social and cultural factors. The absence of opportunities to engage with English beyond classroom settings presents substantial barriers for EFL learners, which makes their language progress difficult, and they rely extensively on teacher and peer support. This matter holds unique importance within informal learning contexts occurring beyond classroom walls because learners frequently operate without direct teacher support or guidance (Bowles, 2024). Thus, in this era of accountability, students are expected to regulate and take responsibility for their learning. The role of students and teachers in the educational journey has changed with the paradigm shift from a behaviorist approach to a constructivist one. Students are now expected to regulate their learning processes, and teachers function as facilitators (Halili & Zainuddin, 2015). This change has fostered instructional techniques that focus on actively involving students and recognizing the value of their learning experiences (Vasu et al., 2022). This emphasizes an ever-growing emphasis on moving students away from passively depending on their teachers to actively and independently seeking knowledge and skills. As suggested by Barros et al. (2022), creating student-centred learning environments can only be effective if students develop a higher level of self-regulation.

Self-regulated learning (SRL) in educational psychology is about how students can learn independently or with some autonomy. This has been a hot topic in second language acquisition (SLA) for many years as it gives us a deeper look into the language learning process (Fukuda, 2017). Canbay (2020) says that the psychological aspects of learners are closely related to self-regulation. SRL comes from educational psychology, and many researchers in SLA are interested in it (Zheng et al., 2018).

Many educational psychologists have defined self-regulated learning. Generally, self-regulated learning is a strategic approach where learners engage and control their cognitive processes, motivational states and behaviours to achieve their educational goals (Schunk & Zimmerman, 2007). Self-regulation involves many cognitive, metacognitive and behavioral strategies that individuals use to meet their educational objectives (Posner & Rothbart, 2000). Self-regulated learning is when students take control of their learning journey. This self-directed approach allows learners to turn their cognitive and physical skills into competencies for specific tasks. It includes metacognitive, motivational and behavioral components that individuals use to gain knowledge and proficiency, such as setting goals, planning strategies, using learning techniques, self-monitoring and self-guidance (Christobel & Kumar, 2023). Three points can be highlighted based on the definitions. First, students are actively involved in their learning. Second, they have the freedom to choose how they want to learn. Third, students are in charge of their learning (Karatas et al., 2016). Self-regulated learning based on social cognitive theory highlights the interaction between the learner, their environment and their behavioural responses. It says learners can influence social elements to achieve their academic aspirations (Chansri et al., 2024).

Like many factors affecting student success, such as attitude, motivation, metacognitive skills, and autonomy, the effect of self-regulated learning on success and its relationship with success are among the important factors examined in various studies in both national and international literature. In fact, in the Council of Higher Education (YÖK) Thesis Center database, it is seen that 915 postgraduate studies are listed in the search made with the keyword 'self-regulation' in all fields. In Google Scholar, when the same keyword is searched only across Turkish pages, 13400 studies are listed. In the Web of Science database, when the keyword 'self-regulated learning' is searched only throughout the study titles, 2897 studies are screened. In the Proquest database, when the keyword 'self-regulated learning' is searched in the study titles, it is seen that there are 1091 studies. It was determined that many of these studies are related to the English language. For example, when the Springer database is searched as 'Self-regulation AND English', 280 studies are listed. It is clear that the number of primary studies on self-regulation is satisfactory. It is time, then, to bring together and integrate the findings obtained in studies examining the relationship between self-regulated learning and achievement in English lessons.

## Literature Review

Systematic reviews and meta-analysis studies on self-regulated learning conducted abroad reveal that they are generally at the compilation level and are conducted in areas such as research trends on self-regulated learning in online learning environments (Tsai et al., 2013), examination of experimental studies on self-regulated learning in the context of modern technology (Junaštková, 2024), self-regulated learning in a clinical context (van

Houten-Schat et al., 2018), effectiveness of self-regulated learning in blended learning in higher education (Luo & Zhou, 2024), interventions and approaches for self-regulation and executive functions in the preschool period (Muir et al., 2023), how educational chatbots support self-regulated learning (Guan et al., 2024), self-regulated learning processes of advanced musicians (dos Santos Silva & Marinho, 2024). Moreover, meta-analysis studies on self-regulated learning aimed at calculating effect size or correlation include the relationship between self-regulated learning and academic achievement in children and adolescents (Dent & Koenka, 2016), how primary school students can effectively learn self-regulated learning strategies (Dignath et al., 2008), the effect of self-regulated education programs on the academic performance, self-regulated strategies, and motivation of university students (Theobald, 2021), the effect of self-regulated learning on learning outcomes in online and blended learning environments (Guntur & Purnomo, 2024), perceived social support and self-regulated learning (Martínez-López et al., 2023), a quantitative review of the effect of self-regulated learning on the academic achievement of first and second grade students (Elhusseini et al., 2022), self-regulated learning in continuing education (Hemmler & Ifenthaler, 2024), the relationship between self-regulated learning strategies and academic performance in online higher education courses (Cheng et al., 2023) have been found to be done in different courses, subjects or levels other than English. It turns out that only one study is a meta-analysis study that calculates the real effect size. In addition, most of the studies were scanned in limited databases, so it can be said that they are not sufficient enough to reveal the effect of self-regulated learning on language (English) achievement or its relationship with language achievement from a broad perspective.

On the other hand, the studies conducted in Turkey are generally compilation or systematic review studies (see. Çetintav & Karaoğlan Yılmaz, 2021; Çobanoğlu et al., 2023; Delibalta & Taşdelen Teker, 2024; Gözübüyük Hazen, 2024; Gümrükçü-Bilgici, 2023; Kazu & Yavuz, 2021; Tutkun et al., 2022; Yağcı, 2024). Furthermore, some of these studies only examine the studies published in just one database, and some include only primary studies conducted in Turkey. In this sense, the number of studies that integrate the primary studies conducted in Turkey and the international literature, and that provide a broader framework is almost non-existent. It is revealed that the number of studies that calculate effect size in the context of meta-analysis or that fall within the scope of relational meta-analysis is very few. Only 3 studies were found in this sense. However, none of these studies directly addressed the effect of self-regulated learning on achievement in English lesson or the relationship between self-regulated learning and achievement in English lesson. From this point of view, the present meta-analysis study is important in bringing together the data from primary studies examining the relationship between self-regulated learning and achievement in English lesson in Turkey and worldwide, and providing a broad framework on the subject.

#### Purpose of the Research

This study investigates the relationship between self-regulated learning in English language teaching and achievement through meta-analysis. “Is there a relationship between self-regulated learning in English language teaching and achievement?” is the basic question of this meta-analysis study. In the light of this basic question, answers to the following research questions were sought. Based on the quantitative data extracted from primary studies,

RQ1. To what extent does self-regulated learning correlate achievement in English lesson?

RQ2. Does the relationship between self-regulated learning and achievement in English lesson differ by;

- a. publication year?
- b. research place?
- c. publication type?
- d. educational level?
- e. language skills?

## Method

### Research Design

The meta-analysis method was used in the present study to unearth the relationship between self-regulated learning and achievement in English lesson. Glass (1976) identifies meta-analysis as the analysis of analysis, and that meta-analysis is a sound methodological alternative to comprehensively understand the rapidly expanding literature. Şen and Yıldırım (2020) define it as a quantitative method applied to combine the results obtained in more than one primary study. Durlak and Lipsey (1991) state that the meta-analysis method allows the quantitative representation of the findings in the primary studies and the relationship of the study characteristics

with these findings. There are basically two types of meta-analysis: group comparison and correlational meta-analysis. Both types of meta-analysis consist of two subheadings. Group comparison meta-analysis consists of treatment effectiveness and group difference meta-analysis types. Correlational meta-analysis is divided into two: covariance and test validity meta-analysis (Durlak & Lipsey, 1991). Correlational meta-analysis was used in this meta-analysis study.

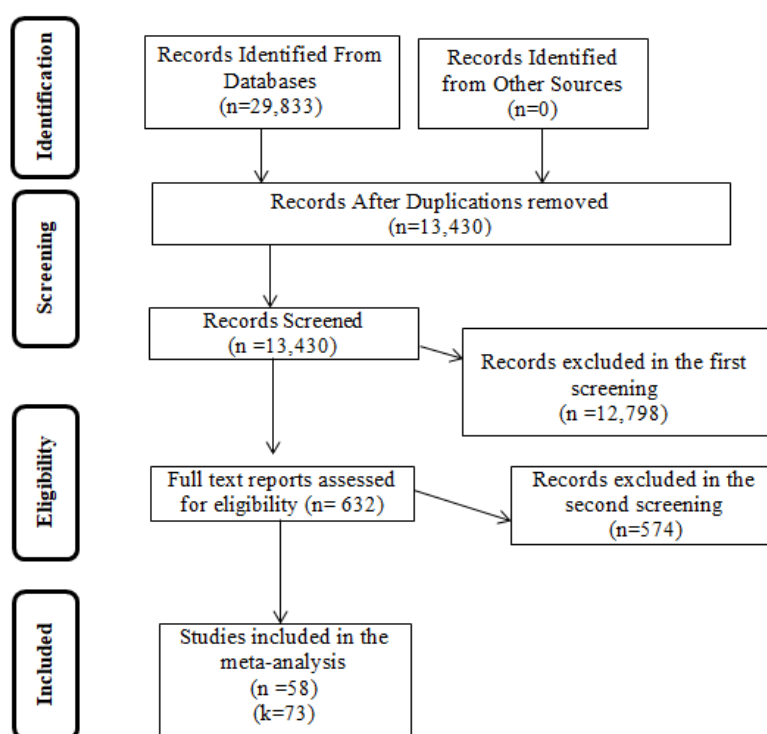
### **Inclusion & Exclusion Criterion**

The inclusion and exclusion criteria for primary studies in the present meta-analysis are as follows:

- A specific starting date was not determined for the publication date of primary studies, but those that were reached until 25.10.2024-that's the last date of the literature review,
- Those that were related to English language teaching or examine the relationship between any area of language skills and self-regulated learning in English lessons,
- Those that provide the Pearson correlation ( $r$ ) value,
- Those that use technology-supported self-regulation strategies (see. An et al., 2021), writing self-regulation strategies (see. Zhu et al., 2024), motivation scale, self-regulation as a sub-dimension (see. Nie et al., 2024), motivational strategies scale for learning (The Motivational Strategy for Learning Questionnaire) to determine the self-regulation levels of the participants,
- Those that were experimental studies by nature yet presented data on the relationship between self-regulation and success in English lessons within the scope of the study (see. Güven, 2023) were also included.
- For those produced from theses, theses were preferred to include.
- Studies published in Turkish or English were included.
- Those without overall correlation coefficients for the measurement tools applied to determine self-regulated learning levels/skills were excluded.
- Those in which students' exam scores or term/year-end achievement scores were presented for success were included. However, studies in which the participants' self-declaration of achievement in English classes were presented were excluded (see. Baissane, 2023; Dan et al., 2024; Omari & Arssi, 2024).

In order to reach primary studies in Turkish databases such as the National Thesis Center of Turkey, Ulakbilim, and Dergipark, the Turkish keywords “öz-düzenleme”, “öz-düzenlemeli öğrenme” and their English equivalents “self-regulation”, “self-regulated learning”, “self-regulatory” keywords were used in databases/article sharing sites and the search was performed using AND, double quotes (“ ”), in title, both in the study titles and in all dimensions of the database/article sharing sites. On the other hand, for databases such as Elsevier/Science Direct, SPRINGER, Taylor & Francis, and Web of Science, the keywords “self-regulation”, “self-regulated learning”, “self-regulatory learning”, “English”, “foreign language”, “foreign language learning” were used in both the study titles and in all dimensions of the databases, with the necessary limitations.

Pre-determined keywords were used to obtain studies to be included in the present meta-analysis. Searches were conducted in the National Thesis Center of Turkey, ULAKBİLİM TR Series, Dergipark, Google Scholars, Education Resources Information Center (ERIC), Proquest Digital Dissertations, Elsevier/Science Direct, Emerald, Web of Science, Taylor & Francis, JSTOR, Springer, SAGE, Wiley Online Library databases and article sharing sites.



**Figure 1.** PRISMA flowchart

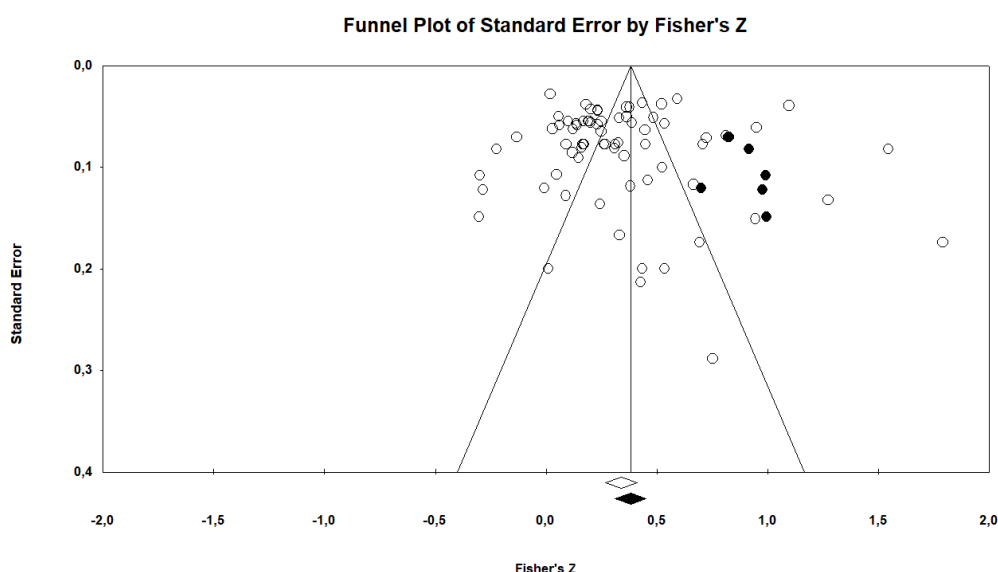
Figure 1 shows that 29.833 studies were listed in the databases in the first stage as a result of the keywords used in the literature review. After eliminating the common studies, 13.430 studies remained. First, the titles and abstracts of these studies were examined, and whether they were within the scope of the present meta-analysis was evaluated. 632 studies remained to be examined in more detail. These studies were examined in detail in terms of title, abstract, method and findings sections by considering the information in the coding scheme, and a total of 73 effect sizes from 58 primary studies were included.

### Coding

In addition to the researcher, the studies included in the meta-analysis were coded by two independent coders to ensure coding reliability (Açıklı, 2009; Temel & Karağaoğlu, 2001). One of the independent coders was an Associate Professor in the field of Curriculum and Instruction, and the other one was an Assistant Professor in the field of English Language Teaching. In calculating the inter-coder reliability value, a value of 1 is given for studies with a perfect agreement, and a value of 0 is given for studies that indicate disagreement (Karabulut, 2020, p.48; Şen & Yıldırım, 2020, p.24). Thus, when calculating the coding reliability between the present study's coders, the coding scheme sections were identified as Item 1, Item 2, Item 3 ..... Item 8. The same items coded by the researcher and other coders were given the value of "1", and the items coded differently were given the value of "0". Accordingly, there were 6 disagreements between the researcher and Coder-1, 8 between the researcher and Coder-2, and 9 between Coder-1 and Coder-2. Based on the formula stated above, a 98.9% agreement between the researcher and Coder-1, 98.6% agreement between the researcher and Coder-2, and 98.4% agreement between Coder-1 and Coder-2. Most of the disagreements were about the educational level. The disagreements were cleared during a sitting with coders.

### Publication Bias

A funnel plot analysis was performed to test the possibility of publication bias visually. The funnel plot in Figure 2 demonstrates 73 correlation coefficients (in Fisher z value) obtained from 58 primary studies.



**Figure 2.** Funnel plot

In Figure 2, the Fisher z values are on the X (horizontal) axis, and the standard error values are on the Y (vertical) axis. Accordingly, the studies included in the meta-analysis are spread on both sides of the vertical line in the funnel plot. Some studies are spread outside the funnel lines on the right and left. There are six studies filled in black in the funnel plot. This indicates that six more studies with negative correlations should be included in the present meta-analysis to prevent publication bias. Since the funnel plot provides a visual interpretation, publication bias was also tested with Rosenthal Classic fail-safe N, Orwin fail-safe N, Egger Regression Intercept and Begg and Mazumdar Rank Correlation statistical tests. The findings related to these statistics are presented below in Table 1.

**Table 1:** Publication bias

<b>Rosenthal Classic fail –safe N</b>	
Z-value for observed studies	41.34844
p-value for observed studies	0.00000
Alpha	0.05000
Tails	2
Z-value for alpha	1.95996
Number of observed studies	73
Number of missing studies that would bring p-value to > alpha	<b>2417</b>
<b>Orwin fail –safe N</b>	
Fisher Z value in observed studies	0.32900
Criterion for ‘trivial’ Fisher z	0.00001
Mean Fisher z in missing studies	0.00000
Number of missing studies needed to bring Fisher z under 0.01	<b>1621</b>
<b>Egger Regression Intercept</b>	
Intercept	0.22532
Standard error	1.35130
95% lower limit (2-tailed)	-2.46910
95% upper limit (2-tailed)	2.91974
t-value	0.16674
df	71
P-value (1-tailed)	0.43402
P-value (2-tailed)	<b>0.86805</b>
<b>Begg and Mazumdar Rank Correlation</b>	
Tau	0.08067
z value for tau	1.00962
P-value (1-tailed)	0.15634
P-value (2-tailed)	<b>0.31268</b>

The Rosenthal Classic fail-safe N revealed that the z value obtained from the 73 correlation coefficients included is 41.34844, and the p-value was 0.000 in Table 1. The fail-safe N was found to be 2417. This indicated that 2417 more studies with 0 or negative values were needed to invalidate the relationship between self-regulated learning and achievement in English lesson. The fact that the number of studies included in the meta-analysis is much smaller than the fail-safe number indicated no publication bias. Orwin's fail-safe N was also used to evaluate publication bias. Accordingly, Orwin's fail-safe N presented that the number of studies with 0 or negative values required to reduce the observed z value of 0.32900 to 0.0001 was 1621. This number was much more than the total number of primary studies, 58. It can be argued that these results supported the absence of publication bias. The findings obtained from the Egger Regression Intercept also showed that the p-value (two-tailed) was greater than 0.05 ( $p=0.86805$ ) and that there was no publication bias. Begg and Mazumdar Rank Correlation number indicated that the two-tailed p significance value was greater than 0.05, as well.

### Data Analysis

This is a correlational meta-analysis study. All values for correlation are first converted to Fisher z values. The analyses were carried out using these values. In correlational meta-analyses, Fisher z values are used instead of correlation values in the analysis phase. Therefore, these values must be converted to Pearson correlation ( $r$ ) when reporting and interpreting. Here, it is stated that both the average Fisher z value used in the sense of general effect size and the lower and upper limit values in the confidence interval should be converted to Pearson correlation coefficient (Borenstein et al., 2019; Şen & Yıldırım, 2020, p. 175). Therefore, in the present meta-analysis, the Pearson correlation coefficients obtained from primary studies were first converted to Fisher z values for analyses and then back to Pearson correlation coefficient during the reporting and interpretation phase. The transformations were made using the z to r and r to z transformations in section 6 in URL-1 (2024).

Rosenthal Classic fail-safe N, Orwin fail-safe N, Egger Regression Intercept, Begg and Mazumdar Rank Correlation analyses were performed for publication bias. Q and  $I^2$  statistics were used to test heterogeneity. The intercoder reliability formula was used to establish agreement between coders. Microsoft Excel and SPSS programs were used for this purpose. The comprehensive Meta-Analysis (CMA) program was used for correlational and moderator analyses. Fu et al. (2011) recommend that there should be at least four studies in each subgroup when performing moderator analysis. The literature demonstrates different approaches to the need for at least 4 studies (Fu et al., 2011) or 2-8 studies (Pincus et al., 2011) in each subgroup for categorical sub-variables in moderator analyses. In the present study, it was decided that at least two studies in each group should reflect the overall effect size more clearly and prevent data loss. In addition, the effect model selection was made according to the heterogeneity test. Cohen's (1992) index was used to interpret Pearson correlation coefficients. Accordingly, 0-0.10 is considered low, 0.10-0.30 is considered medium, and 0.30-0.50 is considered high correlation.

## Results

### Results related to the RQ1

Data obtained from primary studies examining the relationship between self-regulated learning and achievement in English lesson was analyzed to calculate the average Pearson correlation coefficient. The correlation values obtained according to the Fixed Effects Model (SEM) and Random Effects Model (REM), 95% confidence interval values, and Q and p values are presented in Table 2.

**Table 2:** Effect sizes (Pearson  $r$ ) and heterogeneity

Effects Model	k	$r$	z	95% confidence Interval (CI)		Heterogeneity			
				Lower Limit	Upper Limit	Q-value	df(Q)	p	$I^2$
FEM	73	0.318	45.109	0.305	0.33	1640.618	72	0.000	95.611
REM	73	0.327	9.452	0.263	0.388				

Table 2 illustrates that the overall effect size (in Pearson  $r$ ) is 0.318 according to the fixed effect model and 0.327 according to the random effect model. The heterogeneity test shows that the  $Q$  ( $df=72$ ) statistic is calculated as 1640.618 ( $p < 0.01$ ). The fact that the obtained  $Q$  value is well above 72 degrees of freedom and 0.05 confidence level in the  $X^2$  table ( $df=72$ ,  $X^2(0.05)=92.808$ ) reveals that the data is heterogeneous. The calculated  $I^2$  value is 95.611%, which indicates that the data is highly heterogeneous. The average effect size (in Pearson  $r$ ) calculated according to the random effects model indicates a moderate relationship according to the Cohen (1992) classification.

## Results related to the RQ2

### *The Relationship between Self-Regulated Learning and Achievement in English by Publication Year*

It was tested whether the relationship between self-regulated learning and achievement in English lesson differed according to the publication year. As there was only one study in 2010, 2015 and 2017, which would only reflect the current situation, the studies conducted in these years were not included in the moderator analysis. The findings are given in Table 3.

**Table 3:** Pearson correlations by publication year

Publication Year	k	$r$	z	95% CI		Heterogeneity		
				Lower Limit	Upper Limit	Q-value	df(Q)	p
2012	4	0.151	0.694	-0.271	0.524			
2013	3	0.326	6.530	0.231	0.411			
2014	4	0.117	0.641	-0.239	0.447			
2016	2	0.249	4.064	0.130	0.359			
2018	3	0.281	1.788	-0.028	0.541			
2019	2	0.431	1.765	0.231	0.750			
2020	6	0.369	2.686	0.105	0.584			
2021	4	0.366	3.363	0.159	0.542			
2022	16	0.316	3.546	0.145	0.468			
2023	15	0.338	4.655	0.201	0.462			
2024	11	0.454	4.401	0.265	0.609			
Total Between						6.290	10	0.790

Table 3 presents the average correlation values of the Pearson correlation ( $r$ ) numbers for the relationship between self-regulated learning and achievement in English lesson in terms of the years the primary studies were conducted. Accordingly, the studies conducted in 2024 have the highest correlation value with an average correlation value of  $r = 0.454$ . This result indicates a high level of correlation according to the Cohen (1992) correlation index. On the other hand, it is revealed that the lowest correlation ( $r = 0.117$ ) is in the studies conducted in 2014. The fact that the  $Q=6.290$  value in the table is well below the critical value of 18.307 at the 0.05 confidence level and 10 degrees of freedom in the  $X^2$  table and the p-value is greater than 0.05 indicates that there is no significant difference between the correlation coefficients of the studies according to their publication year ( $Q=6.290$ ;  $p>0.05$ ). This finding reveals that the year of publication is not an essential moderator in differentiating the correlation coefficients.

### *The Relationship between Self-Regulated Learning and Achievement in English by Publication Place*

Moderator analysis was performed to determine whether the study's place effectively differentiated the correlation values. Thus, primary studies were divided into Abroad and Turkey to prevent data loss and to make the moderator analysis functional. In the study conducted by Firdaus (2024), data were collected from different sample groups in both Turkey and Indonesia. Therefore, the data from the Turkey sample in this study was processed into the data set as Turkey and from the Indonesian sample group as Abroad. The findings obtained are given in Table 4.

**Table 4:** Pearson correlations by research place

Place of Research	k	r	z	95% CI		Heterogeneity		
				Lower Limit	Upper Limit	Q-value	df(Q)	p
Abroad	54	0.323	8.858	0.255	0.388			
Turkey	19	0.336	4.314	0.189	0.470			
Total Between						0.029	1	0.865

Table 4 shows that the relationship between self-regulated learning and English course success in studies conducted in Turkey ( $r=0.336$ ) is higher than in studies conducted abroad ( $r=0.323$ ). However, the relationship between self-regulated learning and achievement in English lesson is moderately positive in studies conducted in Turkey and abroad. The fact that the  $Q=0.029$  value in the table is well below the critical value of 3.841 at the 0.05 confidence level and 1 degree of freedom in the  $X^2$  table and the p-value is greater than 0.05 indicates that there is no significant difference in terms of where the studies were conducted ( $Q=0.029$ ;  $p>0.05$ ). As a result, the place where the research was conducted is not an important variable in differentiating the overall correlation value.

#### *The Relationship between Self-Regulated Learning and Achievement in English by Publication Type*

Moderator analysis was performed to determine whether the publication type variable effectively differentiated the correlation values. However, only one study was a conference publication type (see Mahadi et al., 2021), so this study was not included in the moderator analysis since it would only reflect the current situation. The findings are given in Table 5.

**Table 5:** Pearson correlations by publication type

Publication Type	k	r	z	95% CI		Heterogeneity		
				Lower Limit	Upper Limit	Q-value	df(Q)	p
Article	47	0.257	8.716	0.201	0.312			
MS Thesis	17	0.504	5.150	0.331	0.645			
Ph.D Dissertations	6	0.215	0.987	-0.070	0.468			
Undergraduate Graduation Thesis	2	0.560	1.483	-0.553	0.955			
Total Between						7.287	3	0.063

Table 5 shows that the studies included in the meta-analysis are divided into four categories: articles in scientific refereed journals, master's theses, doctoral dissertations and undergraduate graduation theses. Undergraduate graduation theses ( $r=0.560$ ) and master's theses ( $r=0.504$ ) have high a relationship. The lowest relationship is found in doctoral dissertations. The  $Q=7.287$  value in the table is below the critical value of 7.815 at the 0.05 confidence level, and 3 degrees of freedom in the  $X^2$  table, and the p-value is greater than 0.05, indicating that there is no significant difference between the effect sizes of the studies according to their publication types ( $Q=7.287$ ;  $p>0.05$ ). This finding reveals that the publication type is ineffective in differentiating the correlation values.

#### *The Relationship between Self-Regulated Learning and Achievement in English by Educational Level*

It's evident in the literature that age ranges differ across education levels across the globe. However, both in the world and in the Turkish education system, the education levels generally consist of preschool, primary school, secondary school, high school and university. In addition, in some countries (especially Iran), language education is provided through Language Institutes or Private Language Courses. Considering all these, in the present meta-analysis, education levels were divided into four categories for the moderator analysis: university, secondary school, high school and Private Language Course. As only one study (see Calero, 2012) was detected at the primary school level, it was not included in the moderator analysis. A moderator analysis was conducted to determine whether the education level effectively differentiated the correlation values. The findings are given in Table 6.

**Table 6:** Pearson correlations by educational level

Educational Level	k	r	z	95% CI		Heterogeneity		
				Lower Limit	Upper Limit	Q-value	df(Q)	p
University	44	0.288	7.917	0.219	0.353			
Secondary School	17	0.430	5.945	0.300	0.546			
High School	6	0.347	1.638	-0.071	0.661			
Private Language Institute	5	0.416	4.312	0.237	0.568			
Total Between						4.811	3	0.186

Table 6 demonstrates that the relationship between self-regulated learning and achievement in English lesson is higher at the secondary school level ( $r = 0.430$ ) than at other educational levels. The lowest relationship ( $r = 0.288$ ) is seen at the university level. However, according to the heterogeneity test results between groups, a  $Q=4.811$  value was obtained. From the  $X^2$  table, it was determined that at the 0.05 level, 3 degrees of freedom was 7.815. Since the calculated heterogeneity value is smaller than the critical value of 7.815 and the p-value is larger than 0.05, indicating no significant difference between the groups ( $Q=4.811$ ;  $p>0.05$ ). Thus, the education level is ineffective in differentiating the correlation values.

### *The Relationship between Self-Regulated Learning and Achievement in English by Language Skills*

The language skills examined in primary studies are divided into seven groups as four basic skills (writing, reading, speaking, listening), grammar, vocabulary and comprehensive English, which can be expressed as integrated skills to examine the relationship between self-regulated learning and English language skill areas. Moderator analysis was performed to determine whether the correlation values differ significantly in the English language skill area, and the findings are given in 7.

**Table 7:** Pearson correlations by language skills

Language Skill	k	r	z	95% CI		Heterogeneity		
				Lower Limit	Upper Limit	Q-value	df (Q)	p
Comprehensive English	32	0.293	5.341	0.189	0.390			
Writing	17	0.365	4.557	0.215	0.499			
Reading	7	0.424	3.891	0.221	0.592			
Speaking	5	0.485	3.199	0.202	0.694			
Vocabulary	5	0.223	3.040	0.081	0.357			
Grammar	4	0.213	1.181	-0.141	0.518			
Listening	3	0.275	2.934	0.094	0.439			
Total Between						5.573	6	0.473

Table 7 reveals the highest relationship between self-regulated learning and English speaking ( $r = 0.485$ ) and reading ( $r = 0.424$ ) skills. The lowest relationship is between self-regulated learning and grammar learning ( $r = 0.213$ ). The fact that the  $Q=5.573$  value given in the table is well below the critical value of 12.592 at the 0.05 confidence level and 6 degrees of freedom in the  $X^2$  table, and the p-value is greater than 0.05 shows that there is no significant difference between the effect sizes according to the language skill area of the studies ( $Q=5.573$ ;  $p>0.05$ ). This finding can be said that the language skill area is not an effective moderator in differentiating the correlation values.

## Discussion

The present meta-analysis study revealed a moderate positive relationship between self-regulated learning and achievement in English lesson. The literature demonstrates that the relationship between various variables and English language learning or the effect of these variables on English language learning has been addressed, and similar results have been found. For example, Fajaruddin et al. (2024) examined the relationship between

technology use and language learning. In the study where 43 effect sizes were calculated from 19 primary studies, it was revealed that a moderate relationship was detected between technology use and language learning. Similarly, Santi et al. (2021) analyzed the relationship between the reading interest of those learning English as a foreign language and vocabulary acquisition in the studies between 2010-2020. Researchers found a moderate relationship between reading interest and English vocabulary acquisition. A meta-analysis study by Uchihara et al. (2019) also found a moderate positive relationship between repetition and incidental vocabulary learning in the second language. Ergen and Kanadlı (2017), who examined the effect of self-regulated learning strategies on academic achievement, identified Science, Mathematics, Social Sciences and Language as course variables in the moderator analysis. Ergen and Kanadlı revealed that self-regulated learning strategies have a moderate effect on language learning. However, Rajić et al. (2022) examined the relationship between self-regulated learning components and the success of gifted students in learning a foreign language. The study presents the relationship between the motivation of gifted students to learn a foreign language and their personality traits. The researchers revealed a low-level positive relationship between motivation for knowledge, which is one of the self-regulated elements, and personality traits - except for emotional stability.

It can be advocated that the relationship level or effect size obtained between self-regulated learning and English learning is not at the desired level in both the current meta-analysis study and the studies conducted by Ergen and Kanadlı (2017) and Rajić et al. (2022). In the self-regulated learning approach, where a learner-centred approach is adopted, self-regulated learning is expected to elevate students' success to higher levels. However, the medium or relatively low relationship or effect obtained in these studies may be due to various reasons. The first of these is thought to be due to the fact that self-regulated procedures may not have been appropriately implemented. Second, as Jeon and Yamashita (2014) stated, based on the data from many studies, many mechanisms affect language learning. These may be anxiety, motivation, learner and teacher attitudes, affective filters, language barriers, etc.

The present meta-analysis reveals that the publication year moderator is ineffective in differentiating the correlation coefficients. Based on this, the year variable does not significantly affect the relationship between self-regulated learning and achievement in English lesson. The lowest correlations were found in studies published in 2012 and 2014. This can be due to the fact that half of the six negative correlations included in the present meta-analysis (see Calero, 2012; Farsani, 2014; Yağlı, 2014) were in these years. However, it can be stated that the relationship between self-regulated learning and English course success increased positively after 2012 - although it decreased slightly in some years. The positive relationship between self-regulated learning and achievement in English lesson can be said to have prevailed over the years. In fact, Öztop and Toptaş (2022) divided the primary studies they included in their meta-analysis into two categories according to the year of publication, before and after 2013, and reached similar results. The researchers found that the relationship between reading comprehension and mathematics success was preserved over the years.

It was found that the language skills area did not significantly differentiate the correlation coefficients in this study. However, the overall correlation coefficients in the speaking and reading skill areas were higher than in the other areas. The learners' interest in reading and speaking and their use of metacognitive skills may have been compelling in the emergence of this situation. Jeon and Yamashita (2014) found a positive moderate relationship between metacognitive skill use and reading in their study. Similarly, Elahi Shirvan et al. (2019) revealed a positive relationship between perceived communicative competence and willingness to speak. The present meta-analysis found a high-level relationship between self-regulated learning and writing skills. Scrutinizing the primary studies examining the relationship between self-regulated learning and writing skills, most of them were conducted with university students. Based on this, the self-regulated learning of university students is an important factor in developing their English writing skills.

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Appendix- Forest plot

